Invitation for Bids

Government of Nepal

Ministry of Energy, Water Resources and Irrigation

Department of Hydrology and Meteorology

Priority River Basins Flood Risk Management Project

Babarmahal, Kathmandu

Date of First Publication: 15 July 2021

Loan/Grant No. and Title: NEP-Loan 3977 and Grant 0741; Priority River Basins Flood Risk Management Project (PRBFRMP)

Contract No. and Title: **PRBFRMP/DHM/FF-01-2021**, Flood Forecasting and Early Warning System (Design, Supply and Install)

Deadline for Submission of Bids: 15 September 2021 at 1200 hours Nepal time

1. Government of Nepal has received financing from the Asian Development Bank (ADB) toward the cost of *Priority River Basins Flood Risk Management Project (PRBFRMP)* and it intends to apply part of the proceeds of this financing to payments under the contract named above. Bidding is open to bidders from eligible source countries of ADB.

2. The *Department of Hydrology and Meteorology, Nepal* ("the Purchaser") invites sealed bids from eligible bidders for design, supply and installation of Flood Forecasting and Early Warning System (FFEWS) within 3 years and subsequent operation and maintenance for 3 years in 6 river basins in the Terai region of Nepal.

3. Open competitive bidding with international advertising will be conducted in accordance with ADB's Single - Stage Two Envelope Bidding procedure and is open to all bidders from eligible countries as described in the Bidding Document.

4. A complete set of Bidding Documents in English can be downloaded from the website www.dhm.gov.np or from tenderlink (Tenderlink.com/adb) free of cost. Bidders, who choose to submit their bid, should deposit the cost of the bidding document, a non-refundable fee of NPR. 20,000 or USD 175.00 in the following revenue account as specified below

Information to deposit the cost of bidding document in Bank:

Name of the Bank: Rastriya Banijya Bank Ltd. Branch: Thamel
Province: Bagmati District: Kathmandu
Name of Office: Department of Hydrology and Meteorology.
Office Code no. : 308023501 Office Account no.: 1000200010000
Rajaswa (revenue) Shirshak no: 14229
Swift code: RBBANPKA

5. To obtain further information and inspect the Bidding Documents, bidders should contact:

Mr. Bikram Shrestha Zoowa
Title/position: PIU-Head, PRBFRMP,
Project Implementation Unit (PIU), DHM
BabarMahal, Kathmandu, Nepal

Telephone No.: 977-1-4219052 (Ext: 129)
E-mail address: prbfrmffews.dhm@gmail.com

6. Bids can be submitted online through the Tenderlink (please refer Bid Data Sheet in bid document) on or before 15 September 2021 at 1200 hours, Nepal time, together with a Bid Security as described in the Bidding Document.

7. To be qualified, bidders shall demonstrate, on the basis of the information submitted in the technical bid, that they are qualified and capable of undertaking the contract satisfactorily. Bidders shall be expected to satisfy the following specific qualification criteria. Please refer to the complete qualification criteria described in the Bidding Document for details:

- at least 5 years of supply experience of IT products and goods of similar nature
- experience in designing, establishing and operating at least two flood forecasting, telemetry and early warning systems comprising field measurement and IT systems, goods and works, whole project valued at least US$ 2.40 million, within the last 7 years
- The goods to be supplied have been in production for at least past 5 years.
- FFEWS has been sold a minimum of 2 systems of similar type and specification over the last 5 years
- Bidder to provide evidence that FFEWS system has been in satisfactory operation for a minimum of 1 year
- Submission of audited financial statements for the last three years. As a minimum, the Bidder's net worth for the last year calculated as the difference between total assets and total liabilities should be positive.
- Minimum average annual turnover of US$ 3.20 million over the last three years.
- Availability of or access to cash flow of US$ 0.40 million

Bikram Shrestha Zoowa

PIU-Head

PRBFRMP, DHM

GovernmentofNepal

Priority River Basins Flood Risk Management Project (PRBFRMP)

Bidding Document

For

Procurement of Flood Forecasting and Early Warning Systems (FFEWS)

Package No. PRBFRMP/DHM/FF-01-2021

Following Single Stage Two Envelope Bidding Procedure

Under

Open Competitive Bidding – International Advertising

Issued on: 15 July 2021

Invitation for Bids No.:PRBFRMP/DHM/FF-01

OCB No.:PRBFRMP/DHM/FF-01-2021

Purchaser:Department of Hydrology and Meteorology

Country:Nepal

Preface

This Bidding Document for Procurement of Information Technology Products and Services has been prepared by Department of Hydrology and Meteorology and is based on the Standard Bidding Document for the Procurement of Information Technology Products and Services issued by the Asian Development Bank dated August 2018.

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Section 1: Instructions to Bidders

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A. General

1. Scope of Bid

1.1 In connection with the Invitation for Bids (IFB) indicated in the Bid Data Sheet (BDS), the Purchaser, as indicated in the BDS, issues this Bidding Document for the supply of IT products and services incidental thereto as specified in Section 6 (Schedule of Requirements). The name, identification, and number of lots of the open competitive bidding (OCB) are provided in the BDS.

1.2 Throughout this Bidding Document,

(a) the term "in writing" means communicated in written (including electronic) form and delivered against receipt;

(b) except where the context requires otherwise, words indicating the singular also include the plural and words indicating the plural also include the singular; and

(c) "day" means calendar day.

2. Source of Funds

2.1 The Borrower or Recipient (hereinafter called "Borrower") indicated in the BDS has applied for or received financing (hereinafter called "funds") from the Asian Development Bank (hereinafter called "ADB") toward the cost of the project named in the BDS. The Borrower intends to apply a portion of the funds to eligible payments under the contract(s) for which this Bidding Document is issued.

2.2 Payments by ADB will be made only at the request of the Borrower and upon approval by ADB in accordance with the terms and conditions of the Financing Agreement between the Borrower and ADB (hereinafter called the Financing Agreement), and will be subject in all respects to the terms and conditions of that Financing Agreement. No party other than the Borrower shall derive any rights from the Financing Agreement or have any claim to the funds.

3. Fraud and Corruption

3.1 ADB's Anticorruption Policy (1998, as amended to date) requires Borrowers (including beneficiaries of ADB-financed activity), as well as Bidders, Suppliers, and Suppliers under ADB-financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, ADB

(a) defines, for the purposes of this provision, the terms set forth below as follows:

(i) "corrupt practice" means the offering, giving, receiving, or soliciting, directly or indirectly, anything of value to influence improperly the actions of another party;

(ii) "fraudulent practice" means any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;

(iii) "coercive practice" means impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;

(iv) "collusive practice" means an arrangement between two or more parties designed to achieve an improper purpose, including influencing improperly the actions of another party;

(v) "abuse" means theft, waste, or improper use of assets related to ADB-related activity, either committed intentionally or through reckless disregard;

(vi) "conflict of interest" means any situation in which a party has interests that could improperly influence that party's performance of official duties or responsibilities, contractual obligations, or compliance with applicable laws and regulations;

(vii) "obstructive practice" means (a) deliberately destroying, falsifying, altering, or concealing of evidence material to an ADB investigation, or deliberately making false statements to investigators, with the intent to impede an ADB investigation; (b) threatening, harassing, or intimidating any party to prevent it from disclosing its knowledge of matters relevant to a Bank investigation or from pursuing the investigation; or (c) deliberate acts intended to impede the exercise of ADB's contractual rights of audit or inspection or access to information; and

(viii) "integrity violation" is any act, as defined under ADB's Integrity Principles and Guidelines (2015, as amended from time to time), which violates ADB's Anticorruption Policy, including (i) to (vii) above and the following: violations of ADB sanctions, retaliation against whistleblowers or witnesses, and other violations of ADB's Anticorruption Policy, including failure to adhere to the highest ethical standard.

(b) will reject a proposal for award if it determines that the Bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations in competing for the Contract;

(c) will cancel the portion of the financing allocated to a contract if it determines at any time that representatives of the borrower or of a beneficiary of ADB- financing engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations during the procurement or the execution of that contract, without the borrower having taken timely and appropriate action satisfactory to ADB to remedy the situation;

(d) will impose remedial actions on a firm or an individual, at any time, in accordance with ADB's Anticorruption Policy and Integrity Principles and Guidelines, including declaring ineligible, either indefinitely or for a stated period of time, to participate[1] in ADB-financed, -administered, or -supported activities or to benefit from an ADB-financed, -administered, or -supported contract, financially or otherwise, if it at any time determines that

[1] Whether as a Contractor, Subcontractor, Consultant, Manufacturer or Supplier, or Service Provider; or in any other capacity (different names are used depending on the particular Bidding Document).

the firm or individual has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations; and

(e) will have the right to require that a provision be included in Bidding Documents and in contracts financed by ADB, requiring Bidders, suppliers, and contractors to permit ADB or its representative to inspect their accounts and records and other documents relating to the bid submission and contract performance and to have them audited by auditors appointed by ADB.

3.2 All Bidders, consultants, contractors, suppliers and other third parties engaged or involved in ADB-related activities have a duty to cooperate fully in any screening or investigation when requested by ADB to do so. Such cooperation includes, but is not limited to, the following:

(a) being available to be interviewed and replying fully and truthfully to all questions asked;

(b) providing ADB with any items requested that are within the party's control including, but not limited to, documents and other physical objects;

(c) upon written request by ADB, authorizing other related entities to release directly to ADB such information that is specifically and materially related, directly or indirectly, to the said entities or issues which are the subject of the investigation;

(d) cooperating with all reasonable requests to search or physically inspect their person and/or work areas, including files, electronic databases, and personal property used on ADB activities, or that utilizes ADB's Information and Communications Technology (ICT) resources or systems (including mobile phones, personal electronic devices, and electronic storage devices such as external disk drives);

(e) cooperating in any testing requested by ADB, including but not limited to, fingerprint identification, handwriting analysis, and physical examination and analysis; and

(f) preserving and protecting confidentiality of all information discussed with, and as required by, ADB.

3.3 All Bidders, consultants, contractors and suppliers shall ensure that, in its contract with its sub-consultants, Subcontractors, and other third parties engaged or involved in ADB-related activities, such sub-consultants, Subcontractors, and other third parties similarly undertake the foregoing duty to cooperate fully in any screening or investigation when requested by ADB to do so.

3.4 The Purchaser hereby puts the Bidder on notice that the Bidder or any joint venture partner of the Bidder (if any) may not be able to receive any payments under the Contract if the Bidder or any of its joint venture partners, as appropriate, is, or is owned (in whole or in part) by a person or entity subject to applicable sanctions.

3.5 Furthermore, Bidders shall be aware of the provision stated in Subclause 3.2 and Subclause 35.1 (a)(iii) of the General Conditions of Contract.

4. Eligible Bidders

4.1 A Bidder may be a natural person, private entity, or government-owned enterprise subject to ITB 4.5—or any combination of them with a formal intent to enter into an agreement or under an existing agreement in the form of a joint venture. In the case of a joint venture,

(a) all parties to the Joint venture shall be jointly and severally liable; and

(b) the Joint venture shall nominate a representative who shall have the authority to conduct all businesses for and on behalf of any and all the parties of the Joint venture during the bidding process

and, in the event the Joint venture is awarded the Contract, during contract execution.

4.2 A Bidder, and all parties constituting the Bidder, shall have the nationality of an eligible country, in accordance with Section 5 (Eligible Countries). A Bidder shall be deemed to have the nationality of a country if the Bidder is a citizen or is constituted, incorporated, or registered, and operates in conformity with the provisions of the laws of that country. This criterion shall also apply to the determination of the nationality of proposed Subcontractors or Suppliers for any part of the Contract, including related services.

4.3 A Bidder shall not have a conflict of interest. All Bidders found to have a conflict of interest shall be disqualified. A Bidder may be considered to be in a conflict of interest with one or more parties in this bidding process if any of, including but not limited to, the following apply:

(a) they have controlling shareholders in common; or

(b) they receive or have received any direct or indirect subsidy from any of them; or

(c) they have the same legal representative for purposes of this Bid; or

(d) they have a relationship with each other, directly or through common third parties, that puts them in a position to have access to material information about or improperly influence the Bid of another Bidder, or influence the decisions of the Purchaser regarding this bidding process; or

(e) a Bidder participates in more than one bid in this bidding process, either individually or as a partner in a Joint venture, except for alternative offers permitted under ITB 13. This will result in the disqualification of all Bids in which it is involved. However, subject to any finding of a conflict of interest in terms of ITB 4.3(a)–(d) above, this does not limit the participation of a Bidder as a Subcontractor in another bid or of a firm as a subcontractor in more than one Bid; or

(f) a Bidder, Joint venture partner, associates, parent company, or any affiliated entity, participated as a consultant in the preparation of the design or technical specifications of the IT Products and services that are the subject of the Bid; or

(g) a Bidder was affiliated with a firm or entity that has been hired (or is proposed to be hired) by the Purchaser or Borrower as Project Manager for the contract; or

(h) a Bidder would be providing goods, works, or non-consulting services resulting from or directly related to consulting services for the preparation or implementation of the project specified in the BDS ITB 2.1 that it provided or were provided by any affiliate that directly or indirectly controls, is controlled by, or is under common control with that firm.

4.4 A firm shall not be eligible to participate in any procurement activities under an ADB-financed, -administered, or -supported project while under temporary suspension or debarment by ADB pursuant to its Anticorruption Policy (see ITB 3), whether such debarment was directly imposed by ADB, or enforced by ADB pursuant to the Agreement for Mutual Enforcement of Debarment Decisions. A bid

from a temporary suspended or debarred firm will be rejected.

4.5 Government-owned enterprises in the Borrower's country shall be eligible only if they can establish that they (i) are legally and financially autonomous, (ii) operate under commercial law, and (iii) are not dependent agencies of the Purchaser.

4.6 A Bidder shall not be under suspension from Bidding by the Purchaser as the result of the execution of a Bid–Securing Declaration.

4.7 Bidders shall provide such evidence of their continued eligibility satisfactory to the Purchaser, as the Purchaser shall reasonably request.

4.8 Firms shall be excluded if by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Borrower's country prohibits any import of goods or contracting of works or services from that country or any payments to persons or entities in that country.

5. Eligible IT Products and Services

5.1 All IT products and services to be supplied under the Contract and financed by ADB shall have their country of origin in eligible source countries as defined in ITB 4.2, and all expenditures under the Contract will be limited to such IT products and services.

5.2 For the purposes of these Bidding Documents, the IT products and services means all:

(a) the required information technologies, including all information processing and communications-related hardware, software, supplies, and consumable items that the Bidder is required to supply and install under the Contract, plus all associated documentation, and all other materials and products to be supplied, installed, integrated, and made operational (collectively called "the products" in some clauses of the ITB); and

(b) the related software development, transportation, insurance, installation, customization, integration, commissioning, training, technical support, maintenance, repair, and other Services necessary for proper operation of the products to be provided by the selected Bidder and as specified in the Contract.

5.3 For the purposes of ITB 5.1 above "origin" means the place where through software development, manufacturing, or substantial and major assembly or integration of components, a commercially recognized product results that is substantially different in basic characteristics or in purpose or utility from its components.

B. Contents of Bidding Document

6. Sections of the Bidding Document

6.1 The Bidding Document consists of Parts I, II, and III, which include all the sections indicated below, and should be read in conjunction with any addenda issued in accordance with ITB 8.

PART I Bidding Procedures

- Section 1 Instructions to Bidders (ITB)
- Section 2 Bid Data Sheet (BDS)
- Section 3 Evaluation and Qualification Criteria (EQC)
- Section 4 Bidding Forms (BDF)
- Section 5 Eligible Countries (ELC)

PART II Supply Requirements

- Section 6 Schedule of Requirements (SOR)

PART III Conditions of Contract and Contract Forms

- Section 7 General Conditions of Contract (GCC)
- Section 8 Special Conditions of Contract (SCC)
- Section 9 Contract Forms (COF)

6.2 The IFB issued by the Purchaser is not part of the Bidding Document.

6.3 The Purchaser is not responsible for the completeness of the Bidding Document and its addenda, if they were not obtained directly from the source stated by the Purchaser in the IFB.

6.4 The Bidder is expected to examine all instructions, forms, terms, and specifications in the Bidding Document. Failure to furnish all information or documentation required by the Bidding Document may result in the rejection of the Bid.

7. Clarification of Bidding Document

7.1 A prospective Bidder requiring any clarification on the Bidding Document shall contact the Purchaser in writing at the Purchaser's address indicated in the BDS. The Purchaser will respond in writing to any request for clarification, provided that such request is received no later than 21 days prior to the deadline for submission of Bids. The Purchaser shall forward copies of its response to all Bidders who have acquired the Bidding Document in accordance with ITB 6.3, including a description of the inquiry but without identifying its source. If so specified in the BDS, the Purchaser shall also promptly publish its response at the web page identified in the BDS. Should the Purchaser deem it necessary to amend the Bidding Document as a result of a clarification, it shall do so following the procedure under ITB 8 and ITB 24.2.

8. Amendment of Bidding Document

8.1 At any time prior to the deadline for submission of the Bids, the Purchaser may amend the Bidding Document by issuing addenda.

8.2 Any addendum issued shall be part of the Bidding Document and shall be communicated in writing to all who have obtained the Bidding Document directly from the Purchaser in accordance with ITB 6.3. The Purchaser shall also promptly publish the addendum on the Purchaser's web page in accordance with ITB 7.1.

8.3 To give prospective Bidders reasonable time in which to take an addendum into account in preparing their Bids, the Purchaser may, at its discretion, extend the deadline for the submission of the Bids, pursuant to ITB 24.2.

C. Preparation of Bids

9. Cost of Bidding

9.1 The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Purchaser shall in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

10. Language of Bid

10.1 The Bid, as well as all correspondence and documents relating to the Bid exchanged by the Bidder and the Purchaser, shall be written in the language specified in the BDS. Supporting documents and printed literature that are part of the Bid may be in another language provided they are accompanied by an accurate translation of the relevant passages in the language specified in the BDS, in which case, for purposes of interpretation of the Bid, such translation shall govern.

11. Documents Comprising the Bid

11.1 The Bid shall comprise two envelopes submitted simultaneously, one containing the Technical Bid and the other the Price Bid, both envelopes enclosed together in an outer single envelope.

11.2 The Technical Bid submitted by the Bidder shall comprise the following:

(a) Letter of Technical Bid;

(b) Bid Security or Bid-Securing Declaration, in accordance with ITB 21;

(c) alternative Technical Bid, if permissible, in accordance with ITB 13;

(d) written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 22;

(e) documentary evidence in accordance with ITB 16, establishing the Bidder's eligibility to bid;

(f) documentary evidence in accordance with ITB 17, that the IT products and services to be supplied by the Bidder are of eligible origin;

(g) documentary evidence in accordance with ITB 18 and ITB 32, that the IT products and services conform to the Bidding Document;

(h) documentary evidence in accordance with ITB 19, establishing the Bidder's qualifications to perform the contract if its bid is accepted; and

(i) list of subcontractors, in accordance with ITB 18.4; and

(j) any other document required in the BDS.

11.3 The Price Bid submitted by the Bidder shall comprise the following:

(a) Price Bid Submission Sheet and the applicable Price Schedules,

in accordance with ITB 12, ITB 14, and ITB 15;

(b) alternative Price Bid corresponding to the alternative Technical Bid, if permissible, in accordance with ITB 13; and

(c) any other document required in the BDS.

11.4 The Bidder shall furnish in the Letter of Price Bid information on commissions and gratuities, if any, paid or to be paid to agents or any other party relating to this Bid.

12. Letter of Bid and Price Schedules

12.1 The Bidder shall submit the Letter of Technical Bid and the Letter of Price Bid using the form furnished in Section 4 (Bidding Forms). These forms must be completed without any alterations to their format, and no substitutes shall be accepted. All blank spaces shall be filled in with the information requested.

12.2 The Bidder shall submit, as part of the Price Bid, the Price Schedules for IT products and services, according to their origin as appropriate, using the forms furnished in Section 4 (Bidding Forms) and as required in the BDS.

13. Alternative Bids

13.1 Unless otherwise indicated in the BDS, alternative Bids shall not be considered.

14. Bid Prices and Discounts

14.1 The prices and discounts quoted by the Bidder in the Letter of Price Bid and in the Price Schedules shall conform to the requirements specified below.

14.2 All items in the Schedule of Requirements must be listed and priced separately in the Price Schedules. If a Price Schedule shows items listed but not priced, their prices shall be assumed to be included in the prices of other items. Items not listed in the Price Schedule shall be assumed not to be included in the Bid, and provided that the Bid is substantially responsive, the corresponding adjustment shall be applied in accordance with ITB 33.3.

14.3 The price to be quoted in the Letter of Price Bid shall be the total price of the Bid excluding any discounts offered. Absence of the total bid price in the Letter of Price Bid may result in the rejection of the Bid.

14.4 The Bidder shall quote discounts and the methodology for their application in the Letter of Price Bid.

14.5 The terms EXW, CIF, CIP, and other similar terms shall be governed by the rules prescribed in the current edition of Incoterms, published by the International Chamber of Commerce, at the date of the Invitation for Bids or as specified in the BDS.

14.6 Prices shall be quoted as specified in each Price Schedule included in Section 4 (Bidding Forms). The disaggregation of price components is required solely for the purpose of facilitating the comparison of Bids by the Purchaser. This shall not in any way limit the Purchaser's right to contract on any of the terms offered

(a) for IT products offered from within the Purchaser's country:

(i) the price of the IT products quoted EXW (ex works, ex factory, ex warehouse, ex showroom, or off-the-shelf, as applicable), including all customs duties and sales and other taxes already paid or payable on the components and raw material used in the manufacture or assembly of IT products quoted ex works or ex factory, or on the previously imported IT products of foreign origin quoted ex warehouse, ex showroom, or off-the-shelf;

(ii) sales tax and all other taxes applicable in the Purchaser's country and payable on the IT products if the Contract is awarded to the Bidder; and

(iii) the total price for the item.

(b) for IT products offered from outside the Purchaser's country:

(i) the price of the IT products quoted CIF (named port of destination), or CIP (border point), or CIP (named place of destination) in the Purchaser's country, as specified in the BDS;

(ii) the price of the IT products quoted FOB port of shipment (or FCA, as the case may be), if specified in the BDS; and

(iii) the total price for the item.

(c) for services whenever such are specified in the Schedule of Requirements:

(i) the local currency cost component of each item comprising the services; and

(ii) the foreign currency cost component of each item comprising the services, inclusive of all customs duties, sales, and other similar taxes applicable in the Purchaser's country, payable on the services, if the Contract is awarded to the Bidder.

Unless otherwise specified in the BDS, the prices must include all costs incidental to the performance of the services, as incurred by the Supplier, such as travel, subsistence, office support, communications, translation, printing of materials, etc. Costs incidental to the delivery of the services but incurred by the Purchaser or its staff, or by third parties, must be included in the price only to the extent such obligations are made explicit in these Bidding Documents (as, e.g., a requirement for the Bidder to include the travel and subsistence costs of trainees).

14.7 Prices for Recurrent Costs beyond the scope of warranty services to be incurred during the Warranty Period, shall be quoted as service prices in accordance with ITB 14.6(c) on the Price Schedule for Recurrent Costs. Recurrent costs are all-inclusive of the costs necessary items such as spare parts, software license renewals, labor, etc., needed for the continued and proper operation of the IT products and services and, if appropriate, of the Bidder's own allowance for price increases.

14.8 Prices quoted by the Bidder shall be fixed during the Bidder's performance of the Contract and not subject to variation on any account, unless otherwise specified in the BDS. A Bid submitted with an adjustable price quotation shall be treated as nonresponsive and shall be rejected, pursuant to ITB 32. If in accordance with the BDS, prices quoted by the Bidder shall be subject to adjustment during the performance of the Contract but a Bid submitted with no indexes identified in the Tables of Adjustment Data will also be treated as nonresponsive and be rejected.

14.9 If so indicated pursuant to ITB 1.1, Bids are being invited for individual contracts (lots) or for any combination of contracts (packages). Unless otherwise indicated in the BDS, prices quoted shall correspond to 100% of the items specified for each lot and to 100% of the quantities specified for each item of a lot. Bidders wishing to offer any price discount for the award of more than one Contract shall specify in their bid the price discount applicable to each package, or alternatively, to individual Contracts within the package. Price discounts shall be submitted in accordance with ITB 14.4, provided the bids for all lots are submitted and opened at the same time.

15. Currencies of Bid

15.1 Bid prices shall be quoted in the following currencies:

(a) Bidders may express their bid price in any fully convertible currency. If a Bidder wishes to be paid in a combination of amounts in different currencies, it may quote its price accordingly.

(b) If some of the expenditures for the related services are to be incurred in the borrowing country, such expenditures should be expressed in the Bid and will be payable in the Purchaser's currency.

16. Documents Establishing the Eligibility of the Bidder

16.1 To establish their eligibility in accordance with ITB 4, Bidders shall

(a) complete the eligibility declarations in the Letter of Bid, included in Section 4 (Bidding Forms); and

(b) if the Bidder is an existing or intended Joint Venture in accordance with ITB 4.1, submit a copy of the Joint Venture Agreement, or a letter of intent to enter into such an agreement. The respective document shall be signed by all legally authorized signatories of all the parties to the existing or intended Joint venture, as appropriate.

17. Documents Establishing the Eligibility of the IT Products and Services

17.1 To establish the eligibility of the IT products and services in accordance with ITB 5, Bidders shall complete the country of origin declarations in the Price Schedule Forms included in Section 4 (Bidding Forms).

18. Documents Establishing the Conformity of the IT Products and

18.1 To establish the conformity of the IT products and services to the Bidding Document, the Bidder shall furnish as part of its Bid documentary evidence that the IT products and services conform to the requirements specified in Section 6 (Schedule of Requirements).

Services to the Bidding Document

18.2 The documentary evidence may be in the form of literature, drawings, or data, and shall consist of a detailed item-by-item description of the essential technical and performance characteristics of the IT products and services, demonstrating substantial responsiveness of the IT products and services to those requirements, and if applicable, a statement of deviations and exceptions to the provisions of Section 6 (Schedule of Requirements).

18.3 Standards for workmanship, process, material, and equipment, as well as references to brand names or catalogue numbers specified by the Purchaser in Section 6 (Schedule of Requirements), are intended to be descriptive only and not restrictive. The Bidder may offer other standards of quality, brand names, and/or catalogue numbers, provided that it demonstrates, to the Purchaser's satisfaction, that the substitutions ensure substantial equivalence or are superior to those specified in Section 6 (Schedule of Requirements).

18.4 For major items of IT products and services as listed by the Purchaser in Section 3 (Evaluation and Qualification Criteria), which the Bidder intends to purchase or subcontract, the Bidder shall give details of the name and nationality of the proposed Subcontractors, including manufacturers, for each of those items. In addition, the Bidder shall include in its bid information establishing compliance with the requirements specified by the Purchaser for these items. Quoted rates and prices will be deemed to apply to whichever Subcontractor is appointed, and no adjustment of the rates and prices will be permitted.

19. Documents Establishing the Qualifications of the Bidder

19.1 The documentary evidence of the Bidder's qualifications to perform the contract, if its bid is accepted, shall establish to the Purchaser's satisfaction that the Bidder meets each of the qualification criterion specified in Section 3 (Evaluation and Qualification Criteria).

19.2 If so required in the BDS, a Bidder that does not manufacture or produce the IT products and services it offers to supply shall submit the Manufacturer's Authorization using the form included in Section 4 (Bidding Forms) to demonstrate that it has been duly authorized by the manufacturer or producer of the IT products and services to supply these IT products and services in the Purchaser's country.

19.3 If so required in the BDS, a Bidder that does not conduct business within the Purchaser's country shall submit evidence that it will be represented by an agent in the country equipped and able to carry out the Supplier's maintenance, repair, and spare parts stocking obligations prescribed in the Conditions of Contract and/or Technical Specifications.

20. Period of Validity of Bids

20.1 Bids shall remain valid for the period specified in the BDS after the bid submission deadline date prescribed by the Purchaser. A Bid valid for a shorter period shall be rejected by the Purchaser as nonresponsive.

20.2 In exceptional circumstances, prior to the expiration of the bid validity period, the Purchaser may request Bidders to extend the period of validity of their Bids. The request and the responses shall be made in writing. If a Bid Security is requested in accordance with ITB 21, it

shall also be extended 28 days beyond the deadline of the extended bid validity and bid security validity issued by the Purchaser. A Bidder may refuse the request without forfeiting its Bid Security. A Bidder granting the request shall not be required or permitted to modify its Bid.

21. Bid Security/ Bid-Securing Declaration

21.1 Unless otherwise specified in the BDS, the Bidder shall furnish as part of its Bid, in original form, either a Bid-Securing Declaration or a bid security as specified in the BDS. In the case of a bid security, the amount and currency shall be as specified in the BDS.

21.2 If a Bid-Securing Declaration is required pursuant to ITB 21.1, it shall use the form included in Section 4 (Bidding Forms). The Purchaser will declare a Bidder ineligible to be awarded a Contract for a specified period of time, as indicated in the BDS, if a Bid-Securing Declaration is executed.

21.3 If a bid security is specified pursuant to ITB 21.1, the bid security shall be, at the Bidder's option, in any of the following forms:

(a) an unconditional bank guarantee,

(b) an irrevocable letter of credit,

(c) a cashier's or certified check, or

(d) SWIFT message in the form of MT760,

all from a reputable source from an eligible country as described in Section 5 (Eligible Countries). In the case of a bank guarantee, the bid security shall be submitted either using the Bid Security Form included in Section 4 (Bidding Forms) or another form acceptable to the Purchaser. The form must include the complete name of the Bidder. The bid security shall be valid for 28 days beyond the original validity period of the bid, or beyond any period of extension if requested under ITB 20.2.

21.4 Unless otherwise specified in the BDS, any bid not accompanied by a substantially compliant bid security or Bid-Securing Declaration, if one is required in accordance with ITB 21.1, shall be rejected by the Purchaser as nonresponsive.

21.5 If a bid security is specified pursuant to ITB 21.1, the bid security of unsuccessful Bidders shall be returned promptly upon signing of the contract with the successful Bidder pursuant to ITB 46.

21.6 If a bid security is specified pursuant to ITB 21.1, the bid security of the successful Bidder shall be returned promptly once the successful Bidder has signed the Contract Agreement and furnished the required Performance Security.

21.7 The bid security may be forfeited or the Bid-Securing Declaration executed, if

(a) notwithstanding ITB 26.3, a Bidder withdraws its bid during the period of bid validity specified by the Bidder on the Letter of Technical Bid, except as provided in ITB 20.2; or

(b) the successful Bidder fails to

(i) sign the Contract Agreement in accordance with ITB 46;

(ii) furnish a Performance Security in accordance with ITB 47; or

(iii) accept the arithmetical corrections of its bid in accordance with ITB 36.

21.8 If the bid security is required as per ITB 21.1, the bid security of a Joint venture shall be in the name of the Joint venture that submits the Bid. If the Joint venture has not been legally constituted at the time of bidding, the bid security shall be in the name of any or all of the Joint venture partners. If the Bid-Securing Declaration is required as per ITB 21.1, the Bid-Securing Declaration of a Joint venture shall be in the name of the Joint venture that submits the Bid. If the Joint venture has not been legally constituted at the time of bidding, the Bid- Securing Declaration shall be in the names of all future partners as named in the letter of intent referred to in ITB 4.1.

22. Format and Signing of Bid

22.1 The Bidder shall prepare one original set of the Technical Bid and one original set of the Price Bid as described in ITB 11 and clearly mark each “ORIGINAL - TECHNICAL BID” and “ORIGINAL - PRICE BID”. In addition, the Bidder shall submit copies of the Technical Bid and the Price Bid, in the number specified in the BDS and clearly mark them “COPY NO… - TECHNICAL BID” and “COPY NO…. - PRICE BID”. In the event of any discrepancy between the original and the copies, the original shall prevail.

22.2 The original and all copies of the Bid shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of the Bidder. This authorization shall consist of a written confirmation as specified in the BDS and shall be attached to the Bid. The name and position held by each person signing the authorization must be typed or printed below the signature. If a Bidder submits a deficient authorization, the Bid shall not be rejected in the first instance. The Purchaser shall request the Bidder to submit an acceptable authorization within the number of days as specified in the BDS. Failure to provide an acceptable authorization within the period stated in the Purchaser’s request shall cause the rejection of the Bid. If either the Letter of Technical Bid or Letter of Price Bid or the Bid-Securing Declaration (if applicable) is not signed, the Bid shall be rejected.

22.3 A Bid submitted by a Joint venture shall be signed so as to be legally binding on all partners.

22.4 Any amendments such as interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the bid.

22.5 For electronic bid submission, procedures for format and signing of the bid shall be as specified in the BDS.

D. Submission and Opening of Bids

23. Sealing and Marking of Bids

23.1 Procedures for submission, sealing, and marking are as follows:

(a) Bidders submitting Bids by mail or by hand shall enclose the original of the Technical Bid, the original of the Price Bid, and each copy of the Technical Bid and each copy of the Price Bid, including alternative Bids, if permitted in accordance with ITB 13, in separate sealed envelopes, duly marking the envelopes as "ORIGINAL - TECHNICAL BID", "ORIGINAL - PRICE BID" and "COPY NO… - TECHNICAL BID" and "COPY NO…. - PRICE BID", as appropriate. These envelopes containing the original and the copies shall then be enclosed in one single envelope. The rest of the procedure shall be in accordance with ITB 23.2 to ITB 23.6.

(b) If electronic bid submission is used, Bidders shall follow the procedures specified in the BDS. In such case, manual bid submission shall not be permitted.

23.2 The inner and outer envelopes shall

(a) bear the name and address of the Bidder;

(b) be addressed to the Purchaser in accordance with ITB 24.1; and

(c) bear the specific identification of this bidding process pursuant to ITB 1.1 and any additional identification marks as specified in the BDS.

23.3 The outer envelopes and the inner envelopes containing the Technical Bids shall bear a warning not to open before the time and date for the opening of Technical Bids, in accordance with ITB 27.1.

23.4 The inner envelopes containing the Price Bids shall bear a warning not to open until advised by the Purchaser in accordance with ITB 27.2.

23.5 If all envelopes are not sealed and marked as required, the Purchaser will assume no responsibility for the misplacement or premature opening of the Bid.

23.6 Alternative Bids, if permissible in accordance with ITB 13, shall be prepared, sealed, marked, and delivered in accordance with the provisions of ITB 22 and ITB 23, with the inner envelopes marked in addition "ALTERNATIVE NO…." as appropriate.

24. Deadline for Submission of Bids

24.1 Bids must be received by the Purchaser at the address (or electronic portal) and no later than the date and time indicated in the BDS.

24.2 The Purchaser may, at its discretion, extend the deadline for the submission of Bids by amending the Bidding Document in accordance with ITB 8, in which case all rights and obligations of the Purchaser and Bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.

25. Late Bids

25.1 The Purchaser shall not consider any Bid that arrives after the deadline for submission of Bids, in accordance with ITB 24. Any Bid received by the Purchaser after the deadline for submission of Bids shall be declared late, rejected, and returned unopened to the

Bidder.

26. Withdrawal, Substitution, and Modification of Bids

26.1 A Bidder may withdraw, substitute, or modify its Bid after it has been submitted by sending a written notice, duly signed by an authorized representative, and shall include a copy of the authorization in accordance with ITB 22.2 (except for withdrawal notices, which do not require copies). The corresponding substitution or modification of the bid must accompany the respective written notice. All notices must be

(a) prepared and submitted in accordance with ITB 22 and ITB 23 (except for withdrawal notices, which do not require copies), and in addition, the respective inner and outer envelopes shall be clearly marked "WITHDRAWAL," "SUBSTITUTION," "MODIFICATION;" and

(b) received by the Purchaser prior to the deadline prescribed for submission of bids, in accordance with ITB 24.

26.2 Bids requested to be withdrawn in accordance with ITB 26.1 shall be returned unopened to the Bidders.

26.3 No Bid may be withdrawn, substituted, or modified in the interval between the deadline for submission of bids and the expiration of the period of bid validity specified by the Bidder on the Letter of Technical Bid or any extension thereof.

26.4 If electronic bid submission is used, Bidders shall follow the procedures for withdrawal, substitution, and modification specified in the BDS.

27. Bid Opening

27.1 The Purchaser shall open the Technical Bids in public at the address, on the date and time specified in the BDS in the presence of Bidders' designated representatives and anyone who chooses to attend. Any specific electronic bid opening procedures required if electronic bidding is permitted in accordance with ITB 23.1(b), shall be as specified in the BDS.

27.2 The Price Bids will remain unopened and will be held in custody of the Purchaser until the time of opening of the Price Bids. The date, time, and location of the opening of Price Bids will be advised in writing by the Purchaser. If the Technical Bid and the Price Bid are submitted together in one envelope, the Purchaser may reject the Bid. Alternatively, the Price Bid may be immediately resealed for later evaluation.

27.3 First, envelopes marked "WITHDRAWAL" shall be opened, read out, and recorded, and the envelope containing the corresponding bid shall not be opened, but returned to the Bidder. No bid withdrawal shall be permitted unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is read out at bid opening.

27.4 Next, outer envelopes marked "SUBSTITUTION" shall be opened. The inner envelopes containing the Substitution Technical Bid and/or Substitution Price Bid shall be exchanged for the corresponding envelopes being substituted, which are to be returned to the Bidder unopened. Only the Substitution Technical Bid, if any, shall be

opened, read out, and recorded. Substitution Price Bid will remain unopened in accordance with ITB 27.2. No envelope shall be substituted unless the corresponding substitution notice contains a valid authorization to request the substitution and is read out and recorded at bid opening.

27.5 Next, outer envelopes marked “MODIFICATION” shall be opened. No Technical Bid and/or Price Bid shall be modified unless the corresponding modification notice contains a valid authorization to request the modification and is read out and recorded at the opening of Technical Bids. Only the Technical Bids, both Original as well as Modification, are to be opened, read out, and recorded at the opening. Price Bids, both Original as well as Modification, will remain unopened in accordance with ITB 27.2.

27.6 All other envelopes holding the Technical Bids shall be opened one at a time, and the following read out and recorded

(a) the name of the Bidder;

(b) whether there is a modification or substitution;

(c) the presence of a bid security or a Bid-Securing Declaration, if required; and

(d) any other details as the Purchaser may consider appropriate.

Only Technical Bids and alternative Technical Bids read out and recorded at bid opening shall be considered for evaluation. Unless otherwise specified in the BDS, all pages of the Letter of Technical Bid are to be initialed by at least three representatives of the Purchaser attending the bid opening. No Bid shall be rejected at the opening of Technical Bids except for late bids, in accordance with ITB 25.1.

27.7 The Purchaser shall prepare a record of the opening of Technical Bids that shall include, as a minimum: the name of the Bidder and whether there is a withdrawal, substitution, modification, or alternative offer; and the presence or absence of a bid security or a Bid-Securing Declaration, if one was required. The Bidders’ representatives who are present shall be requested to sign the record. The omission of a Bidder’s signature on the record shall not invalidate the contents and effect of the record. A copy of the record shall be distributed to all Bidders.

27.8 At the end of the evaluation of the Technical Bids, the Purchaser will invite bidders who have submitted substantially responsive Technical Bids and who have been determined as being qualified for award to attend the opening of the Price Bids. The date, time, and location of the opening of Price Bids will be advised in writing by the Purchaser. Bidders shall be given reasonable notice of the opening of Price Bids.

27.9 The Purchaser will notify Bidders in writing who have been rejected on the grounds of being substantially nonresponsive to the requirements of the Bidding Document and return their Price Bids unopened.

27.10 The Purchaser shall conduct the opening of Price Bids of all Bidders

who submitted substantially responsive Technical Bids, in the presence of Bidders` representatives who choose to attend at the address, on the date, and time specified by the Purchaser. The Bidder's representatives who are present shall be requested to sign a register evidencing their attendance.

27.11 All envelopes containing Price Bids shall be opened one at a time and the following read out and recorded

(a) the name of the Bidder;

(b) whether there is a modification or substitution;

(c) the Bid Prices, including any discounts and alternative offers; and

(d) any other details as the Purchaser may consider appropriate.

Only Price Bids, discounts, and alternative offers read out and recorded during the opening of Price Bids shall be considered for evaluation. Unless otherwise specified in the BDS, all pages of the Price Bid Submission Sheet and Price Schedules are to be initialed by at least three representatives of the Purchaser attending bid the opening. No Bid shall be rejected at the opening of Price Bids.

27.12 The Purchaser shall prepare a record of the opening of Price Bids that shall include, as a minimum: the name of the Bidder, the Bid Price (per lot if applicable), any discounts, and alternative offers. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record. A copy of the record shall be distributed to all Bidders who submitted bids on time, and posted online when electronic bidding is permitted.

E. Evaluation and Comparison of Bids

28. Confidentiality

28.1 Information relating to the examination, evaluation, comparison, and postqualification of Bids, and recommendation of contract award, shall not be disclosed to Bidders or any other persons not officially concerned with such process until the publication of Contract award.

28.2 Any attempt by a Bidder to influence the Purchaser in the examination, evaluation, comparison, and postqualification of the Bids or Contract award decisions may result in the rejection of its Bid.

28.3 Notwithstanding ITB 28.2, from the time of opening the Technical Bids to the time of Contract award, if any Bidder wishes to contact the Purchaser on any matter related to the bidding process, it should do so in writing.

29. Clarification of Bids

29.1 To assist in the examination, evaluation, comparison, and postqualification of the bids, the Purchaser may, at its discretion, ask any Bidder for a clarification of its bid. Any clarification submitted by a Bidder with regard to its bid and that is not in response to a request by the Purchaser shall not be considered. The Purchaser's request

for clarification and the response shall be in writing. No change in the prices or substance of the bid shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the Purchaser in the evaluation of the Price bids, in accordance with ITB 33.

29.2 If a Bidder does not provide clarifications on its Bid by the date and time set in the Purchaser's request for clarification, its bid may be rejected.

30. Deviations, Reservations, and Omissions

30.1 During the evaluation of Bids, the following definitions apply:

(a) "Deviation" is a departure from the requirements specified in the Bidding Document;

(b) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Document; and

(c) "Omission" is the failure to submit part or all of the information or documentation required in the Bidding Document.

31. Examination of Technical Bids

31.1 The Purchaser shall examine the Technical Bid to confirm that all documents and technical documentation requested in ITB 11.2 have been provided, and to determine the completeness of each document submitted.

31.2 The Purchaser shall use the criteria and methodologies listed in this ITB and Section 3 (Evaluation and Qualification Criteria). No other evaluation criteria or methodologies shall be permitted. By applying the criteria and methodologies the Purchaser shall determine the Most Advantageous Bid.

Preliminary Examination

31.3 The Purchaser will examine the bids, to determine whether they have been properly signed, whether required securities have been furnished, and are substantially complete (e.g., not missing key parts of the bid or silent on excessively large portions of the technical requirements). In the case where a prequalification process was undertaken for the Contract(s) for which these bidding documents have been issued, the Purchaser will ensure that each bid is from a prequalified bidder and that, in the case of a Joint Venture, partners and structure of the Joint Venture are unchanged from those in the prequalification.

Technical Evaluation

31.4 The Purchaser will examine the information supplied by the Bidders pursuant to ITB 11 and ITB 16, and in response to other requirements in the Bidding document, taking into account the following factors:

(a) overall completeness and compliance with, and deviations from, the Section 6 (Schedule of Requirements);

(b) type, quantity, quality, and long-term availability of maintenance services and of any critical consumable items necessary for the operation of the IT products;

(c) any other relevant technical factors that the Purchaser deems

necessary or prudent to take into consideration;

(d) any proposed deviations in the bid to the contractual and technical provisions stipulated in the bidding documents.

31.5 If specified in the BDS, the Purchaser's evaluation of responsive Bids will take into account technical factors, in addition to cost factors. An Evaluated Bid Score (B) will be calculated for each responsive Bid using the formula, specified in Section 3 (Evaluation and Qualification Criteria), which permits a comprehensive assessment of the Bid cost and the technical merits of each Bid.

31.6 Where alternative technical solutions have been allowed in accordance with ITB 13, and offered by the Bidder, the Purchaser will make a similar evaluation of the alternatives. Where alternatives have not been allowed but have been offered, they shall be ignored.

32. Responsiveness of Technical Bid

32.1 The Purchaser's determination of a Technical Bid's responsiveness is to be based on the contents of the Technical Bid itself, as defined in ITB 11.

32.2 A substantially responsive Technical Bid is one that meets the requirements of the Bidding Document without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that,

(a) if accepted, would

(i) affect in any substantial way the scope, quality, or performance of the IT products and services specified in Section 6 (Schedule of Requirements); or

(ii) limits in any substantial way, inconsistent with the Bidding Document, the Purchaser's rights or the Bidder's obligations under the proposed Contract; or

(b) if rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive Technical bids.

32.3 The Purchaser shall examine the technical aspects of the Bids in particular, to confirm that all requirements of Section 6 (Schedule of Requirements) have been met without any material deviation, reservation, or omission.

32.4 If a Technical Bid is not substantially responsive to the requirements of the Bidding Document, it shall not be considered further and be rejected by the Purchaser. The Bidder shall not be permitted to correct or withdraw material deviation, reservation, or omission once bids have been opened.

33. Nonmaterial Nonconformities

33.1 Provided that a Technical Bid is substantially responsive, the Purchaser may waive nonconformities in the bid that do not constitute a material deviation, reservation, or omission.

33.2 Provided that a Technical Bid is substantially responsive, the Purchaser may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities or omissions in the Technical Bid

related to documentation requirements. Requesting information or documentation on such nonconformities shall not be related to any aspect of the Price Bid of the Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.

33.3 Provided that a Technical Bid is substantially responsive, the Purchaser shall rectify quantifiable nonmaterial nonconformities or omissions related to the Bid Price. To this effect, the Bid Price shall be adjusted, for comparison purposes only, to reflect the price of the missing or nonconforming item or component. The adjustment shall be made using the method indicated in Section 3 (Evaluation and Qualification Criteria).

34. Qualification of the Bidder

34.1 The Purchaser shall determine to its satisfaction during the evaluation of Technical Bids whether Bidders meets the qualifying criteria specified in Section 3 (Evaluation and Qualification Criteria).

34.2 The determination shall be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to ITB 19. Unless permitted in the BDS, the determination shall not take into consideration the qualifications of other firms such as the Bidder's subsidiaries, parent entities, affiliates, Subcontractors, or any other firm(s) different from the Bidder.

34.3 An affirmative determination shall be a prerequisite for the opening and evaluation of a Bidder's Price Bid. The Purchaser reserves the right to reject the bid of any bidder found to be in circumstances described in GCC 35.2. A negative determination shall result into the disqualification of the Bid.

35. Examination of Price Bids

35.1 Following the opening of Price Bids, the Purchaser shall examine the Price Bids to confirm that all documents and financial documentation requested in ITB 11.5 have been provided, and to determine the completeness of each document submitted.

35.2 The Purchaser shall confirm that the following documents and information have been provided in the Price Bid. If any of these documents or information is missing, the offer shall be rejected:

(a) Letter of Price Bid in accordance with ITB 12.1; and

(b) Price Schedules, in accordance with ITB 12, ITB 14, and ITB 15.

36. Correction of Arithmetical Errors

36.1 During the evaluation of Price Bids, the Purchaser shall correct arithmetical errors on the following basis:

(a) If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected, unless in the opinion of the Purchaser there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price shall be corrected.

(b) If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected.

(c) If there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) and (b) above.

36.2 If the Bidder that submitted the Most Advantageous Bid does not accept the correction of errors, its Bid shall be rejected and its bid security may be forfeited, or its Bid-Securing Declaration executed.

37. Conversion to Single Currency

37.1 For evaluation and comparison purposes, the currency(ies) of the Bid shall be converted into a single currency as specified in the BDS.

38. Domestic Preference

38.1 Unless otherwise specified in the BDS, domestic preference shall not apply.

39. Evaluation and Comparison of Price Bids

39.1 The Purchaser shall use the criteria and methodologies listed in this ITB and Section 3 (Evaluation and Qualification Criteria). No other evaluation criteria or methodologies shall be permitted. By applying the criteria and methodologies the Purchaser shall determine the Most Advantageous Bid.

Economic Evaluation

39.2 To evaluate a Price Bid, the Purchaser shall consider the following:

(a) the bid price as quoted in accordance with ITB 14;

(b) price adjustment for correction of arithmetic errors in accordance with ITB 36.1;

(c) price adjustment due to discounts offered in accordance with ITB 14.4;

(d) adjustment for nonmaterial nonconformities in accordance with ITB 33.3;

(e) assessment whether the bid is abnormally low in accordance with ITB 40;

(f) price adjustment due to application of the evaluation criteria specified in Section 3 (Evaluation and Qualification Criteria), including factors related to the characteristics, performance, and terms and conditions of purchase of the IT products and services, which have been expressed in monetary terms; and

(g) converting the amount resulting from applying (a) to (c) above, if relevant, to a single currency in accordance with ITB 37.

39.3 The Purchaser's evaluation of a bid will exclude and not take into account,

(a) in the case of IT products offered from within the Purchaser's country, all sales tax and all other taxes, applicable in the Purchaser's country and payable on the IT products if the Contract is awarded to the Bidder;

(b) in the case of IT products offered from outside the Purchaser's country, all customs duties, sales tax, and other taxes, applicable in the Purchaser's country and payable on the IT

products if the Contract is awarded to the Bidder; and

(c) any allowance for price adjustment during the period of performance of the Contract, if provided in the Bid.

39.4 If the Bidding Document allows Bidders to quote separate prices for different lots (contracts), and the award to a single Bidder of multiple lots (contracts), the methodology to determine the price combinations offering optimum value for money, including any discounts offered in the Bid Submission Sheet, is specified in Section 3 (Evaluation and Qualification Criteria).

39.5 The Purchaser shall compare all substantially responsive Bids to determine the Most Advantageous Bid.

40. Abnormally Low Bids

40.1 An abnormally low bid is one where the bid price, in combination with other elements of the bid, appears to be so low that it raises concerns as to the capability of the Bidder to perform the contract for the offered bid price.

40.2 When the offered bid price appears to be abnormally low, the Purchaser shall undertake a three-step review process as follows:

(a) identify abnormally low costs and unit rates by comparing them with the engineer's estimates, other substantially responsive bids, or recently awarded similar contracts;

(b) clarify and analyze the bidder's resource inputs and pricing, including overheads, contingencies and profit margins; and

(c) decide whether to accept or reject the bid.

40.3 With regard to ITB 40.2 (b) above, the Purchaser shall seek written explanation of the reasons for proposed price or costs from the bidder, including a detailed analysis of its bid prices by reference to the scope, proposed methodology, schedule, and allocation of risks and responsibilities. This may also include information regarding the economy of the manufacturing process, the services provided, the technical solutions chosen or any exceptionally favorable conditions available to the bidder for the supply of the IT products and services or for the execution of the work; or the originality of the work, supplies, or services proposed.

40.4 After examining the explanation given and the detailed price analyses presented by the bidder, the Purchaser may

(a) accept the bid, if the evidence provided satisfactorily accounts for the low bid price and costs, in which case the bid is not considered abnormally low;

(b) accept the bid, but require that the amount of the performance security be increased at the expense of the bidder to a level sufficient to protect the Purchaser against financial loss. The amount of the performance security shall generally be not more than 20% of the contract price; or

(c) reject the bid if the evidence provided does not satisfactorily account for the low bid price, and make a similar determination for the next ranked bid, if required.

41. Purchaser's Right to Accept Any Bid, and to Reject Any or All Bids

41.1 The Purchaser reserves the right to accept or reject any Bid, and to annul the bidding process and reject all bids at any time prior to Contract award, without thereby incurring any liability to the Bidders. In case of annulment, all Bids submitted and specifically, bid securities, shall be promptly returned to the Bidders.

42. Notice of Intention for Award of Contract

42.1 If Standstill provisions apply as specified in the BDS, the standstill period shall be defined in the BDS to specify the duration subsequent to notification of intention for award of contract (before making the actual contract award) within which any unsuccessful bidder can challenge the proposed award.

F. Award of Contract

43. Award Criteria

43.1 The Purchaser shall award the Contract to the Bidder whose offer has been determined successful in line with ITB 39 to ITB 40 above.

44. Purchaser's Right to Vary Quantities at Time of Award

44.1 At the time the Contract is awarded, the Purchaser reserves the right to increase or decrease the quantity of IT products and services originally specified in Section 6 (Schedule of Requirements), provided this does not exceed the percentages indicated in the BDS, and without any change in the unit prices or other terms and conditions of the Bid and the Bidding Document.

45. Notification of Award

45.1 Prior to the expiration of the period of bid validity and upon expiry of the standstill period specified in ITB 42.1, or upon satisfactory resolution of a complaint filed within standstill period, if applicable, the Purchaser shall transmit the Notification of Award using the form included in Section 9 (Contract Forms) to the successful Bidder, in writing, that its Bid has been accepted. At the same time, the Purchaser shall also notify all other Bidders of the results of the bidding.

45.2 Unless standstill period applies, upon notification of award, unsuccessful Bidders may request in writing to the Purchaser for a debriefing seeking explanations on the grounds on which their Bids were not selected. The Purchaser shall promptly respond in writing and/or in a debriefing meeting to any unsuccessful Bidder who, after publication of contract award, requests a debriefing.

45.3 Until a formal contract is prepared and executed, the notification of award shall constitute a binding Contract

45.4 Within 2 weeks of the award of contract or expiry of the standstill period, where such period applies, or, if a complaint has been filed within the standstill period, upon receipt of ADB's confirmation of satisfactory resolution of the complaint, the borrower shall publish in an English language newspaper or widely known and freely accessible website the results identifying the bid and lot or package numbers, as applicable and the following information:

(a) name of each Bidder who submitted a Bid;

(b) bid prices as read out at bid opening;

(c) name and evaluated prices of each Bid that was evaluated;

(d) name of Bidders whose Bids were rejected and the reasons for their rejection; and

(e) name of the winning Bidder, and the price it offered, as well as the duration and summary scope of the contract awarded.

46. Signing of Contract

46.1 Promptly after notification, the Purchaser shall send to the successful Bidder the Contract Agreement.

46.2 Within 28 days of receipt of the Contract Agreement, the successful Bidder shall sign, date, and return it to the Purchaser.

47. Performance Security

47.1 Within 28 days of the receipt of notification of award from the Purchaser, the successful Bidder shall furnish the Performance Security in accordance with the GCC, subject to ITB 40.4, using for that purpose the Performance Security Form included in Section 9 (Contract Forms), or another form acceptable to the Purchaser. If the institution issuing the performance security is located outside the country of the Purchaser, it shall have a correspondent financial institution located in the country of the Purchaser to make it enforceable.

47.2 Failure of the successful Bidder to submit the abovementioned Performance Security or sign the Contract Agreement shall constitute sufficient grounds for the annulment of the award and forfeiture of the bid security or execution of the Bid-Securing Declaration. In that event, the Purchaser may award the Contract to the next Most Advantageous Bidder whose offer is substantially responsive and is determined by the Purchaser to be qualified to perform the Contract satisfactorily.

48. Bidding-Related Complaints

48.1 The procedures for dealing with Bidding-Related Complaints arising out of this bidding process are specified in the BDS.

Section 2: Bid Data Sheet

A. General	
ITB 1.1	The number of the Invitation for Bids (IFB) is: PRBFRMP/DHM/FF-01
ITB 1.1	The Purchaser is: Department of Hydrology and Meteorology, Kathmandu, Nepal
ITB 1.1	The name of the open competitive bidding (OCB) is: Flood Forecasting and Early Warning System (Design supply and install). The identification number of the OCB is: PRBFRMP/DHM/FF-01-2021 The number and identification of lots comprising this OCB is: None
ITB 2.1	The Borrower is: Nepal
ITB 2.1	The name of the Project is: Priority River Basins Flood Risk Management Project (PRBFRMP)
B. Contents of Bidding Document	
ITB 7.1	Any request for clarification shall be sent 14 days before the bid submission deadline through the Tenderlink portal: https://www.tenderlink.com/adb, and the Employer will respond through Tenderlink. The tender can be found by searching PRBFRMP/DHM/FF-01-2021. Technical Clarifications on the use of Tenderlink can be mailed to support team at Support@tenderlink.com. Such clarifications are not subject to the above clarification deadline.
C. Preparation of Bids	
ITB 10.1	The language of the Bid is: English
ITB 11.1	ITB 11.1 is replaced as follows: "The Bid shall comprise of two electronic documents submitted simultaneously, one containing the Technical Bid and the other the Price Bid."
ITB 11.2 (j)	The Bidder shall submit with its Technical Bid the following additional documents: **For national bidders;** 1. Notarized copy of company registration certificate 2. Notarized copy of VAT/ PAN registration for national and resident foreign Bidder 3. Notarized copy of tax clearance certificate for national and resident foreign Bidder. **For foreign bidders**; copy of Income Tax Return or similar document issued by the appropriate authority in their home countries. **For both national and foreign bidders;** 1. The bid addendums issued by Purchaser (if any) duly signed by the Authorized

	representative of the bidder. 2. Technical Proposal shall also include a Health and Safety COVID-19 Plan (HS-C19 Plan), in accordance with the relevant government regulations and guidelines on COVID-19 prevention and control of Nepal or in the absence thereof, to international good practice guidelines such as the Considerations for Public Health and Social Measures in the Workplace in the Context of COVID-19 (2020) published by the World Health Organization, Geneva, and available in https://www.who.int/publications-detail/considerations-for-public-health-and-social-measures-in-the-workplace-in-the-context-of-covid-19 **Any bid not accompanied by the HS-C19 Plan shall be rejected by the Employer as nonresponsive.** If a Bidder does not submit or submits a HS-C19 Plan that does not provide sufficient information in accordance to the required submission information listed in the bidding document by the Employer, the Employer shall issue a clarification to request for HS-C19 Plan or further information on the submitted HS-C19 Plan from the Bidder. The Bidder must submit the requested information within 10 working days of receiving such a request. Failure to provide a satisfactory response to the request for further information within the prescribed period of receiving such a request shall cause the rejection of the Bid.
ITB 11.3 (c)	The Bidder shall submit with its Price Bid the following additional documents: None
ITB 12.2	The units and rates in figures entered into the Price Schedules should be typewritten or if written by hand, must be in print form. Price Schedules not presented accordingly may be considered nonresponsive.
ITB 13.1	Alternative Bids shall not be permitted.
ITB 14.5	The Incoterms edition is: 2010
ITB 14.6(b)(i)	For IT products, goods and services offered from outside the Purchaser's country, the Bidder shall quote prices using the following Incoterms: CIP Kathmandu for office based equipment and CIP actual place of installation in the 6 river basins of Terai region in Nepal.
ITB 14.6(b)(ii)	In addition to the above, the Bidder shall quote prices for IT products, goods and services offered from outside the Purchaser's country using the following Incoterms: None
ITB 14.8	The prices quoted by the Bidder shall not be adjustable.
ITB 14.9	Not Applicable
ITB 19.2	The Bidder is required to submit documentation or Manufacturer's Authorization to substantiate that it is an authorized dealer, distributor, or reseller of the IT products and goods being procured.
ITB 19.3	The Bidder is <u>not</u> required to include with its bid, evidence that it will be represented by

	an Agent in the Purchaser's country.
ITB 20.1	The bid validity period shall be 180 days.
ITB 21.1	The Bidder shall furnish a scanned copy of the original bid security in the amount of **USD 119,000** or NPR Equivalent. If the financial institution issuing the Security is located outside Nepal, it shall have a corresponding Bank in Nepal to make it enforceable in Nepal.
ITB 21.2	The ineligibility period will be: Not Applicable
ITB 21.4	Subject to the succeeding sentences, any bid not accompanied by an irrevocable and callable bid security shall be rejected by the Purchaser as nonresponsive. If a Bidder submits a bid security that (i) deviates in form, amount, and/or period of validity, or (ii) does not provide sufficient identification of the Bidder (including, without limitation, failure to indicate the name of the Joint Venture or, where the Joint Venture has not yet been constituted, the names of all future Joint Venture Partners), the Purchaser shall request the Bidder to submit a compliant bid security within fourteen days of receiving such a request. Failure to provide a compliant bid security within the prescribed period of receiving such a request shall cause the rejection of the Bid.
ITB 22.1	In addition to the original Bid, the number of copies is: Not Applicable
ITB 22.2	The written confirmation of Authorization to sign on behalf of the Bidder shall consist of: (a) Organizational document, board resolution or its equivalent, or Power of Attorney specifying the representative's authority to sign the bid on behalf of the Bidder. (b) If the Bidder is an intended or an existing joint venture, the Power of Attorney should be signed by all partners and specify the authority of the named representative of the joint venture to sign on behalf of, and legally bind, the intended or existing joint venture. If the joint venture is not yet formed, also include evidence from all proposed joint venture partners of their intent to enter into a joint venture in the event of a contract award. Power of Attorney to be submitted should be in original or legally notarized or attested by the appropriate authority in the bidder's home country.
ITB 22.2	The Bidder shall submit an acceptable authorization within seven days.

ITB 22.5	**<u>Electronic Submission of Proposals</u>** The bidders shall **only** submit their bids electronically, using the procedure outlined in ITB 23.1(b). **Hand delivery of bids shall not be permitted.** The electronic submission should contain scanned signed original submission letters in the required format for both the Technical Proposal and the Financial Proposals. IMPORTANT: It is the Contractors' sole responsibility to ensure the reliability of the electronic transmittal and that the electronically submitted files are complete, workable and not corrupted. Price bids shall be password-protected. Bidders are encouraged to use a password generator. Like any other IT system, Tenderlink may encounter technical difficulties and server malfunctions. Bidders should allow for sufficient time to submit bids. The Purchaser and ADB are not liable for any loss or damage claimed by any party due to technical difficulties. Please note that while there is no limit to the file size or number of files that may be uploaded in Tenderlink, uploading a file exceeding 2GB will affect the speed of upload. Hence, bidders are advised to (i) split the technical and financial bids into smaller files and (ii) start uploading 1 day prior to the deadline. Uploading of files does not automatically result to submission. The 'Make Submission' button must be clicked before the tender closes. In the Tenderlink portal, resources for suppliers/bidders are available under the Online Help and Support tabs
D. Submission and Opening of Bids	
ITB 23.1(b)	Bidders shall submit their Bids electronically through the following web portal: https://www.tenderlink.com/adb The tender can be found by searching for PRBFRMP/DHM/FF-01-2021 Technical bids must be uploaded to the technical tender box. Financial bids must be uploaded to the financial tender box
ITB 23.2(c)	The additional identification marks are: Not Applicable
ITB 24.1	**ALL BID SUBMISSIONS MUST BE MADE ELECTONICALLY VIA TENDERLINK** **THE DEADLINE FOR BID SUBMISSION IS**: Date: **15 September 2021** Time: 1200 hours (Nepal Local Time)

ITB 26.4	Electronic procedures for withdrawal, substitution, and modification shall be: A Bidder may withdraw, substitute, or modify its Bid – Technical or Price – after it has been submitted only by making such changes to its Bid, and as a complete replacement or withdrawal via Tenderlink. Such changes must be made and submitted before the deadline for submission of Bids.
ITB 27.1	Electronic bid opening procedure shall be as follows: All bidders shall have the option of viewing the opening via [bidder to specify the electronic platform, e.g. Skype, Zoom, etc. The platform should allow a minimum of 50 participants]. The links to the viewing will be issued via email to bidders 7 days prior to the opening. Electronic bid opening procedure shall be as follows: Bids shall be submitted through the Tenderlink tender box at or before the deadline stipulated in ITB 24.1. The electronic keys required to open the Tender Bid box will be issued to Project Manager, PIU, PRBFRMP, FFEWS by Tenderlink and only issued to the Bid Opening Committee during the Bid Opening Meeting. The files containing the Bid shall be downloaded and opened in public at PRBFRMP, FFEWS, PIU/DHM, Kathmandu. The name of the Bidder, the presence of a bid security; and any other details as the Employer may consider appropriate shall be read out. The aforementioned details shall be recorded in the Record of Bid Opening. The supporting electronic files will be subsequently downloaded and opened by the Bid Opening Committee.
ITB 27.3 to 27.5	ITBs 27.3, 27.4 and 27.5 are not applicable.
ITB 27.6	The Letter of Technical Bid shall be initialed by at least two representatives of the Purchaser attending Technical Bid opening. ITB 27.6(b) is not applicable
ITB 27.9	The Purchaser will notify Bidders in writing who have been rejected on the grounds of their Technical Bids being substantially nonresponsive to the requirements of the Bidding Document. The passwords of their Price Bids will not be requested, and the Price Bids will not be opened.
ITB 27.11	The Letter of Price Bid and Price Schedules shall be initialed by at least two representatives of the Purchaser attending Bid opening. ITB 27.11(b) is not applicable

E. Evaluation and Comparison of Bids	
ITB 31.4 and ITB 31.5	The Purchaser's evaluation of responsive Bids will take into account the following technical factors, features, weight and scoring scale as per table below, in addition to cost factors as specified in Section 3 (Evaluation and Qualification Criteria): (i) Performance, capacity, functionality and usability features (such as ease of use, ease of administration, or ease of expansion) that either exceed levels specified as mandatory in Section 6 (Schedule of Requirements), and/or influence the life cycle cost and effectiveness of the IT products and goods. (ii) The quality of the Bidder's proposed arrangements for specialist services, management and coordination, training, quality assurance, technical support, logistics, problem resolution, and transfer of knowledge, and other such activities as specified by the Purchaser in Section 6 (Schedule of Requirements). (iii) Any sustainable procurement requirement if specified in Section 6 (Schedule of Requirements).

Feature and Weight (in %)	**Scoring Scale**				
	0	**30**	**60**	**80**	**100**
A. Extent to which the offered IT products and goods meet the "Mandatory" and "Desirable" technical requirements of Functionality and Usability. Performance, capacity, or functionality features that either exceed levels specified as mandatory in Section 6 (Schedule of Requirements) and/or influence the life cycle cost and effectiveness of the IT products.					
A.1 Computers (10%)					
A.2 Modelling Software and development of model-based flood forecasting and warning system, hydrological and 1-D / 2D hydrodynamic; Gauge to Gauge method of Flood forecasting (35%)					
A.3 Data transmission, integration and database development and dissemination systems. Data analysis, development & updating of rating curves, generation of discharge time series from water levels of the rivers (25%)					

B. Extent to which the offered experts and local support meets requirements. The quality of the Bidder's proposed arrangements for specialist services, management and coordination, training, quality assurance, technical support, logistics, problem resolution, and transfer of knowledge, and other such activities as specified by the Purchaser in Section 6.						
B.1 Training (10%)						
B.2 Operation & maintenance of discharge measuring equipment; ADCP, DGPS, Echo sounder (10%)						
B.3 Curriculum vitae of proposed experts providing specialist services (10%)						

Features will be assessed following the 0 to 100 scoring scale described in Section 3 (Evaluation and Qualification Criteria). Technical factors shall have a weight of 0.5 and price 0.5 (total 1.0)

The cutoff score for technical competence is 75 out of total 100 and bids scoring below this score will not be further considered for evaluation.

ITB 34.2	The qualifications of other firms such as the Bidder's subsidiaries, parent entities, affiliates, subcontractors shall not be permitted.
ITB 37.1	The currency that shall be used for bid evaluation and comparison purposes to convert all bid prices expressed in various currencies into a single currency is: Nepalese Rupees (NPR). The source of the selling exchange rate shall be: Nepal Rastra Bank The date for the selling exchange rate shall be: **08 September 2021**
ITB 38.1	Domestic preference shall not apply.
ITB 42.1	Standstill provisions shall not apply.
F. Award of Contract	
ITB 44.1	The maximum percentage by which quantities may be increased is: 15% The maximum percentage by which quantities may be decreased is: 15%
ITB 48.1	The procedures for Bidding-Related Complaints are referenced in the Procurement Regulations for ADB Borrowers (Appendix 7). The Bidder should submit its complaint following these procedures, in writing, to:

	For the attention: Bikram Shrestha Zoowa Title/position: Project Manager, PRBFRMP, PIU, DHM Purchaser: PRBFRMP, Project Implementation Unit (PIU) DHM E-mail address: prbfrmffews.dhm@gmail.com

Section 3: Evaluation and Qualification Criteria

Table of Criteria

1. Technical Evaluation

1.1 Technical Criteria (ITB 31 and ITB 32)

In addition to the cost factors, the Purchaser has chosen to give weight to important technical factors (i.e., technical features weight 0.5 and the price weight, 0.5).The total technical score assigned to each Bid in the Evaluated Bid Formula will be determined by adding and weighting the scores assigned by an evaluation committee to technical features of the bid, in accordance with the criteria set forth below.

(a) The technical features to be evaluated are generally defined below and are specifically identified in the BDS:

(i) Performance, capacity, or functionality features that either exceed levels specified as mandatory in Section 6 (Schedule of Requirements), and/or influence the life cycle cost and effectiveness of the IT products.

(ii) Usability features, such as ease of use, ease of administration, or ease of expansion, which influence the life cycle cost and effectiveness of the IT products.

(iii) The quality of the Bidder's proposed arrangements for management and coordination, training, quality assurance, technical support, logistics, problem resolution, and transfer of knowledge, and other such activities as specified by the Purchaser in Section 6 (Schedule of Requirements).

(iv) Any sustainable procurement requirement if specified in Section 6 (Schedule of Requirements).

(b) Feature scores will be grouped into a small number of evaluation categories, generally defined below and specifically identified in the BDS:

(i) The technical features that reflect how well the IT products and services meet the Purchaser's business requirements (including quality assurance and risk-containment measures associated with the implementation of the IT products and services).

(ii) The technical features that reflect how well the IT products and services meet the system's functional performance standards.

(iii) The technical features that reflect how well the IT products and services meet the general technical requirements for hardware, software, and services.

(c) As specified in the BDS, each category has been given a weight and within each category each feature is also given a weight (in %).

(d) During the evaluation, the evaluation committee will assign each desirable/preferred feature a whole number score of 0 where the feature is absent, and 30, 60, 80 and 100 represent a desirable functionality (e.g., of a software package) or a quality improving the prospects for a successful implementation (such as the strengths of the proposed project staff, the methodology, the elaboration of the project plan, etc., in the bid). The scoring will be 0 for the feature being absent,30 for the features being present but showing deficiencies, 60 for meeting the requirements, 80 for marginally exceeding the requirements, and 100 for significantly exceeding the requirements. Fractional scores are not allowed but any whole number score between 0 to 100 can be given.

(e) The feature technical scores will be combined in a weighted sum to form the total Technical Bid Score using the following formula:

$$T \equiv \sum_{j=1}^{n} S_j * W_j$$

where:

S_j	=	Feature technical score of Feature "j"
W_j	=	weight of Feature "j" as specified in the BDS
n	=	number of Features

and $$\sum_{j=1}^{n} W_j = 1$$

2. Qualification Criteria

2.1 Eligibility

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	

2.1.1 Nationality

Nationality in accordance with ITB 4.2.	Must meet requirement	Must meet requirement	Must meet requirement	Not applicable	Letter of Technical Bid; Forms ELI – 1 and ELI - 2

2.1.2 Conflict of Interest

No conflicts of interest in accordance with ITB 4.3.	Must meet requirement	Must meet requirement	Must meet requirement	Not applicable	Letter of Technical Bid

2.1.3 ADB Eligibility

Not having been declared ineligible by ADB, as described in ITB 4.4.	Must meet requirement	Must meet requirement	Must meet requirement	Not applicable	Letter of Technical Bid

2.1.4 Government-Owned Enterprise

Bidder required to meet conditions of ITB 4.5.	Must meet requirement	Must meet requirement	Must meet requirement	Not applicable	Letter of Technical Bid; Forms ELI – 1 and ELI - 2

2.1.5 United Nations Eligibility

Not having been excluded by an act of compliance with a United Nations Security Council resolution in accordance with ITB 4.8.	Must meet requirement	Must meet requirement	Must meet requirement	Not applicable	Letter of Technical Bid

2.2 Historical Contract Nonperformance

2.2.1 History of Nonperforming Contracts

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
Nonperformance of a contract[a]did not occur as a result of contractor default since 1 January2018	Must meet requirement	Must meet requirement	Must meet requirement[b]	Not Applicable	Form CON-1

[a]*Nonperformance, as decided by the Purchaser, shall include all contracts where (a) nonperformance was not challenged by the contractor, including through referral to the dispute resolution mechanism under the respective contract, and (b) contracts that were so challenged but fully settled against the contractor. Nonperformance shall not include contracts where Purchaser's decision was overruled by the dispute resolution mechanism. Nonperformance must be based on all information on fully settled disputes or litigation, i.e. dispute or litigation that has been resolved in accordance with the dispute resolution mechanism under the respective contract and where all appeal instances available to the Bidder have been exhausted.*

[b]*This requirement also applies to contracts executed by the Bidder as Joint Venture member.*

2.2.2 Suspension Based on Execution of Bid-Securing Declaration

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
Not under suspension based on execution of a Bid-Securing Declaration pursuant to ITB 4.6.	Must meet requirement	Must meet requirement	Must meet requirement	Not applicable	Letter of Technical Bid

2.2.3 Pending Litigation and Arbitration

Pending litigation and arbitration criterion shall not apply.

2.3 Experience and Technical Capacity

2.3.1 Contractual Experience

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
(a) The Supplier should have at least 5 years of supply experience of IT products and goods of similar nature required by the project (documentation required).	Must meet requirement	Not applicable	Not applicable	Must meet requirement	Form EXP – 1
(b) Demonstrate experience in designing, establishing and operating at least two (2) flood forecasting, telemetry and early warning systems comprising field measurement and IT systems, goods and works,whole project each valued at leastUS$ 2.40 million, within the last seven (7) years, with nature and complexity similar to the scope of requirements described in Section 6 (Schedule of Requirements). These must be showcased in the bidder's experience.	Must meet requirement	Not applicable	Not applicable	Must meet requirement	Form EXP – 1

2.3.2 Technical Experience

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
The Bidder shall demonstrate that (a) the goods to be supplied have been in production for at least 5 years, (b) FFEWS has been sold a minimum of 2 systems of similar type and specification over the last 5 years, and (c) Bidder to provide evidence that FFEWS system has been in satisfactory operation for a minimum of 1 year.	Must meet requirement	Must meet requirement	Not applicable	Not applicable	Form EXP – 2

2.4 Financial Situation

2.4.1 Historical Financial Performance

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
Submission of audited financial statements or, if not required by the law of the Bidder's country, other financial statements acceptable to the Purchaser, for the last three (3) years to demonstrate the current soundness of the Bidder's financial position. As a minimum, the Bidder's net worth for the last year calculated as the difference between total assets and total liabilities should be positive.	Must meet requirement	Not applicable	Must meet requirement	Not applicable	Form FIN - 1

2.4.2 Size of Operation (Average Annual Turnover)

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
Minimum average annual turnover of US$ 3.20 million calculated as total payments received by the Bidder for contracts completed or under execution over the last three (3)years.	Must meet requirement	Must meet requirement	Must meet 25% of the requirement	Must meet 40% of the requirement	Form FIN - 2

2.4.3 Cash Flow Capacity

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
Availability of or access to liquid assets, lines of credit, and other finances sufficient to meet cash flow requirement which is US$ 0.40 million.	Must meet requirement	Must meet requirement	Must meet 25% of the requirement	Must meet 40% of the requirement	Form FIN - 3

3. Economic Evaluation

3.1 Economic Criteria

3.1.1 Adjustment for Scope

3.1.1.1 Local Handling and Inland Transportation

Costs for inland transportation, insurance, and other incidental costs for delivery of the IT products and goods from the EXW premises, or port of entry, or border point to project site as defined in Section 6 (Schedule of Requirements), shall be quoted in the Price Schedule for Services to Be Offered from Outside and Within the Purchaser's Country provided In Section 4 (Bidding Forms). These costs will be taken into account during bid evaluation. If a Bidder fails to include such costs in its Bid, then these costs will be estimated by the Purchaser on the basis of published tariffs by the rail or road transport agencies, insurance companies, or other appropriate sources, and added to EXW or CIP price.

3.1.1.2 Minor Omissions or Missing Items

Pursuant to ITB 33.3, the cost of all quantifiable nonmaterial nonconformities or omissions from the contractual and commercial conditions shall be evaluated, including technical features identified as 'Mandatory' (or implied as mandatory by the use of the word 'must') in Section 6 (Schedule of Requirements) and for which nonconformance does not require rejection for non-responsiveness. The Purchaser will make its own assessment of the cost of any nonmaterial nonconformities and omissions, for the purpose of ensuring fair comparison of Bids.

3.1.1.3 The Employer will take into account the quality of the Health and Safety COVID -19 Plan ('the Plan') attached to the Technical Proposal in its evaluation of the Adequacy of the Technical Proposal.

1. The bidder should demonstrate in the Plan the health and safety measures they will put in place on site in relation to COVID-19 prevention and controls, including but not limited to, PPE requirements, site set up, training, induction and mobilization of new personnel, equipment and plants cleaning and other hazard management measures while undertaking site work activities, site visitors health and safety protocols, as well as the approach to the monitoring and reporting of the Plan. The Plan should be fit for purpose for the particular construction works of this contract and be aligned with any relevant government regulations and guidelines on COVID-19 prevention and controls, as well as workplace safety requirements, or in the absence thereof, to international good practice guidelines such as World Health Organization. 2020. Considerations for public health and social measures in the workplace in the context of COVID-19 (2020) published by the World Health Organization, Geneva, and available in https://www.who.int/publications-detail/considerations-for-public-health-and-social-measures-in-the-workplace-in-the-context-of-covid-19

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3.1.2 Adjustment for Deviations from the Terms of Payment

Deviations from the Terms of Payment as specified in SCC 16.1 are not permitted.

3.1.3 Adjustment for Deviations in the Delivery and Completion Schedule

Deviations from the Delivery and Completion Schedule specified in Section 6 (Schedule of Requirement) are not permitted.

3.1.4 Operation and Maintenance (O&M) Costs

Costs associated with system development, operation and maintenance over the full project duration based on the bidder's solution will be included in the bidder's financial price. FFEWS system and equipment operation and maintenance costs could vary marginally between different suppliers. However due to the perceived minor differences, i.e., difficulty in validating performance claims, energy consumption, spare parts requirement etc., O & M costs are not included separately in economic criteria as a factor for bid evaluation. Details of operation and maintenance required are shown in Section 6 of this bid document Schedule of Supply in (a) items N.1 to N.12 in List of Goods and Related Services (b) Sub-section 2.5Operation and maintenance period and (c) Appendix C - Operations and Maintenance Specifications.

3.1.5 Spare Parts

The items and quantities of spare parts, tools, goods, software and others likely to be required during the initial 36-month installation and development phase followed by a 36month operate, refine and maintenance phase of the goods, equipment, data flow and FFEWS system is to be included by Bidder in its Bid Price.

3.2 Combined Evaluation

The Purchaser will evaluate and compare the Bids that have been determined to be substantially responsive, pursuant to ITB 39.

As indicated by the BDS, the Purchaser's evaluation of responsive Bids will take into account technical factors, in addition to cost factors (technical features weight 0.5 and the price weight, 0.5).

An Evaluated Bid Score (B) will be calculated for each responsive Bid using the following formula, which permits a comprehensive assessment of the Bid price and the technical merits of each Bid:

$$B \equiv \frac{C_{low}}{C} X + \frac{T}{T_{high}} (1 - X)$$

Where

C	=	Evaluated Bid Price
C_{low}	=	lowest of all Evaluated Bid Prices among responsive Bids
T	=	total technical score awarded to the Bid
T_{high}=		technical score achieved by the Bid that was scored best among all responsive Bids
X	=	weight for the Price as specified in the BDS (0.5)

The Bid with the best Evaluated Bid Score (B) among responsive Bids shall be the Most Advantageous Bid provided the Bidder was found to be qualified to perform the Contract in accordance with ITB 31 and ITB 39.

Section 4: Bidding Forms

Table of Forms

Letter of Technical Bid

-- Note --

The Bidder must accomplish the Letter of Technical Bid on its letterhead clearly showing the Bidder's complete name and address.

Date: _____
Open Competitive Bidding (OCB) No.: _____
Invitation for Bid (IFB) No.: _____
Alternative No.: _____

To: [*insert complete name of the Purchaser*]

We, the undersigned, declare that:

(a) We have examined and have no reservations to the Bidding Document, including the Addenda issued in accordance with Instructions to Bidders (ITB) 8.

(b) We offer to supply in conformity with the Bidding Document and in accordance with the delivery schedule specified in Section 6 (Schedule of Requirements), the following IT products and services: [*insert a brief description of the IT products and services*]

(c) Our Bid consisting of the Technical Bid and the Price Bid shall be valid for a period of [*insert validity period as specified in ITB 20.1 of the BDS*] days from the date fixed for the bid submission deadline in accordance with the Bidding Document, and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

(d) We undertake, if our bid is accepted, to commence work on the IT products and services and to achieve installation and acceptance within the respective times stated in the Bidding Documents.

(e) We hereby certify that all the software offered in this bid and to be supplied under the Contract is either owned by us or, (ii) covered by a valid license from the proprietor of the software.

(f) Our firm, including any subcontractors or suppliers for any part of the Contract, have nationalities from eligible countries in accordance with ITB 4.2.

(g) We, including any subcontractors or suppliers for any part of the contract, do not have any conflict of interest in accordance with ITB 4.3.

(h) We are not participating, as a Bidder, either individually or as partner in a Joint Venture, in more than one Bid in this bidding process in accordance with ITB 4.3(e), other than alternative offers in accordance with the Bidding Document.

(i) Our firm, Joint Venture partners, associates, parent company, its affiliates or subsidiaries, including any Subcontractors or Suppliers for any part of the contract, are not subject to, or not controlled by any entity or individual that is subject to, a temporary suspension or a debarment imposed by the Asian Development Bank or a debarment imposed by the Asian Development

Bank in accordance with the Agreement for Mutual Enforcement of Debarment Decisions between the Asian Development Bank and other development banks.[1]

(j) Our firm, Joint Venture partners, associates, parent company, affiliates or subsidiaries, including any Subcontractors or Suppliers for any part of the Contract, are not, or have never been, temporarily suspended, debarred, declared ineligible, or blacklisted by the Purchaser's country, any international organization, and other donor agency.

(k) Our firm, Joint Venture partners, associates, parent company, affiliates or subsidiaries, including any Subcontractors or Suppliers for any part of the Contract, are not, or have never been, temporarily suspended, debarred, declared ineligible, or blacklisted by the Purchaser's country, any international organization, and other donor agency.

If so debarred, declared ineligible, temporarily suspended or blacklisted, please state details (as applicable to each Joint Venture partner, associate, parent company, affiliate, subsidiaries, Subcontractors, and/or Suppliers):

(i) Name of Institution: _____
(ii) Period of debarment, ineligibility, or blacklisting [*start and end date*]: _____
(iii) Reason for the debarment, ineligibility, or blacklisting: _____

(l) Our firm's, Joint Venture partners, associates, parent company's affiliates or subsidiaries, including any Subcontractors or Suppliers key officers and directors have not been [*charged or convicted*] of any criminal offense (including felonies and misdemeanors) or infractions/violations of ordinance which carry the penalty of imprisonment.

If so charged or convicted, please state details:

(i) Nature of the offense/violation: _____
(ii) Court and/or area of jurisdiction: _____
(iii) Resolution [*i.e. dismissed; settled; convicted/duration of penalty*]: _____
(iv) Other relevant details [*please specify*]**:** _____

(m) We understand that it is our obligation to notify ADB should our firm, Joint Venture partners, associates, parent company, affiliates or subsidiaries, including any Subcontractors or Suppliers, be temporarily suspended, debarred or become ineligible to work with ADB or any other MDBs, the Purchaser's country, international organizations, and other donor agencies, or any of our key officers and directors be charged or convicted of any criminal offense or infractions/violations of ordinance which carry the penalty of imprisonment.

(n) Our firm, Joint Venture partners, associates, parent company, affiliates or subsidiaries, including any Subcontractors or Suppliers, are not from a country which is prohibited to export goods to or receive any payments from the Purchaser's country by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations.

(o) [We are not a government-owned enterprise] / [We are a government-owned enterprise but meet the requirements of ITB 4.5].[2]

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[1]These institutions include African Development Bank, European Bank for Reconstruction and Development (EBRD), Inter-American Development Bank (IADB), and the World Bank Group. According to paragraph 9 of the Agreement, other international financial institutions may join upon the consent of all Participating Institutions and signature of a Letter of Adherence by the international financial institution substantially in the form provided (Annex B to the Agreement). Upon adherence, such international financial institution shall become a Participating Institution for purposes of the Agreement. Bidders are advised to check www.adb.org/integrity for updates.

[2]Use one of the two options as appropriate.

(p) We have not been suspended nor declared ineligible by the Purchaser based on execution of a Bid-Securing Declaration in accordance with ITB 4.6.

(q) We agree to permit ADB or its representative to inspect our accounts and records and other documents relating to the bid submission and to have them audited by auditors appointed by ADB.

(r) We understand that any misrepresentation that knowingly or recklessly misleads, or attempts to mislead may lead to the automatic rejection of the Bid or cancellation of the contract, if awarded, and may result in remedial actions, in accordance with ADB's Anticorruption Policy (1998, as amended to date) and Integrity Principles and Guidelines (2017, as amended from time to time).

Name _____

In the capacity of _____

Signed _____

Duly authorized to sign the Bid for and on behalf of _____

Date _____

Country of Origin Declaration Form

Name of Bidder _____ IFB Number _____ Page ___ of ___

Item	Description	Country of Origin

Letter of Price Bid

- Note -

The Bidder must accomplish the Letter of Price Bid on its letterhead clearly showing the Bidder's complete name and address.

Date: _____
Open Competitive Bidding (OCB) No.: _____
Invitation for Bid (IFB) No.: _____
Alternative No.: _____

To: [*insert complete name of the Purchaser*]

We, the undersigned, declare that:

(a) We have examined and have no reservations to the Bidding Document, including Addenda issued in accordance with Instructions to Bidders (ITB) 8.

(b) We offer to supply in conformity with the Bidding Document and in accordance with Section 6(Schedule of Requirements), the following IT products and services: [*insert a brief description of the IT products and services*]

(c) The total price of our Bid, excluding any discounts offered in item (d) below, is

[amount of foreign currency in words], [amount in figures], and [amount of local currency in words], [amount in figures]

The total bid price from the price schedules should be entered by the bidder inside this box. Absence of the total bid price in the Letter of Price Bid may result in the rejection of the bid.

(d) The discounts offered and the methodology for their application are as follows:

Discounts: If our Bid is accepted, the following discounts shall apply: [*specify in detail each discount offered and the specific item of the Schedule of Requirements to which it applies*]

Methodology of Application of the Discounts: The discounts shall be applied using the following method: [*specify in detail the method that shall be used to apply the discounts*]

(e) Our Bid shall be valid for a period of [*insert validity period as specified in ITB 20.1 of the BDS.*] days from the date fixed for the bid submission deadline in accordance with the Bidding Document, and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

(f) If our Bid is accepted, we commit to obtain a Performance Security in accordance with the Bidding Documents.

(g) The following commissions, gratuities, or fees have been paid or are to be paid with respect to the bidding process or execution of the Contract:[3]

Name of Recipient	Address	Reason	Amount
_____	_____	_____	_____
_____	_____	_____	_____

(h) We understand that this Bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal Contract is prepared and executed.

(i) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.

(j) We agree to permit ADB or its representative to inspect our accounts and records and other documents relating to the bid submission and to have them audited by auditors appointed by ADB.

Name _____

In the capacity of _____

Signed _____

Duly authorized to sign the Bid for and on behalf of _____

Date _____

[3] If none has been paid or is to be paid, indicate "None."

Price Schedules

The Bidder shall complete and submit with its Bid the Price Schedules pursuant to ITB 12 and in accordance with Part 2 Supply Requirements, Section 6 (Schedule of Requirements). The list of items in column 1 of the Price Schedules shall coincide with the List of IT Products and Services specified by the Purchaser in the Schedule of Requirements.

The units and rates in figures entered into the Price Schedules should be typewritten or if written by hand, must be in print form. Price Schedules not presented accordingly may be considered nonresponsive. Any necessary alterations due to errors, etc., shall be signed by the Bidder.

Price Schedule for IT Products and Goods to Be Offered from Within the Purchaser's Country

Name of Bidder _____ IFB Number _____ Page ___ of ___

Item	Description	Country of Origin	Domestic Value Added in Percent	Quantity and Unit of Measurement	Unit Price EXW + supply and installation (Kathmandu and 6 river valley locations)	Total EXW Price per item	Sales and Other Taxes Per Item	Total Price per Item including Taxes
1	**2**	**3**	**4**	**5**	**6**	**7 = 5 x 6**	**8**	**9 = 7 + 8**
					Total Amount			

Notes:

Column 4: In accordance with margin of preference ITB 38, if applicable.
Domestic Value Added comprises domestic labor, the domestic content of materials, domestic overheads and profits from the stage of mining the raw material until final assembly.

Column 6: Incoterm in accordance with ITB 14
Currency in accordance with ITB 15
Price shall include all customs duties and sales and other taxes already paid or payable on the components and raw materials used in the manufacture or assembly of the item or the customs duties and sales and other taxes already paid on previously imported items.

Column 8: Payable in the Purchaser's country if Contract is awarded

Name _____

In the capacity of _____

Signed _____

Duly authorized to sign the Bid for and on behalf of _____

Date _____

Price Schedule for IT Products and Goods to Be Offered from Outside the Purchaser's Country

Name of Bidder _____ IFB Number _____ Page ___ of ___

Item	Description	Country of Origin	Quantity and Unit of Measurement	Unit Price CIP (Kathmandu and 6 river valley locations)		Total Price CIP per Item
1	**2**	**3**	**4**	**5**		**6 = 4 x 5**
					Total Amount	

Notes:
Columns 5 and 6: Incotermin accordance with ITB 14
Currency in accordance with ITB 15

Name _____

In the capacity of _____

Signed _____

Duly authorized to sign the Bid for and on behalf of _____

Date _____

Price Schedule for Services to Be Offered from Outside and Within the Purchaser's Country

Name of Bidder _____ IFB Number _____ Page ___ of ___

Item No.	Description	Country of Origin	Quantity and Unit of Measure-ment	Unit Price (a) Foreign Currency	Unit Price (b) Local Currency	Total Price per Item (a) Foreign Currency	Total Price per Item (b) Local Currency
1	2	3	4	5(a)	5(b)	6(a) = 4 x 5(a)	6(b) = 4 x 5(b)
	Section 6: Employer's Requirements; Knowledge Transfer, Items L2, L3 and L5 of II Related Services – training-related costs, to be reimbursed at actuals		**Provisional Sum (bidder to retain the amount unchanged)**			**USD 114,000 (For L2,48,,000 L3, 50,000 and L5, 16,000)**	
	Contingency		**Contingency Sum (bidder to retain the amount unchanged)**			**USD 468,000**	
					Total Amount		

Notes:

Columns 5 and 6: Currencies in accordance with ITB 15

Prices are to be quoted inclusive of all customs duties, sales and other similar taxes applicable in the Purchaser's country and payable on the Related Services, if the Contract is awarded to the Bidder

Name _____

In the capacity of _____

Signed _____

Duly authorized to sign the Bid for and on behalf of _____

Date _____

Price Schedule for Operation and Maintenance (O & M) Costs

Operation and Maintenance Item	Maximum all-inclusive Operation and Maintenance Costs			Total Prices	
	Year 1	Year 2	Year 3	Local Currency	Foreign Currency
			Total Amount		

Name _____

In the capacity of _____

Signed _____

Duly authorized to sign the Bid for and on behalf of _____

Date _____

Grand Summary

Price Component	Total Price	
	Local Currency	Foreign Currency
Price Schedule for IT Products to Be Offered from Within the Purchaser's Country		
Price Schedule for IT Products to Be Offered from Outside the Purchaser's Country		
Price Schedule for Services to Be Offered from Outside and Within the Purchaser's Country		
Price Schedule for Operation and Maintenance Costs		
Total Bid Price (to be carried forward to the Letter of Price Bid)		

Name _____

In the capacity of _____

Signed _____

Duly authorized to sign the Bid for and on behalf of _____

Date _____

Bid Security

When requested in the Bid Data Sheet, the Bidder shall furnish as part of its bid, a Bid Security.

In case of an unconditional guarantee issued by a bank, the Bidder shall use the Bid Security Form included in this section or another form acceptable to the Purchaser prior to bid submission pursuant to ITB 21.3. In either case, the form must include the complete name of the Bidder. The bid security shall be valid for number of days as specified in the BDS beyond the original validity period of the Bid, or beyond any period of extension if requested under ITB 20.2.

Bid Security
Bank Guarantee

[insert bank's name, and address of issuing branch or office][4]

Beneficiary: *[insert name and address of the Purchaser]*
Date: *[insert date]*
BidSecurity No.: *[insert number]*

We have been informed that *[insert name of the bidder]*(hereinafter called "the Bidder") has submitted to you its bid dated *[insert date(as day, month, and year)]*(hereinafter called "the Bid") for the execution of *[insert name of contract]*under Invitation for Bids No. *[insert IFB number]*("the IFB").

Furthermore, we understand that, according to your conditions, bids must be supported by a bid guarantee.

At the request of the Bidder, we *[insert name of bank]*hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of *[insert amount in words][insert amount in figures]*upon receipt by us of your first demand in writing accompanied by a written statement, stating that the Bidder is in breach of its obligation(s) under the bid conditions, because the Bidder

(a) has withdrawn its Bid during the period of bid validity specified by the Bidder in the Letter of Technical Bid; or

(b) does not accept the correction of errors in accordance with the Instructions to Bidders (hereinafter "the ITB"); or

(c) having been notified of the acceptance of its Bid by the Purchaser during the period of bid validity, (i) fails or refuses to execute the Contract Agreement; or (ii) fails or refuses to furnish the Performance Security, in accordance with the ITB.

This guarantee will expire (a) if the Bidder is the successful Bidder, upon our receipt of copies of the Contract Agreement signed by the Bidder and the Performance Security issued to you upon the instruction of the Bidder; or (b) if the Bidder is not the successful Bidder, upon the earlier of (i) our receipt of a copy of your notification to the Bidder of the name of the successful Bidder, or (ii) [*insert number of days consistent with ITB 21.3*] days after the expiration of the Bidder's bid.

Consequently, any demand for payment under this guarantee must be received by us at the office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458 (*or ICC Publication No. 758 as applicable*).

[Authorized signature(s) and bank's seal (where appropriate)]

[4] All italicized text is for use in preparing this form and shall be deleted from the final document.

Manufacturer's Authorization

Date: *[insert date (as day, month, and year) of bid submission]*

OCB No.: *[insert number of bidding process]*

To:*[insert complete name of the Purchaser]*

WHEREAS

We*[insert complete name of the manufacturer]*, who are official manufacturers of *[insert type of goods manufactured]*, having factories at *[insert full address of manufacturer's factories]*, do hereby authorize*[insert complete name of the bidder]*to submit a bid the purpose of which is to provide the following IT products and services, manufactured by us *[insert name and/or brief description of the goods]*, and to subsequently negotiate and sign the Contract.

We hereby extend our full guarantee and warranty in accordance with Clause 28 of the General Conditions, with respect to the goods offered by the above firm.

Signed: *[insert signature(s) of authorized representative(s) of the manufacturer]*

Name:*[insert complete name(s) of authorized representative(s) of the manufacturer]*

Title:*[insert title]*

Duly authorized to sign this Authorization on behalf of *[insert complete name of the manufacturer]*

Dated on _____ day of _____, _____*[insert date of signing]*

-- Note --

All italicized text is for use in preparing this form and shall be deleted from the final document.

The bidder shall require the manufacturer to fill out this form in accordance with the instructions indicated. This letter of authorization should be signed by a person with the proper authority to sign documents that are binding on the manufacturer. The bidder shall include it in its bid, if so indicated in the Bid Data Sheet (BDS).

Bidder's Qualification

To establish its qualifications to perform the contract in accordance with Section 3 (Evaluation and Qualification Criteria), the Bidder shall provide the following information requested in the corresponding Information Sheets.

Form ELI - 1: Bidder's Information Sheet

Bidder's Information	
Bidder's legal name	
In case of a Joint Venture, legal name of each partner	
Bidder's country of constitution	
Bidder's year of constitution	
Bidder's legal address in country of constitution	
Bidder's authorized representative (name, address, telephone number(s), fax number(s) and e-mail address)	

Attached are copies of the following documents:

- ❑ 1. In case of a single entity, articles of incorporation or constitution of the legal entity named above, in accordance with ITB 4.1 and ITB 4.2
- ❑ 2. Authorization to represent the firm or Joint Venture named above, in accordance with ITB 22.2
- ❑ 3. In case of a Joint Venture, a letter of intent to form a Joint Venture or Joint Venture agreement, in accordance with ITB 4.1
- ❑ 4. In case of a government-owned enterprise, any additional documents not covered under 1 above required to comply with ITB 4.5

Form ELI - 2: Joint Venture Information Sheet

Each member of the Joint Venture must fill out this form separately.

Joint Venture Information	
Bidder's legal name	
Joint Venture Partner's legal name	
Joint Venture Partner's country of constitution	
Joint Venture Partner's year of constitution	
Joint Venture Partner's legal address in country of constitution	
Joint Venture Partner's authorized representative information (name, address, telephone number(s), fax number(s) and e-mail address)	

Attached are copies of the following documents:

- ❑ 1. Articles of incorporation or constitution of the legal entity named above, in accordance with ITB 4.1 and ITB 4.2
- ❑ 2. Authorization to represent the firm named above, in accordance with ITB 22.2
- ❑ 3. In the case of a government-owned enterprise, in accordance with ITB 4.5

Form CON– 1: Historical Contract Nonperformance

Each Bidder must fill out this form in accordance with Criteria 2.2.1 and 2.2.3of Section 3 (Evaluation and Qualification Criteria) to describe any history of nonperforming contracts and pending litigation or arbitration formally commenced against it.

In case of a Joint Venture, each Joint Venture Partner must fill out this form separately and provide the Joint Venture Partner's name:

Joint Venture Partner: _____

Table 1: History of Nonperforming Contracts			
Choose one of the following: ❑ No nonperforming contracts. ❑ Below is a description of nonperforming contracts involving the Bidder (or each Joint Venture member if Bidder is a Joint Venture).			
Year	**Description**	**Amount of Non-performed Portion of Contract ($ equivalent)**	**Total Contract Amount ($ equivalent)**
[insert year]	Contract Identification: *[indicate complete contract name/ number, and any other identification]* Name of Purchaser: *[insert full name]* Address of Purchaser: *[insert street/city/country]* Reason(s) for nonperformance:*[indicate main reason(s)]*	*[insert amount]*	*[insert amount]*

Form EXP - 1: Contractual Experience

Fill out one (1) form per contract.

Contractual Experience		
Contract No . . . . . **of**	**Contract Identification**	
Award Date		**Completion Date**
Role in Contract	❑ **Manufacturer** ❑ **Supplier** ❑ **Subcontractor**	
Total Contract Amount	**$**	
If partner in a joint venture or subcontractor, specify participation of total contract amount	**Percent of Total**	**Amount**
Purchaser's name **Address** **Telephone/Fax Number** **E-mail**		
Description of the Similarity in Accordance with 2.3.1 of Section 3 (Evaluation and Qualification Criteria)		
(a) The Supplier should have at least 5 years of supply experience of IT products and goods of similar nature required by the project (documentation required). (b) Demonstrate experience in designing, establishing and operating at least two (2) flood forecasting, telemetry and early warning systems comprising field measurement and IT systems, goods and works, whole project each valued at least US$ 2.4 million, within the last seven (7) years, with nature and complexity similar to the scope of requirements described in Section 6 (Schedule of Requirements). These must be showcased in the bidder's experience.		

Form EXP - 2: Technical Experience

Fill out one (1) form per contract.

Technical Experience		
Name of Product		
Manufacturer:		**Address and Nationality:**
Requirements in Accordance with Criterion 2.3.2 of Section 3 (Evaluation and Qualification Criteria)		
The Bidder shall demonstrate that (a) the goods to be supplied have been in production for at least 5 years, (b) FFEWS has been sold a minimum of 2 systems of similar type and specification over the last 5 years, and Bidder to provide evidence that FFEWS system has been in satisfactory operation for a minimum of 1 year.		

- Note -

Add pages as necessary. The Purchaser reserves the right to verify authenticity of Bidder submissions.

Form FIN - 1: Historical Financial Performance

Each Bidder must fill out this form.

In case of a Joint Venture, each Joint Venture Partner must fill outthis form separately and provide the Joint Venture Partner's name:

Joint Venture Partner: _____

	Financial Data for Previous ___ Years [$ Equivalent]		
	Year 1:	**Year 2:**	**Year __:**
Information from Balance Sheet			
Total Assets (TA)			
Total Liabilities (TL)			
Net Worth = TA-TL			
Current Assets (CA)			
Current Liabilities (CL)			
Working Capital = CA - CL			

Most Recent Working Capital		To be obtained for most recent year and carried forward to FIN-3 Line 1; in case of Joint Ventures, to the corresponding Joint Venture Partner's FIN-3.

Information from Income Statement			
Total Revenues			
Profits Before Taxes			
Profits After Taxes			

❑ Attached are copies of financial statements (balance sheets including all related notes, and income statements) for the last _____ years, as indicated above, complying with the following conditions:

- Unless otherwise required by Section 3 of the Bidding Documents, all such documents reflect the financial situation of the legal entity or entities comprising the Bidder and not the Bidder's parent companies, subsidiaries, or affiliates.
- Historical financial statements must be audited by a certified accountant.
- Historical financial statements must be complete, including all notes to the financial statements.
- Historical financial statements must correspond to accounting periods already completed and audited (no statements for partial periods shall be requested or accepted).

Form FIN - 2: Size of Operation (Average Annual Turnover)

Each Bidder must fill out this form.

The information supplied should be the Annual Turnover of the Bidder or each member of a Joint Venture in terms of the amounts billed to clients for each year for work in progress or completed, converted to US dollars at the rate of exchange at the end of the period reported.

In case of a Joint Venture, each Joint Venture Partner must fill out this form separately and provide the Joint Venture Partner's name:

Joint Venture Partner: _____

Annual Turnover Data for the Last Three Years			
Year	**Amount Currency**	**Exchange Rate**	**$ Equivalent**
		Average Annual Turnover	

Form FIN - 3: Cash Flow Capacity

Specify proposed sources of financing, such as working capital, liquid assets,[5] lines of credit, and other financial resources (other than any contractual advance payments) available to meet the cash flow requirements indicated under Criterion 2.4.3 of Section 3 (Evaluation and Qualification Criteria).

Financial Resources		
No.	**Source of financing**	**Amount ($ equivalent)**
1		
2		
3		

[5] Liquid assets mean cash and cash equivalents, short-term financial instruments, short-term available-for-sale-securities, marketable securities, trade receivables, short-term financing receivables, and other assets that can be converted into cash within one (1) year.

Section 5: Eligible Countries

1. Afghanistan
2. Armenia
3. Australia
4. Austria
5. Azerbaijan
6. Bangladesh
7. Belgium
8. Bhutan
9. Brunei Darussalam
10. Cambodia
11. Canada
12. China, People's Republic of
13. Cook Islands
14. Denmark
15. Fiji Islands, Republic of
16. Finland
17. France
18. Georgia
19. Germany
20. Hong Kong, China
21. India
22. Indonesia
23. Ireland
24. Italy
25. Japan
26. Kazakhstan
27. Kiribati
28. Korea
29. Kyrgyz
30. Lao People's Democratic Rep.
31. Luxembourg
32. Malaysia
33. Maldives
34. Marshall Islands
35. Micronesia, Federal States of
36. Mongolia
37. Myanmar
38. Nauru, Republic of
39. Nepal
40. Netherlands
41. New Zealand
42. Niue
43. Norway
44. Pakistan
45. Palau
46. Papua New Guinea
47. Philippines
48. Portugal
49. Samoa
50. Singapore
51. Solomon Islands
52. Spain
53. Sri Lanka
54. Sweden
55. Switzerland
56. Tajikistan
57. Taipei,China
58. Thailand
59. Timor-Leste, Democratic Republic of
60. Tonga
61. Turkey
62. Turkmenistan
63. Tuvalu
64. United Kingdom
65. United States of America
66. Uzbekistan
67. Vanuatu
68. Viet Nam

Section 6:Schedule of Supply

Contents

1. List of IT Products,Goods and Related Services

Item Number	Name of IT Products,Goods or related services	Description	Unit of measurement	Quantity
I. IT Products and Goods				
A.	Hydro-Meteorological Equipment	Supply, housing, installation, commissioning complete		
A.1	Tipping bucket type Rain gauges		numbers	43
A.2	Radar type water level sensors		numbers	31
A 3	Discharge measuring equipment			
A.3.1	ADCP		numbers	3
A.3.2	DGPS		numbers	3
A.3.3	Echo sounder		numbers	3
A.3.4	Sediment measuring equipment (2- US D74 or equivalent + 1- US DH 48 or equivalent)		numbers	3
A.3.5	Automatic Evaporimeter (installed at raingauge sites – 1 per basin)		numbers	6
A.3.6	Surveillance Camera (at all gaugesites)		numbers	74
B.	Computers and Printers			
B.1	Servers at DHM Central office and basin offices as per specifications (Type Com-01)		numbers	8
B.2	Desktop PC at DHM Central office and basin offices as per specifications (Type Com-02)		numbers	8
B.3	Laptop for DHM central office and basin offices as per specifications (Type Com-03)		numbers	4

B.4	Printer for DHM central office and basin offices as per specifications (Type Printer-01)		numbers	4
B.5	Printer for DHM central office and basin offices as per specifications (Type Printer-02)		numbers	4
C	Installation of high speed internet at DHM field offices	Speed at least 40 MBPS	numbers	4
D	Model based flood forecasting and early warning system	Hydrological and 1D-2D hydrodynamic models	Rivers	5
E	Modelling Software (including hydrological and 1D2D Hydraulic)Support and maintenance costs only (model should be license cost free)		Set, full system	1
F	High resolution DEM(Digital Elevation model) data		Basin	5
II. RELATED SERVICES				
Item Number	**Name of Goods or related services**	**Description**	**Unit of measurement**	**Quantity**
G:	**Hydro-meteorological equipment services**			
G.1	Site feasibility survey, availability of land, design and drawing for hydro-met stations		Nos	74

H	**Data transmission, integration and database development and dissemination systems**			
H.1	Annual cost of Internet (4 sites x 5 years)		Years	20
H.2	Integration of Mobile network with servers and field stations		Lump sum	1
H.3	Mobile SIM charges for 31 SIMs		Years	5
H.4	Telemetry database development and management web application		basins	6
I:	**Topographic Survey, Discharge and Sediment Measurement and Extreme flow Estimation**			
I.1	Supply and installation of staff gauges for manual reading, including level connection to the datum, maintenance for 5 years		numbers	31
I.2	Supply and installation of crest gauges for marking of highest flow level and slope and replenishment of hydrochromatic paints for 5 years		numbers	31
I.3	Inundation survey based on community experience in key locations of flood affected area in the recent past	GPS location and depth of inundation in meters above sea level	basin	5
I.4	River Survey; measurement of river cross sections in the following rivers:	approx.380 meter apart		at least
I.4a	Mohana-Khutia (total length of river, 140 km)		numbers	369
I.4b	East Rapti (total length of river, 139km)		numbers	366
I.4c	Lakhandehi (total length of river, 61 km)		numbers	161
I.4d	Bakraha (total length of river, 54 km)		numbers	142
I.4e	Mawa-Ratuwa (total length of river, 91 km)		numbers	239
I.5	Topography check survey on floodplain (5 basins)		numbers	200

I.6	Discharge measurements at sixteen locations (Mohana-120, Khutiya-120, Mawa- Ratuwa-180, Bakraha-180, Lakhandeh-180, East Rapti-180) for the 5 month wet season (1 May - 30 Sept) weekly for the first year after gauge installation, every 2 weeks during the wet season for the remaining 4 years of the contract.		numbers	960
I.7	Extreme flow estimation of each hydrometric site by indirect slope area method and using energy equation by installation of crest gauges at 3 locations, Replacement of hydrochromatic tapes for high flow marking for 5 years		set of survey	16x5
I.8	Sediment measurement and observation, to be made at same frequency and location as discharge measurements (I.6).		numbers	960
J:	**Data Processing Work**			
J.1	Ground truthing of high resolution DEM by integrating satellite based DEM with topographic check data, cross section of river and river bathymetry data		Basins	5
J.2	Arrangement of point data and remote sensing based data in proper formats for hydrological and hydraulic models		Basins	5
J.3	Data analysis, development & updating of rating curves, generation of discharge time series from water levels of the rivers.		numbers	16
K:	**Development of FFEWS and Decision Support System**			
K.1	Gauge to Gauge method of Flood forecasting;			
K.1.a	Gauge Reading for 5 years @ 5 months, 3 times per day for 31 stations including mobile data transmission		Station Months	775
K.1.b	Development cost		Basins	5
K.1.c	Operation cost, including performance assessment & reporting for 5 rivers for 5 years		Basin Years	25

K.1.d	Dissemination cost		Years	5
K.2	Model based flood forecasting and warning system (hydrological and 1D2D hydrodynamic)@ 5 river basins			
K.2.a	Operation cost, including performance assessment & reporting		Basin Years	15
K.2.b	Dissemination cost		Years	3
K.3	Setting impact based warning and danger level at forecasting stations for downstream communities		Basins	5
K.4	Development of alarm and alert message generation and dissemination system		Lump sum	1
K.5	Integration of models, Automation of FFEWS system		Basins	5
K.6	Development of Web based Graphical Interface and Mobile App		Lump sum	1
K.7	Development of Forecast Verification Tool and Auto Reporting Mechanism		Lump sum	1
L:	**Knowledge Transfer**			
L.1	On the job training to DHM Technicians as per TOR	O&M data collection, equipment and IT	Lump sum	1
L.2	Group training (10 participants from Central Office, 1 each from 6 field offices twice a year during O&M period.	Flood forecasting and warning		PS
L.3	Workshop (25 participants in each river basin community2 times during O&M period.	Flood forecasting and warning		PS
L.4	Report presentation and expert review once every year during O&M period.	Technical meetings	Lump sum	1

L.5	On the job training site visits of DHM staff during 2 years of installation and 3 years of Operation and maintenance, 320 person-nights of DHM staff (one person stay for one night is a person-night).			PS
M:	**Reports, SOP, Guidelines and Manual Development**			
M.1	Handover of Raw and Processed Data		Lump sum	1
M.2	Handover of Model		Lump sum	1
M.3	Technical Tutorials		Lump sum	1
M.4	User Operation and Troubleshooting Manual		Lump sum	1
N:	**Operation and Maintenance**			
N.1	Price for inland transportation and other services required in the Purchaser's country to convey all the Goods to their final destination (including Insurance) from the EXW premises, or port of entry, or border point to Project Sites.		Lump sum	1
N.2	Security cost of tipping bucket type Rain gauge stations (5 years X 43 sites)		station years	215
N.3	Operation & maintenance of tipping bucket type Rain gauge stations (43 Sites)		years	5
N.4	Security cost of radar type water level sensor stations (5 years X 31 sites)		station years	155
N.5	Operation & maintenance of radar type water level sensor stations (31 Sites)		years	5

N.6	Operation & maintenance of discharge measuring equipment (ADCP, DGPS, Echo sounder – 9 numbers)		years	5
N.7	Field operations including transport, office setup etc. during 2 years of installation by the bidders		years	2
N.8	Office setup, operation and transport cost in Kathmandu during 3 years of installation and system development		years	3
N.9	Field operation cost during Operation and maintenance period (3 years)		years	3
N.10	Office operation cost in Kathmandu during Operation & maintenance period of 3 years		years	3
N.11	Insurance cost of all equipment		years	6

2. Delivery and Completion Schedule

The delivery period shall start as of the date of the signing of the Contract Agreement.

The delivery schedule indicates a delivery date at the destination sites indicated below. It is expected that the contractor schedules his work in the field during the main working period between October to May. Monsoon period is during June to September; however, some rain may occur during any period of the year. The Supplier should provide a suitable program and schedule of works.

S.N	Description of IT Products, Goods or Related Services	Unit	Quantity	Delivery Schedule (Duration in months, cumulative)	Location	Installation	Completion Date (Duration in months, cumulative)
A.	**Hydro-met Equipment (as per details and specifications) supply, civil works, housing, installation, commissioning complete**						

A.1	**Tipping bucket type Rain gauges**	Nos	43	8 months	At the respective sites as shown in Section 6 - Appendix A: Location of telemetry hydro-met stations and in Drawings. To be confirmed by site survey and in agreement with DHM.	12 months	
A.2	**Radar type water level sensors**	Nos	31	12 months	At the respective sites as shown in Section 6 - Appendix A: Location of telemetry hydro-met stations and in Drawings.	18 months	
A.3	**Discharge measuring equipment**						
A.3.1	ADCP	Nos	3	8 moths	Field location to be agreed with DHM	12 months	
A.3.2	DGPS	Nos	3	8 moths		12 months	
A.3.3	Echo sounder	Nos	3	8 moths		12 months	
A.3.4	Sediment measuring equipment(2- US D74 or equivalent + 1- US DH 48 or equivalent)	Nos	3	12 months		18 months	

A.3.5	Automatic Evaporimeter (installed at raingauge sites – 1 per basin)	Nos	6	8 months		12 months	
A.3.6	Surveillance Camera (at all gauge sites)	Nos	74	8 months		12 months	
B.	**Computers and Printers**	Nos		6 months	DHM area offices	7 months	
C.	Installation of high speed internet (at least 40 MBPS) at DHM field offices	Nos	4	12 months	DHM area offices	12 months	
D	Model based flood forecasting and warning system (Including out of box costs only - system development services included in item K)	Nos	5	34 months	DHM office, Kathmandu	36 months	

E.	Support and Maintenance cost for Modelling Software (including hydrological and 1D2D Hydraulic) (model should be license cost free)	LS	1	Throughout the project duration	DHM office, Kathmandu		
F.	High resolution DEM (Digital Elevation model) data	Basin	5				24 months
G.	**Hydro-met equipment services**						
G.1	Site feasibility survey, availability of land, design and drawing for hydromet stations (31 hydro stations and 43 rainfall stations)	Nos	74		At the respective sites as shown in Section 6 - Appendix A: Location of telemetry hydro-met stations and in Drawings.		11 months

H.	**Data transmission, integration and database development and dissemination systems**					12 months	For 5 years
I.	**Topographic Survey, Discharge and Sediment Measurement and Extreme flow Estimation**						
I.1	Supply and installation of staff gauges for manual reading, including level connection to the datum, maintenance for 5 years	Nos	31	6 months	At the respective sites as shown in Section 6 - Appendix A: Location of telemetry hydro-met stations and in Drawings.		12 months

I.2	Supply and installation of crest gauges for marking of highest flow level and slope and replenishment of hydrochromatic paints for 5 years	Nos	31		At the respective sites as shown in Section 6 - Appendix A: Location of telemetry hydro-met stations and in Drawings.		
I.3	Inundation survey based on community experience in key locations of flood affected area in the recent past	Basins	5				24 months
I.4	**Measurement of river cross sections in the following rivers:**	Nos					24 months
I.5	**Topography Check survey on floodplain (5 basins)**	Nos	200				24 months

I.6	**Discharge measurements at sixteen locations for 5 months (1 May - 30 Sept) weekly for the first year after gauge installation, every 2 weeks for the wet season for the remaining period of 4 years.**	Nos	960				6 years
I.7	Extreme flow estimation of each hydrometric site by indirect slope area method and using energy equation by installation of crest gauges at 3 locations, Replacement of hydrochromatic tapes for high flow marking for 5 years	Set of survey	80				6 years

I.8	Sediment measurement and observation, to be made at same frequency and location as discharge measurements (I.6).	numbers	960				6 years
J.	**Data Processing Work**						
J.1	Ground Truthing of High Resolution DEM by integrating Satellite based DEM with Topographic check data, Cross Section of River and River Bathymetry Data	Basins	5				30 months
J.2	Arrangement of point data and remote sensing based data in proper formats for hydrological and hydraulic models	Basins	5				30 months

J.3	Data analysis, development & updating of rating curves, generation of discharge time series from water levels	Nos	16				6 years
K	**Development of FFEWS and Decision Support System**						6 years
L.	**Knowledge transfer**						6 years
M.	**Reports, SOP, Guidelines and Manual Development**						6 years
N.	**Operation and Maintenance**						6 years

3. Technical Specifications

Table of Contents

1. Introduction

1.1. Background

Through the Priority River Basin Flood Risk Management project, ADB is supporting the Government of Nepal to improve the resilience of communities to flooding in six river basins in the Terai Region. These areas are highly exposed to flooding with vulnerable communities. The local response to flooding will be strengthened through the provision of hydrometric equipment and the establishment of flood forecasting and early warning systems (FFEWS).

The existing system of flood forecasting and early warning in some basins of Nepal includes real time data acquisition systems (primarily rainfall and water-level), a central data server, integrated catchment hydrological (rainfall-runoff) models and river and floodplain hydrodynamic models within a real time flood forecasting system. A numerical weather prediction (NWP) model provides quantitative rainfall forecasts for up to 3 days in advance, which are used in some of the hydrological model to forecast runoff. The hydrodynamic model produces 3-days flood (flow and water-level) forecasts at selected locations along the river system.

DHM has developed and is operating a flood forecasting and early warning system in the major river basins of Koshi, Gandaki and Karnali Rivers. The system has recently been extended to include the Bagmati River Basin and West Rapti River Basin. Real time reporting rain gauges have been installed in these basins, which together with the NWP forecasts, provide inputs to the rainfall-runoff models which produce catchment runoff which in turn as used as inputs to the forecasting hydrodynamic models. Real time water level data from river gauging stations in the basins are used by data assimilation techniques to minimize errors in the hindcast period which update the forecasts. The forecasting models are run every day in the morning during monsoon season at DHM head office in Kathmandu. The results are interpreted into warnings which are combined with the "*River Watch*" and "*Rainfall Watch*" systems of DHM and are disseminated to the public via the DHM website. Important warnings are also disseminated via mass SMS as well as through the various disaster management agencies of the Government.

The FFEWS system operated by DHM is in its preliminary phase with medium to big river system and needs advancement with multi-models or ensemble models to come up with improving accuracy level of the flood forecasts along with generation of forecast with uncertainty associated with the predictions. The FFEWS envisaged in this project is for very small catchments with floods of flashy nature and major portion of catchments are prone to overland flow and sediment and debris laden than to confined river channels in the southern part of the Terai during monsoon season. The purpose of the FFEWS in the project area is to develop impact based early warning system so that loss of life and property in the flood prone zone would be reduced subsequently. Since the FFEWS system has to be built considering the embankment and associated risk of failure of the infrastructure, the hydraulic component of modelling work is of a bit most important to set appropriate warning and danger level threshold at the base and forecasting stations. Further, to disseminate the warning message to community level with adequate lead time, both the forecast and real time monitoring of rainfall and water level in the forecasting stations and impact of failure of embankment at sensitive locations has to be integrated with fully automated Decision Support System (DSS) which is capable to generate automated text messages of warning and danger level threshold identifying the vulnerable settlements and would be meaningful to the community at flood prone zone. Finally there shall be provision of integrating the information for community to take proper action against the warning messages such as identifying safe ways and safe area or contemporary shelters during disaster period in DSS so that the disaster management authorities take appropriate rescue and response operation during flooding and inundation. Almost all project area has to begin with FFEWS from detail survey of site of stations, designing of network including civil works, database management for forecasting and inundation models, assimilation work, integration of hydrological and hydraulic models, determination of warning thresholds at forecasting stations, development of DSS system in DHM premise are the complete package of the project. Hence, DHM opens the call for competitive

suppliers and service providers to design, install, develop, operate, capacitate and handover the robust impact based FFEWS system to DHM for proposed river basins in Nepal.

2. Scope of Work

2.1. Overview

The overall scope includes the provision of hydrometric equipment and data monitoring equipment, and the provision of operational flood forecasting and early warning system for six river basins in the Terai Region of Nepal. Maps of these six river basins can be found in Appendix A.

The scope includes the provision (site visit, detail design of network-associated civil work, procurement, installation, monitoring and maintenance) of automatic rain and river water-level gauges, periodic river gauging using Acoustic Doppler Current Profilers (ADCP) and sediment monitoring, river/floodplain topographic surveys, data transmission, database management, development of flood forecasting models, and real time operational flood forecasting and early warning, and associated activities, for the Mohana-Khutia, East Rapti, Lakhandehi, Bakraha and Mawa-Ratuwa river basins in the Terai region of Nepal.

For the West Rapti River basin the scope includes only the provision (site visit, detail design of network-associated civil work for additional stations, procurement, installation, monitoring and maintenance) of automatic rain and river water-level gauges to support and improve an existing flood forecasting and early warning system.

The scope includes automating data flow, procuring necessary software licenses, developing fit-for-purpose models for flood forecasting and producing early warning systems (FFEWS) for dissemination by various means including a web-based application.

The total project is scheduled to run over 6 years (72 months). Input has been separated into a war36-month installation and development phase, followed by a 36-month operate, refine and maintenance phase of the equipment, data flow and FFEWS system.

Comprehensive training and capacity building, including on-the-job training and training courses are included. The Supplier will provide necessary training to enable DHM to update the underlying models and operate and maintain the system after the project is complete and the systems are handed over to DHM. It is required to regularly train DHM staff in all operation and maintenance components of the flood forecasting and early warning system, including instrumentation, data flow (acquisition, transmission, storage), gauge-to-gauge correlation, hydrological and hydraulic modeling, and all aspects of the flood forecasting and early warning system, including dissemination.

An existing network of rain gauges and hydrometric gauges is currently operated by DHM and data will be available. There are no river gauging stations in four of the river basins covered under this project (Mohana-Khutia, Lakhandehi, Bakraha, and Mawa-Ratuwa) and no historical river discharge data are available for these rivers. The proposed hydrometric systems for these four river basins under this project are completely new. The project is also supporting the West Rapti river basin by providing additional hydrometric equipment to support the existing FFEWS. There is only one river gauging station in the upper reach of East Rapti river.

Another 43rain gauges, and 31water level gauges, with telemetry to DHM offices, will be installed under the project. One evaporimeter shall be installed next to one raingauge station in each basin. Some of the water-level stations will be set up as gauging stations with regular river gauging using ADCPs procured under the project. Gauges will be equipped with data loggers, solar power supply, and hybrid GSM/GPRS/satellite data transmission devices. The automatic rainfall and water-level gauges will record and transmit the data to a central server in real time, where a suite of software using a number of algorithms will use the data to simulate floods and produce flood

forecasts and provide early warnings for up to 3 days in advance. The Supplier will establish a common platform for communication of data and dissemination of forecasts via SMS, smartphone application and web-based software compatible with existing system and infrastructure at DHM.

The scope requires bidders to understand the river systems, site conditions, locations of proposed telemetry and discharge measurement sites, existing system of DHM and its field offices (for example, data storage and flood forecasting systems), operational methods. On implementation the proposed technology and software will be adapted to suit the operational needs of DHM. To fully understand the scope, the local conditions, and the operating conditions of the system to be installed, it is advised that the bidder visits DHM and the site and be fully acquainted with the river systems and local situations pertaining to the work. It is recommended that the bidder visit the sites at their own cost prior to bidding and accommodate DHM engineers in each visit during site selection, installation and topographic survey work. Bidders shall study the existing arrangements of DHM so that they are fully aware of the system to be deployed, its suitability and feasibility considering the ground reality. Bidders are also advised to study the Priority River Basin Flood Risk Management Project documents prepared under the Water Resources Project Preparatory Facility (Package 7)[1].

[1] https://www.adb.org/projects/45206-001/main#project-documents

Flood forecasting and early warning system

2.1.1. Flood forecasting system

DHM already undertake flood forecasting activities for other catchments in Nepal using various approaches. A suite of flood forecasting modelling tools will be developed under this FFEWS project for five of the six river basins. West Rapti already has an operational FFEWS in place and a flood forecasting model will not be required for this basin, however new real time hydrometric data for the West Rapti is included in the scope of this FFEWS project. Relevant attributes of each basin are outlined in Table 1.

The flood forecasting modelling tools required range from the simple correlation methods to advanced flood forecasting and warning systems. They are inter-linked and essential components to the final deliverable – the FFEWS system. The Supplier will develop the following suite of flood forecasting tools for five river basins;

(i) Gauge-to-gauge correlation of water-levels: The simplest and cheapest method, fast to develop, and therefore will be the first tool to become operational. The tool includes an automated gauge-to-gauge water-level correlation forecasting system, as an early phase activity. DHM is using this method for many of their river basins, e.g., in Karnali. Gauge-to-gauge correlation is a generic term and the tool should consist of different approaches, possibly including simple mathematical correlation and other advanced tools. One approach is to supplement the gauge-to-gauge water-level correlation with flow and water-level (via rating curve) forecasts from the hydrological model (using observed and forecast rainfall) in order to increase the forecast lead time. The gauge-to-gauge correlation tool must be flexible enough to allow re-calibration and refinement from time to time as more data becomes available. The gauge-to-gauge correlation forecasting tool should be developed for the five basins over the first 6-12 months of the project and would become operational as soon as sufficient water-level data become available from the newly installed gauge network. The gauge-to-gauge correlation method is recommended as a beneficial utilization of this time, particularly as it will generate an opportunity to transfer early knowledge into the final product. The gauge-to-gauge correlation system should remain operational throughout the project, in parallel with the model-based approach. The approach is an integral part of data analysis; this tool will provide support to the other four components, and will be used as a quick forecasting tool to generate new knowledge early in the project, and to be translated into the final model-based deliverables. Advantages of this method are that community-based disaster risk management (CBDRM) could become operational much earlier, and key areas of uncertainty in flood level forecasting could be identified early in the project.

(ii) Rainfall-runoff (hydrological) models combined with gauge-to-gauge correlation of water-levels: rainfall-runoff models using real-time observed and forecast rainfall will be used to supplement and improve the gauge-to-gauge correlation of water-levels and discharge, and by doing so increase the forecast lead time to 72 hrs. Stage-discharge rating curves will be derived at each gauging station using results from river gauging, if available, or by estimation from hydraulic models, or otherwise. The uncertainty associated with forecasts should be quantified. Further, the rainfall-runoff models will be a pre-cursor to the sub-catchment hydrological models as input to the model-based forecasting system.

(iii) Model-based approach: an automated model-based flow and water-level forecasting system. This type of forecasting tool is currently being used by DHM in the Bagmati, Koshi and West Rapti basins. Fit-for-purpose hydrological and 1D2Dhydraulic models will be

developed and calibrated to observed data. The models will use all available data, including real-time hydrometric and survey data, and will be calibrated to recorded events and the gauged rating curves. Inundation extent shall be verified to highest possible degree in term of spatial and temporal scale (greater or equal to 90% significant level) by comparing at least a single flood event against the satellite/drone based flood inundation image and field survey for each basin and will be fit-for-purpose for flood forecasting. The model-based forecasting system would be developed, calibrated, validated, operationalized incrementally as more and more data becomes available from the new gauge network and other survey work. Systems for five of the six river basins must be operational within the first 36 months of the project. The model-based forecasting system must be flexible enough to allow re-calibration and refinement from time to time as more data becomes available. Once implemented, the model-based forecasting system must remain operational throughout the project, in parallel with the gauge-to-gauge correlation approach.

a. Hydrological model: a semi-distributed conceptual continuous (soil moisture tracking) rainfall-runoff model accepting rainfall and potential evapotranspiration as input and producing sub-basin hydrographs as output. The hydrological model should be sufficiently refined (spatially) consistent with observed and forecasted rainfall to allow flash floods to be forecasted. The hydrological models (HEC-HMS) developed under the Priority River Basins Flood Risk Management Project (WRPPF-Package 7) will be available and could be used as reference for the FFEWS hydrological model development. Model calibration/validation should be carried out and reported valid for monsoon and dry period separately regarding matching of time of peak and quantity in sub-daily scale describing with suitable statistics and forecast skill verification tools to the satisfaction of DHM. Models should be demonstrated to be stable under the full range of flow conditions (from low flow to extreme flood flow).

b. Hydraulic model: a fully dynamic hydraulic model accepting sub-basin hydrographs as input and producing water-level and flow hydrographs as output. The model needs to be fast and stable (run time for 3 days should be<10 minutes for each basin) and therefore the simple modelling method should be chosen which is able to adequately reproduce the flood dynamics (be that routing, 1D-2D). Floodplains behind stopbanks should be modelled and connected to the main channel with weir links to represent flow over the stopbanks/embankments. The hydraulic models (HEC-RAS) developed under the Priority River Basins Flood Risk Management Project (WRPPF-Package 7) will be available for the reference. However, 1D2D hydraulic model for inundation considering the impact to settlement both due to overtopping and failure of the embankments at the sensitive location before exposed to the community and its activities. Model calibration/validation should be carried out verified for historical inundation with satellite images or the community based inundation maps done through social survey and reported to the satisfaction of DHM. Models should be demonstrated to be stable under the full range of flow conditions (from low flow to extreme flood flow). The hydraulic model can be developed as a standalone model and incorporated into a forecasting tool once complete. It is proposed to use the hydraulic model as a forecasting tool as soon as it is ready in order to ensure that the best tools available at any given time are in use for flood forecasting purposes. The model should be capable for producing flood impact maps. These can be

generated dynamically or using a lookup approach based on pre-prepared maps). The system should be capable of including scenarios to simulate embankment failures at key locations, and resulting impacts.

(iv) Integrated flood forecasting and early warning system must be robust enough to continue in the absence of data and internet connectivity and must be stable under all reasonable data input conditions. The forecasting system must have the capability to undertake the following processes;

a. Provide forecasts for up to 72 hours.

b. FFEWS front-end (user-friendly interface) to allow DHM flood forecasters and others to manage the process flow (data acquisition, pre-processing, run schedule, post-processing, forecast dissemination, archiving, summary generation) both directly and remotely.

c. Import rainfall and hydrometric observed time series data in various formats, including but not limited to gridded rainfall forecast data from numerical weather prediction models, satellite-based rainfall estimates, weather-radar-based rainfall estimates and interpolated grid-based observed rainfall from neighboring meteorological stations. The rainfall forecasts for the forecast period shall be obtained from numerical weather prediction models (such as WRF model of DHM, GFS, DWD, ECMWF etc.)The system should also be able to import hydrological forecasts from alternative sources such as from the GloFAS system.

d. Pre-process the hydrometric observed data and meteorological forecasts, as required.

e. Infill data gaps of rainfall and river gauge/discharge whenever there is a lag or lost data related to failure of sensor, data logger, communication system, electricity or any other technical issues.

f. Coupling of the hydrological and hydraulic models

g. Schedule model forecast simulations. Forecast simulations should be both automatic (in forecasting mode) and manual (for re-simulating historical events).

h. Undertake flood forecasts including hindcast (over suitable period), nowcast and forecast (72 hours), using hotstart files from the previous forecast.

i. Automatic updating of model state by inverse modelling (data assimilation) or other, over the hindcast period to fit recently observed water-level or discharge data, and real time rainfall from stations to address the effect of antecedent precipitation in flood forecasting.

j. Post-process and disseminate water-level and flow forecasts, as required. Dissemination by SMS and by webpage is required by integrating and improvising DHM existing processes and procedures with standard DSS software or developing DSS interface in web based at the backend and DSS front end for user to disseminate information of hazard and risk to concerned agencies and individuals, including participating communities in specific media and formats may be required.

k. Automatically generate flood inundation maps (of various scales) of forecasts, based on model cross-sections and other topographical information not directly used by the hydraulic model. (Static and with option of dynamic input data).

l. Establish early warning status levels (warning, alert and alarm levels) at each forecast location, levels to be established based on estimated impacts to adjacent communities and infrastructure.

m. Automatic generation of a warning report and automatic generation of 72 hour forecast bulletin for early warning dissemination, include uncertainty estimates associated with forecast.

n. Archive model input and result files and water-level and flow forecasts, as required.

o. Trouble-shoot, by saving interim files and tracking all processes, checking and reviewing once the forecast has been completed

p. Monitoring/evaluation method to summarize forecast accuracy (compared to actual observations) on a single forecast, daily, monthly seasonal basis and to identify where the systems can be improved and upgraded.

q. The system should be configured to run ensemble forecasts based on ensembles of rainfall (e.g. ECMWF), and carry out necessary post processing to display percentile plots.

Table 1: FFEWS model development: attributes of each basin

Basin	Catchment area (km^2)	Expected FFEWS model coverage: river lengths (km)		
		Gauge-to-gauge correlation	1-dimensional hydraulic models	Remarks
Mohana-Khutiya	702	88	131	1d/2d integrated model in flat area where inundation starts
Mawa-Ratuwa	413	52	102	
Bakraha	437	57	74	
Lakhandehi	425	49	49	
East Rapti	2963	135	135	

The scope of works includes the supply, installation and commissioning of flood forecasting including all necessary hardware, software and data.

The software used (with the exception of the operating systems) should be free to use with no additional license costs incurred for additional users or instances of the software used. DHM will be consulted in selecting the software.

All software licenses (if required) will be procured in the name of DHM. All software maintenance costs for a period of 6 years from license procurement shall be borne by the Supplier.

2.1.2. Web based Display and Mobile App

User friendly web based and mobile app shall be developed to view model generated discharge hydrographs with chart and uncertainty information table for 3day forecast and with an option to generate information in different time interval (1hr, 3hr, 6hr, 12hr and 24hr). A similar Graphical User Interface has to be developed for inundation mapping. Web and Mobile App shall be capable to generate notification and alarm whenever the mobile device is within the area getting flood alert polygons for warning and danger level. The system shall be capable of indicating a route to a flood free safe area.

2.1.3. Hydrometric gauge network

The following outlines the hydrometric equipment procured and installed under the project. All equipment will be procured in the name of DHM. All equipment and collected data will remain under the ownership of DHM. All operation and maintenance costs for the entire contract shall be borne by the Supplier.

Rainfall stations: Forty-three (43No.) auto-telemetry tipping bucket rainfall stations plus adequate spare parts will be procured and installed as summarized in Table 2. Appendix A shows the provisional locations of the proposed telemetry rain gauges, subject to final confirmation during the project.

Water-level and discharge stations: Thirty-one (31No.) auto-telemetry water-level gauges plus adequate spare parts will be procured and installed. Two categories of stations have been proposed as outlined in Table 2: water level only and water level with rating curve stations. Staff gauges covering the full range of probable water-levels (from baseflow to highest probable water-level) shall be installed at a location close by the water-level gauge. The zero of the staff gauge shall be surveyed to a vertical datum agreed by the client. The numbers of each type are also outlined in Table 2. Appendix A shows the provisional locations of water-level and river gauging stations. Station locations have been selected to allow model calibration against water level at least every 10km along each watercourse, and therefore forecast points (at a gauge location) at least every 10km. To make the system operational even in the natural calamities (such as Flood, earthquake, landslide, Forest fire etc.) in term of communication 6 water level/ discharge stations (1 station per basin) must be connected with satellite communication medium in addition with GSM (2 mobile network 2G/3G) communication modem. Stations shall be selected in such a way that the information to downstream people is very helpful during flooding time after the approval from DHM.

Manual staff gauges will be read manually three times per day morning, noon and night for 5 years after the installation. Water levels will be send by text message (or data entry app) and automatically ingested into the telemetry database. Manual readers will also be responsible for marking and recording high flows on crest gauges.

Surveillance webcam capable to monitor during day and night shall be installed in hydrometric stations to monitor water level and security of equipment and infrastructure in the station.

Table 2: FFEWS model development - proposed auto-hydrometric stations with telemetry

Basin	Number of rain gauges	Number of water-level-only gauges	Number of water-level gauge with rating curve gauges
Mohana-Khutiya	11	5	4
Mawa-Ratuwa	4	1	3
Bakraha	6	2	3
Lakhandehi	5	1	3
East Rapti	12	3	3
West Rapti	5	3	-
Total	43	15	16

The scope of works includes:

1. Survey and review the proposed sites for all rain gauges, water-level gauges, gauging stations and telemetric network for hydrometric stations (according to WMO standard).The supplier will be responsible for identifying appropriate land and locations which shall be government land or premises such as public school, government offices excluding

conservation area to the maximum possible so that there is no requirement of detail environmental assessment. DHM will assist in liaison for permission to use such land.

2. Submission of detailed design drawings and specifications for all the components and civil works for hydrometric equipment installation at each location for approval of DHM before proceeding.
3. Civil construction suitable for installing and securing rain gauges, water-level gauges, and staff gauges at all locations.
4. Procure, receive, supply, transportation to site, install, test, commission of the gauges and telemetric equipment as per specifications, and completing the cabling work, transmission system, security system including power supply to the system.
5. Erection and commissioning of communication equipment for each gauge to send data to and receive the control commands from the central monitoring station/center.
6. Supply, installation and commissioning of computer equipment with all necessary licensed software for servers and monitoring stations. Telemetry database and web application for managing telemetry data.

Further details on expected location of the equipment is given in Appendix A. The minimum technical specifications for the equipment is provided in Appendix B.

2.1.4. Topographic data

A topographical survey consisting of cross-sections of the main channels and key tributaries is to be carried out. The topographic survey shall include river sections, all cross-channel structures and flood embankment profiles. The cross-section location should be determined in advance and agreed with DHM. The average cross-section spacing is about 380m. Topography must be surveyed to vertical and horizontal datum agreed by the client. A vertical accuracy of 10 cm (maximum) is expected from the topographical survey. Horizontal resolution of the topographic survey shall be 1m in the main channel. No topographic survey equipment is required to be delivered, the Supplier shall carry out the river topographical surveys and deliver the required topographical information in a format agreed with DHM. Total cross-sectional survey numbers are shown in Table 3. In addition, the zero of all 43 installed staff gauges at water-level stations shall be surveyed to the same vertical datum.

For the floodplain areas including the flat area of Siwalik and Terai the latest high resolution DSM / DTM should be procured with vertical accuracy of 10cm. The DEM should be improved by ground truthing / check survey (a minimum of 40 check points distributed within each basin).This corrected high resolution DEM shall be used in forecasting modelling and mapping.

The survey team will also be responsible for conducting a flood survey of local communities and gathering quantative data on areas flooded in the past, to cross reference and validate the results of the hydrodynamic modelling.

Table 3: Proposed topographic survey in each basin

Basin	River length (km)	No. of cross-sections to be surveyed
Mohana-Khutiya	140	369
Mawa-Ratuwa	91	239
Bakraha	54	142
Lakhandehi	61	161
East Rapti	139	366

2.1.5. River gauging and sediment measuring equipment

Three (3 No.) Acoustic Doppler Current Profiler (ADCP), each supported by echo sounder (depth measurement) and DGPS (differential global position measurement) suitable for gauging in Nepalese rivers (fast currents, high sediment load) for manual river gauging at the sixteen proposed gauging stations (refer Table 2). All equipment will be procured in the name of DHM. All equipment and collected data will remain under the ownership of DHM. All operation and maintenance costs for the contract period shall be borne by the Supplier. The minimum technical requirements for the equipment to be supplied can be found in Appendix B. In case Sediment sampling equipment supplier shall need approval from DHM.

The supplier must carry out discharge gauging at the sixteen(16) gauging stations every week during the rainy season (1st May- 30thSeptember) for the first year and every two weeks in the monsoon during the remaining project implementation period, including the operation and maintenance period. The supplier must also take measurements of suspended sediments during this gauging, this should be done using the data from the ADCP and also via direct sampling methods. The supplier will use methods to estimate the overall sediment concentrations and infer bed material transportation by indirect method to better understand river morphology in these rivers.

The hydrographic team with be responsible for estimating and verification of extreme flows by marking high flows and using methods such as indirect slope area method to estimate flood flows.

2.2. Design, Installation, testing and acceptance

The Supplier will be responsible for all aspects of the design, supply, installation, testing and acceptance of the system. This includes:

1. Design, supply, installation and commissioning of flood forecasting and early warning systems shall be installed in the central monitoring room as per specifications and at respective DHM's river basin offices.
2. Successful tests and trials of the entire system with calibration and verification using gauged discharge when available during the course of work.
3. Acceptance testing and client approval of all components of the flood forecasting and early warning system.
4. For civil works, Nepal / India / equivalent international standards to be followed.
5. Supplier to submit to purchaser Site Specific Environmental Management Plan (SSEMP) under which the Site Specific Health and Safety Management Plan (SSHSMP) is attached. The SSHSMP is to be submitted to the Purchaser and a confirmation of no objection of the SSHSMP should be obtained from the Purchaser prior to commencement of site work. Supplier to comply with the requirements in project's Initial Environmental Examination available at the link https://www.adb.org/projects/52195-001/main#project-documents

The supplier should prepare detailed design documents for the approval of DHM prior to purchase or installation.

The supplier will be responsible for developing detailed testing procedures which will need to be approved by DHM. The tests will be conducted in the presence of a DHM officer (or appointed expert) and test certificates provided for approval. The Supplier should provide a comprehensive test report detailing any outstanding issues and defects. The supplier will cover reasonable expenses for any site visit.

2.3. Training and documentation

The Supplier will provide necessary documentation and training to enable DHM to update, operate and maintain the system after the project is complete and the systems handed over to DHM. Comprehensive training and documentation will be provided on all elements of the system and its maintenance including (but not limited to):

(i) Instrumentation: sensors, instruments, telemetry, power sources, central monitoring station equipment and especially maintenance requirements.

(ii) Data: data acquisition, transmission, database storage, processing, quality assurance, backup, archiving, and database administration and especially maintenance requirements

(iii) Gauge-to-gauge correlation: theory and flood forecasting implementation (data flow, pre and post processing, algorithms, troubleshooting, etc.)

(iv) Hydrological modeling: theory and flood forecasting implementation (data flow, pre and post processing, algorithms, troubleshooting, assimilation etc.)

(v) Hydraulic modeling: theory and flood forecasting implementation (data flow, pre and post processing, algorithms, troubleshooting, etc.)

(vi) Flood forecasting, including all aspects of the flood forecasting systems (data flow, pre and post processing, algorithms, model updating, troubleshooting, dissemination, etc.), especially related to refinement, operation and maintenance tasks.

(vii) Decision support system of flood forecasting and early warning system

(viii) Flow Discharge Measurements and Development of Rating Curves

(ix) Operations and maintenance training course for staff working onsite (data collection and equipment)

(x) Using FFEWS at DHM weather forecasting center including back-up, Recovery and Web-Services.

(xi) Specialized IT Training for O&M of FFEWS

(xii) Technical manual, user manual, troubleshoot steps for general maintenance and operation. Procedure for recalibration of model each year.

(xiii) On the job training:

This training is designed to enhance the in-house capacity of DHM technician during different steps of model development, O&M and troubleshooting. Different additional contents mentioned below as well as points from i) to xii) shall be included. Under this item bidder shall be responsible for following activities (but not limited to):

- Bidder shall manage two days per week to train the DHM technician on following tasks of FFEWS development:
    - <u>Data management</u>: Hydro-meteorological data collection, quality control, data processing, Statistical analysis, gap filling etc. Topographical data collection, data processing, quality control, selection of DEM, DEM correction using field data.
    - Selection and use of satellite data for verification of flooding event.

- Model development: Detail description of methodology, parameter, appropriate method and parameter selection, calibration and validation.
- Detail description of source of forecasted rainfall data, satellite rainfall data, it's significance, mechanism to use in system.
- Detailing of automation of FFEWS.
- Data assimilation module (theory, selection, use, development and coupling)
- Model update: In case of addition or dysfunctional case of hydro-meteorological station.
- Decision support system: (theory, selection, use, development and coupling)
- Operation, maintenance and troubleshooting:
  - Identification of issues
  - License issues(if applicable)
  - Software issue (operating system, hydrological and hydraulic model etc.)
  - Power cut off issues
  - Internet discontinuity issues
  - Changes in website link of forecasted rainfall data, satellite data, real time hydrometric data
  - Change in input data format (eg .Netcdf ,.tiff etc)
  - Identification of probable issues on DSS and its solution.

- Minimum 2 DHM technician shall be trained, addition of trainee shall be made as per the mutual understanding.
- Additional training (theoretical as well as practical) shall be conducted as per the demand and requirement of DHM technician.
- During 3 years of O& M period training shall be given to enhance the operational capacity and troubleshooting capacity of developed FFEWS model.
- All the logistics and other facilities (Stationaries, etc.) shall be managed by supplier as per the requirement of technician to conduct the training.

(xiv) Group training:

- Group training to DHM technician shall be conducted under this item.
- Minimum 10 technicians from DHM (KTM) and 6 technician from field office (Outside KTM) shall be included in training.
- Training courses will take place at suitable venue in Nepal. Supplier will provide classroom and other logistics (including overnight cost for participants).
- On-the-job training will be provided by the Supplier in conjunction with the installation of software, hydro-meteorological equipment, model development,

calibration validation, operation of model and troubleshooting of model during installation and O&M period.

- Minimum 2 training per year shall be conducted. Additional training shall be conducted as per the requirement of DHM.
- These courses will be designed as per the requirement of technician, and shall be finalized after approval from DHM
- Training shall be conducted on different phases: installation of hydro-meteorological station, model development, the operation and maintenance phase for refreshing the trained staff and training additional staff.

The classroom training, hands on experience and troubleshooting will be prepared as video for easy access and will be posted on the web. All training modules will be also provided as a media file (Windows Media Player Compatible) on a USB Drive.

2.4. Operation and maintenance period (3 years)

The Supplier will be responsible for all aspects of operation and maintenance of the FFEWS, during the development phase of the project and in the operation and maintenance period following the main project phase.

The Supplier will be responsible for:

1. Preventive and breakdown maintenance and replacement of necessary equipment to ensure trouble-free operation – throughout the year.
2. 24-7 in-country availability for trouble shooting during the flood season
3. Prepare the FFEWS – at the beginning of each flood season.
4. Analysis of the data and operational production of flood forecasts and early warning systems – during the flood season.
5. Document and evaluate flood forecast performance compared with observations and preparation of annual reports – at the end of the flood season.
6. Updating and fine-tuning models with new data - during each year's dry season.
7. Generation and submission of summary reports related to data quality, station maintenance, software and models, training, etc.- monthly during the flood season.
8. Ensuring security of the equipment and reporting failures through vandalism to respective officer of DHM - continuously.
9. Training DHM officers in operation and repair and maintenance of the hydrometric and telemetry equipment, including comprehensive instruction on instrument operations, the software and hardware operations - continuously.
10. Training DHM officers in FFEWS system operation, including input data specification, model revision and update, quality assurance performance checks - continuously.
11. Handover to DHM all modelling software and customized applications developed during the contract (and shall remain the property of DHM). Hand over by way of electronic format (e.g. flash drive), apart from the installed and commissioned programs in the server. The software that requires licensing from the manufacturer shall be licensed and license certificates shall be submitted to DHM in the name of DHM.

12. Handover to DHM all data, backup data, data storage and restoration, database administration and software maintenance to ensure continuous data acquisition, data processing and data dissemination to the users.
13. Handover technical manual, user manual, scripts and codes, troubleshoot guideline for general repair and training manual for revision of models, inventory of equipment with comprehensive specification satellite and remote sensing data including high resolution DEM

Further details of the technical requirements for the operational and maintenance are provided in Appendix C.

3. Implementation and Delivery Schedule

3.1. Project completion

The total project is scheduled to run over 6 years (72 months). Input for the two main forecasting approaches has been separated into (i) a development phase and (ii)an operate, refine and maintenance phase.

Development phase: The supply of all the materials to the relevant sites, including installation, testing, data transmission and receipt, establishment of the forecasting models and production of flood warnings shall be completed within 36 months of contract signing. The client will advise in writing that the required activities of the commission period have been completed to its satisfaction.

Operate, refine and maintenance phase: The maintenance period will start once the client has advised in writing that the required activities in commission period have been completed to its satisfaction. During the operate, refine and maintenance phase the forecast tools/systems will be re-calibrated, re-validated as more data becomes available and as operational issues are encountered. The Supplier will be responsible for the operation of the entire developed system including repairs and maintenance of all components, for a period of 36 months after satisfactorily completing the commissioning period. Upon satisfactory completion of the maintenance period the Supplier shall hand over all documents, data, software licenses, software code developed, hardware and spare parts to DHM at the end of the project (notionally 6 years). The client will advise in writing that the required activities in maintenance period have been completed to its satisfaction.

The gauge-to-gauge water-level correlation has;

(i) a development phase of 12 months

(ii) a operate, refine and maintenance phase of 60 months

The model-based approach has;

(i) a development phase of 36 months

(ii) a operate, refine and maintenance phase of 36 months

The Supplier will refine the forecasting models as and when stopbanks and other river training works are completed, according to as-built surveys (or construction drawings in their absence). The model should also be refined whenever significant changes to the main channel have been identified (using the provisional sum for topographic survey, where necessary).

During the operate, refine and maintenance phase the Supplier will check the forecasts on a daily basis and trouble-shoot the gauge-to-gauge correlation system and the model-based system. On-site trouble-shooting at DHM offices must be performed each year prior to and during each flood season (taken to be from 1st May to 31st October for this project). The Supplier will place at least one team-member in DHM's offices specifically for this task over the 6-month wet season period and have a remote team available on-call for difficult trouble-shooting. The month of May will be used for re-training and ensuring all flood forecasting models are prepared and ready for the coming flood season; June to September will be used for operation and trouble-shooting where forecast performance during significant rainfall events will be reported on within 1 week of the event and all issues identified will be rectified within 1 week, or as agreed with DHM; October will be used for summarizing the forecast performance over the flood season.

Every year, after each wet season, DHM will review the flood forecast performance and will identify aspects of the gauge-to-gauge correlation system and the model-based system which must be addressed by refinement by the FFEWS Supplier during the subsequent dry season.

Prior to the completion of the project the Supplier will prepare a detailed operation and maintenance manual and plan for DHM which will outline processes and procedures for regular operation and maintenance of the FFEWS as well as suggested staff O&M inputs and equipment purchases.

The supplier will be expected to attend regular progress meetings, submit monthly progress reports, and give progress presentations as necessary to and on behalf of the client.

The project plan will be kept up to date with tracking of projects milestones and other project management activities necessary for the efficient execution of the project.

3.2. Bidding price inclusion

3.2.1. System development, operation and training costs

Costs associated with system development, operation and maintenance over the full project duration based on the bidder's solution will be included in the bidder's financial price.:

(i) Software licensing and annual maintenance/support price. Bidders should use open source or freely available software wherever possible. However, Bidders should include in their technical proposal if their proposed solution incurs any software licensing and support fees and include indicative fees in their financial proposal (up until the completion of the project including the O&M period).

(ii) Computing facilities (in addition to facilities already available within DHM). The bidders shall assume that all computing facilities necessary to implement their proposed solution will not be available within DHM and will need to be procured under the project. The bidders will outline in their technical proposal the technical specifications of all computing equipment required to implement their proposed solution and will include costs for the same in their financial proposal.

(iii) Mobile data transfer costs. The bidders will advise in their technical proposal whether mobile data transfer will be required (for data retrieval and forecast dissemination) for their proposed solution and will include mobile data transfer costs in their financial proposal (up until the completion of the project). Note that currently there is an agreement in place with local mobile service providers whereby flood forecast dissemination by mobile is not charged for and it should be assumed that agreement will apply for this project as well.

3.2.2. Warranty

The supplier will be responsible for the replacement of any defective equipment during the implementation and operation and maintenance period. All equipment should be in

good working condition and free of defects when handed to DHM at the end of the contract.

3.2.3. Documentation

The Supplier shall submit the following project documentation:

(i) Project inception report (after 2 months)

(ii) Monthly progress reports

(iii) Detailed design report for FFEWS including all equipment to be installed (including civil, electrical works)

(iv) Project plan (after 2 months)

(v) Quality Plan (after 2 months)

(vi) Risk assessment and Health and safety documentation

(vii) Data sheets & Test Certificates

(viii) Training manuals

(ix) User Manuals

(x) Test report

4. Bidder experience

4.1. Bidder's experience required for the specialist services

The FFEWS will consist of a number of components. Suppliers are required to show their capability and experience in implementing each of the following components;

- Hydrometric gauge network system installation and maintenance
- Flood forecasting models development and maintenance
- Flood forecasting system development and maintenance

The bidder will provide a list of qualified and experienced specialist staff available for the execution of the works as required. The specialist personnel for this assignment is expected to include the following desirable expertise (minimum requirements are listed in the Table below):

- Project management / team leader
- Hydrological and hydraulic modellers;
- Flood forecast and early warning system development (FFEWS) expert
- Meteorological forecast specialist
- GIS specialists
- Hydromet network telemetry instrument design and installation experts
- Site engineers – Electrical / mechanical
- Data management and ICT
- Software developers
- Field personnel

The team should be well connected and available always for the DHM officers to reach and interact. Their names and phones numbers shall be updated and provided to the concerned sub-divisions, divisions and circle office.

The Supplier's staff shall be available, should be able to reach places on the sites quickly and well connected to provide any details, photographs, demonstration, changes in configuration, remote video calls and access to machines at any given point in time.

The Suppliers' site office will be located at logistically convenient and central location. All inventories shall be recorded and inventory made available from the central stores.

The Bidder must demonstrate it has the following key personnel (CV's to be attached to the bid) that meet the following minimum requirements:

Sl. No.	Position	Total Work Experience [years]	Experience in Similar Work [years]
1	Project Manager (Graduate Engineer)-1 no.	10	5
2	Site Engineers- Electrical/Mechanical Engineer and Civil Engineer (graduates) -2 nos.	5	3
3	Hydrological and hydraulic modeller / software Engineer – 1 no.	5	3
4	Flood forecast and early warning system development expert - – 1 no.	10	5

Appendices

Appendix A: Location telemetry hydro-met stations

Appendix B: Hardware specifications

Appendix C: Operations and maintenance

Appendix A- Map of equipment locations

Appendix A: Location of Proposed Telemetry Hydro-met stations

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Note that the gauge locations are indicative only and to be reviewed during the project phase.

Location of the six Priority Basins of the Project

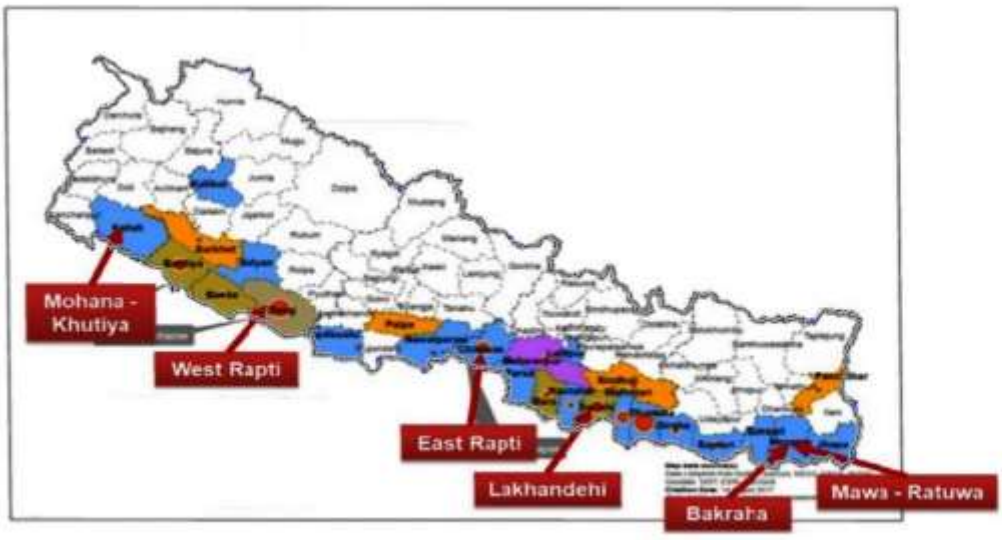

Figure 1 Location Map of the six Priority Basins of the Project

1. Bakraha Basin

Table 4 Location of the proposed telemetry rain gauge stations in Bakraha basin

Catchment/basin name	Rain gauge ID	Name of nearest settlement	Station coordinates	
			Longitude, E (deg)	Latitude, N (deg)
Bakraha	B_Rain _01	Kalbote	87.621	26.825
	B_Rain_02	ThuloDhade	87.584	26.769
	B_Rain_03	Chisapani	87.609	26.707
	B_Rain_04	Latijhoda	87.594	26.634
	B_Rain_05	Dipu	87.602	26.552
	B_Rain_06	Sautha	87.599	26.469

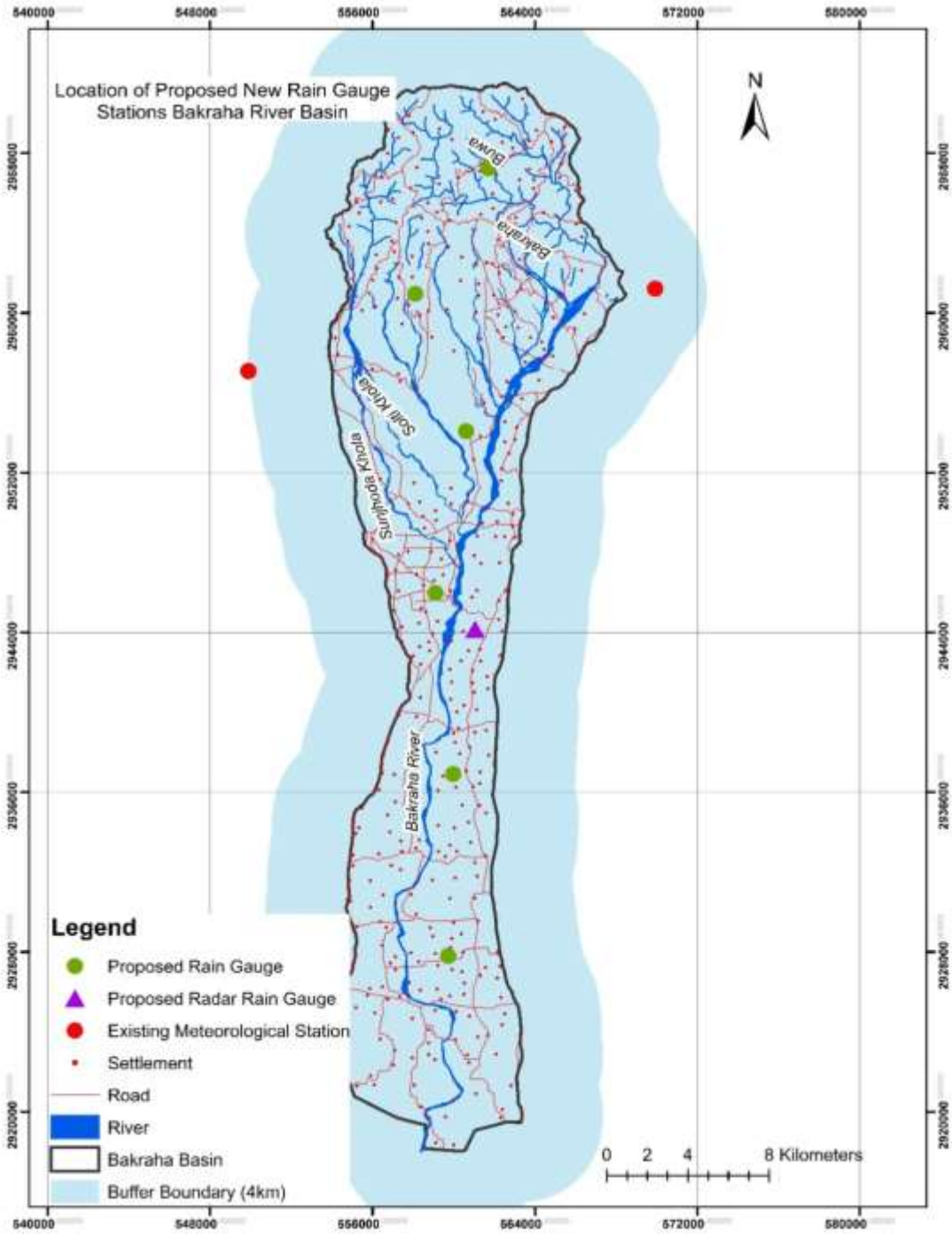

Figure 2 Location of the proposed rain gauges in Bakraha basin (note: Radar Rain Gauge excluded from bid)

Table 5Location of the proposed Water level and discharge stations in Bakraha basin

River name	Water level and discharge gauge ID	fGauge type	Name of nearest settlement	Station coordinates	
				Longitude, E (deg)	Latitude, N (deg)
Bakraha	B_G_01	Water Level	Jayanagar	87.594	26.566
	B_G_02	Water Level	Kaimi	87.574	26.496
	B_GD_03	Water Level and discharge	SonapurMajhitol	87.600	26.403
	B_GD_04	Water Level and discharge	Tapu	87.605	26.635
	B_GD_05	Water Level and discharge	Mechedagi	87.625	26.706

Note: B_G: stands for Gauge only (water level) station in Bakraha River; B_GD stands for gauge and discharge

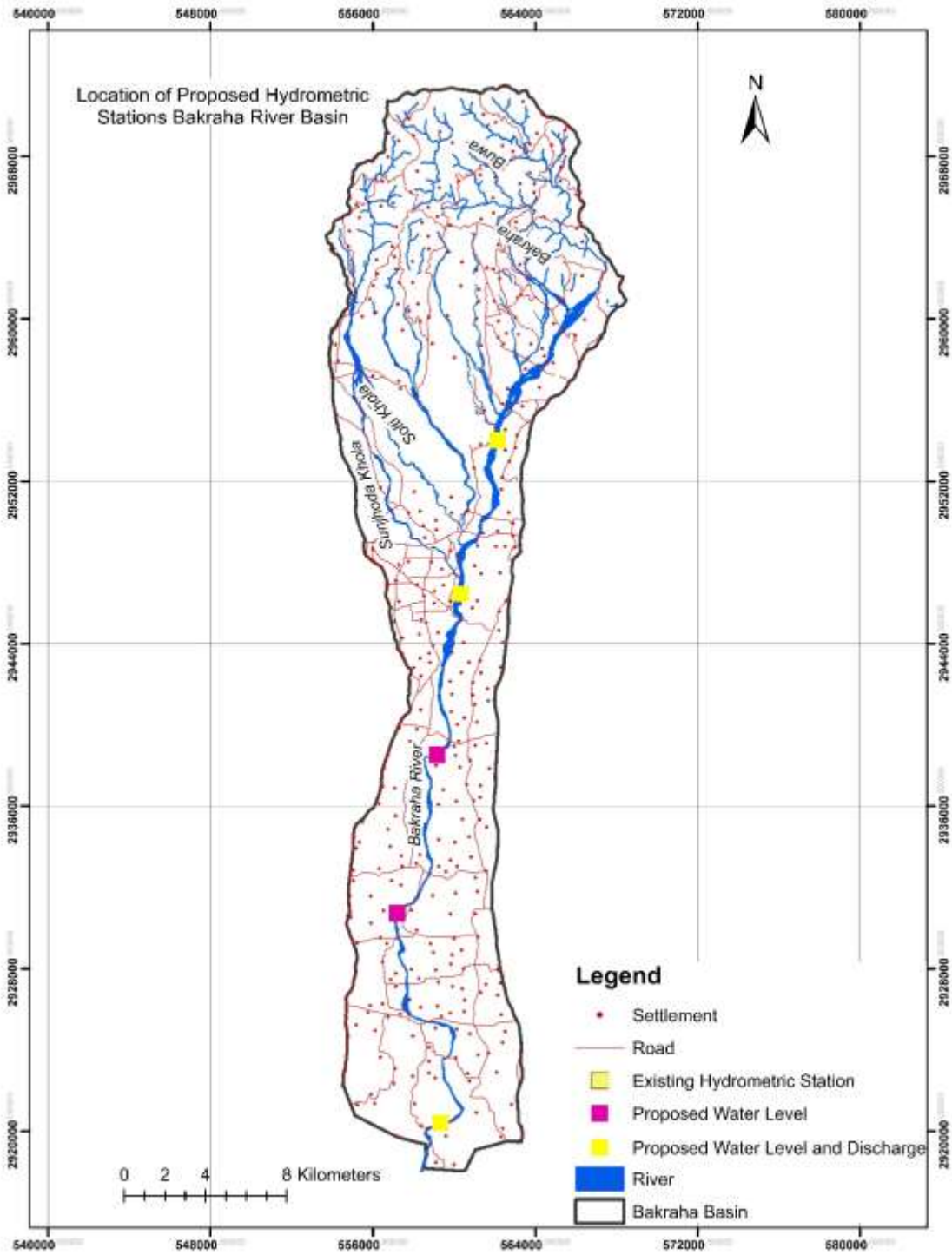

Figure 3Location of the proposed water level and discharge stations in Bakraha basin

2 East Rapti Basin

Table 6Location of the proposed telemetry rain gauge stations in East Raptibasin

Catchment/basin name	Rain gauge ID	Name of nearest settlement	Station coordinates	
			Longitude, E (deg)	Latitude, N (deg)
East Rapti	ER_Rain_01	Nayan Basti	84.309	27.584
	ER_Rain_02	Chitwan National Park	84.429	27.588
	ER_Rain_03	Budhikulogaun	84.536	27.668
	ER_Rain_04	Sainikgaun	84.634	27.618
	ER_Rain_05	Tarchan	84.704	27.702
	ER_Rain_06	Pairang	84.817	27.648
	ER_Rain_07	Keureni	84.941	27.641
	ER_Rain_08	Ghairang	84.977	27.540
	ER_Rain_09	Dhaddaghari	85.085	27.549
	ER_Rain_10	Bhangeta	84.271	27.460
	ER_Rain_11	Chitwan National Park	84.374	27.494
	ER_Rain_12	Chitwan National Park	84.704	27.505

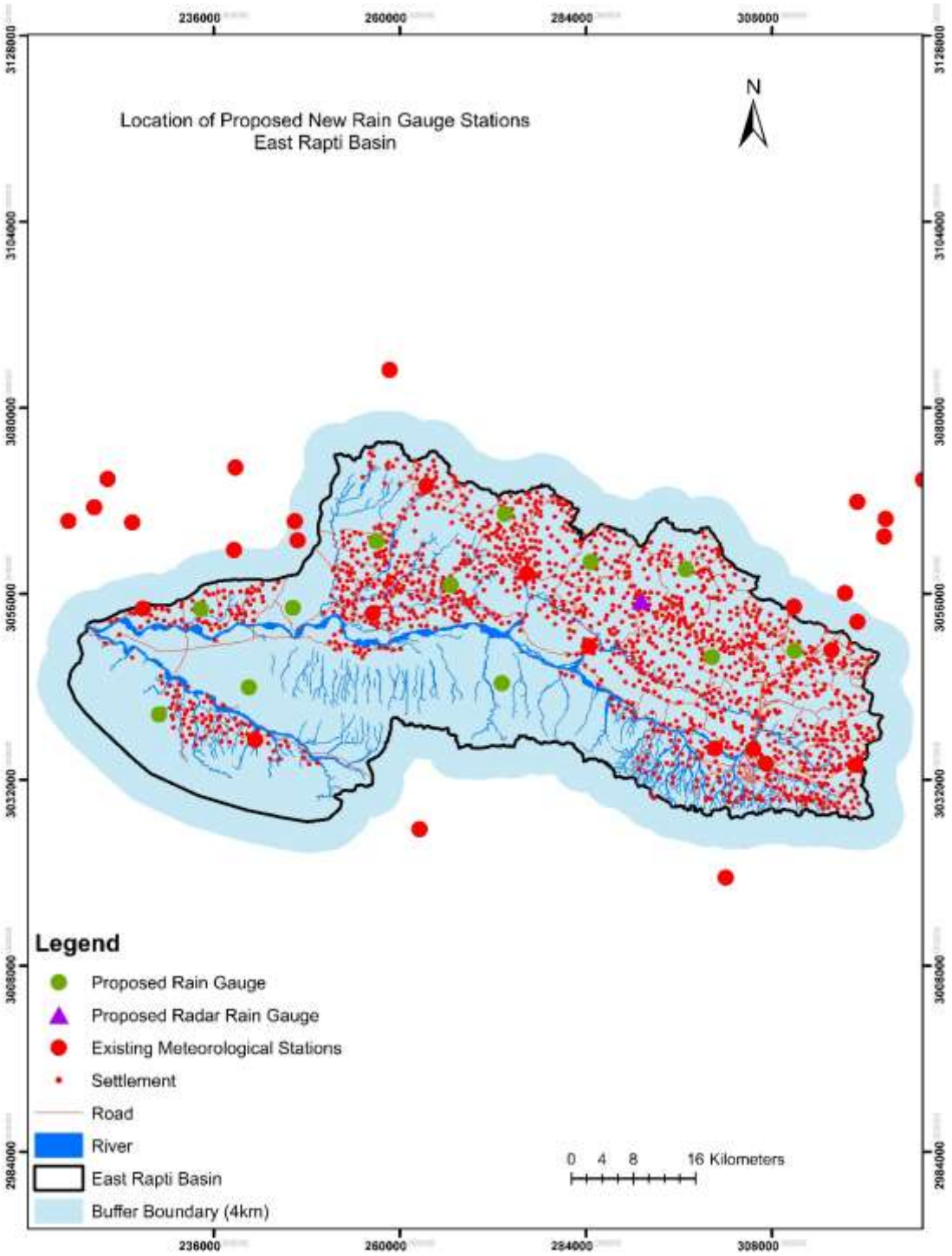

Figure 4Location of the proposed rain gauges in East Rapti basin (note: Radar Rain Gauge excluded from bid)

Table 7Location of the proposed water level and discharge stations in East Rapti Basin

River name	Water level and discharge gauge ID	Gauge type	Name of nearest settlement	Station coordinates	
				Longitude, E (deg)	Latitude, N (deg)
East Rapti	ER_G_01	Water Level	Khadrauli	84.306	27.561
	ER_G_02	Water Level	Kamalpur	84.567	27.553
	ER_G_03	Water Level	Dardara	84.877	27.476
	ER_GD_04	Water Level and Discharge	Sunachuri	84.745	27.537
	ER_GD_05	Water Level and Discharge	Bhawanipur	84.429	27.557
	ER_GD_06	Water Level and Discharge	Androli	84.165	27.558

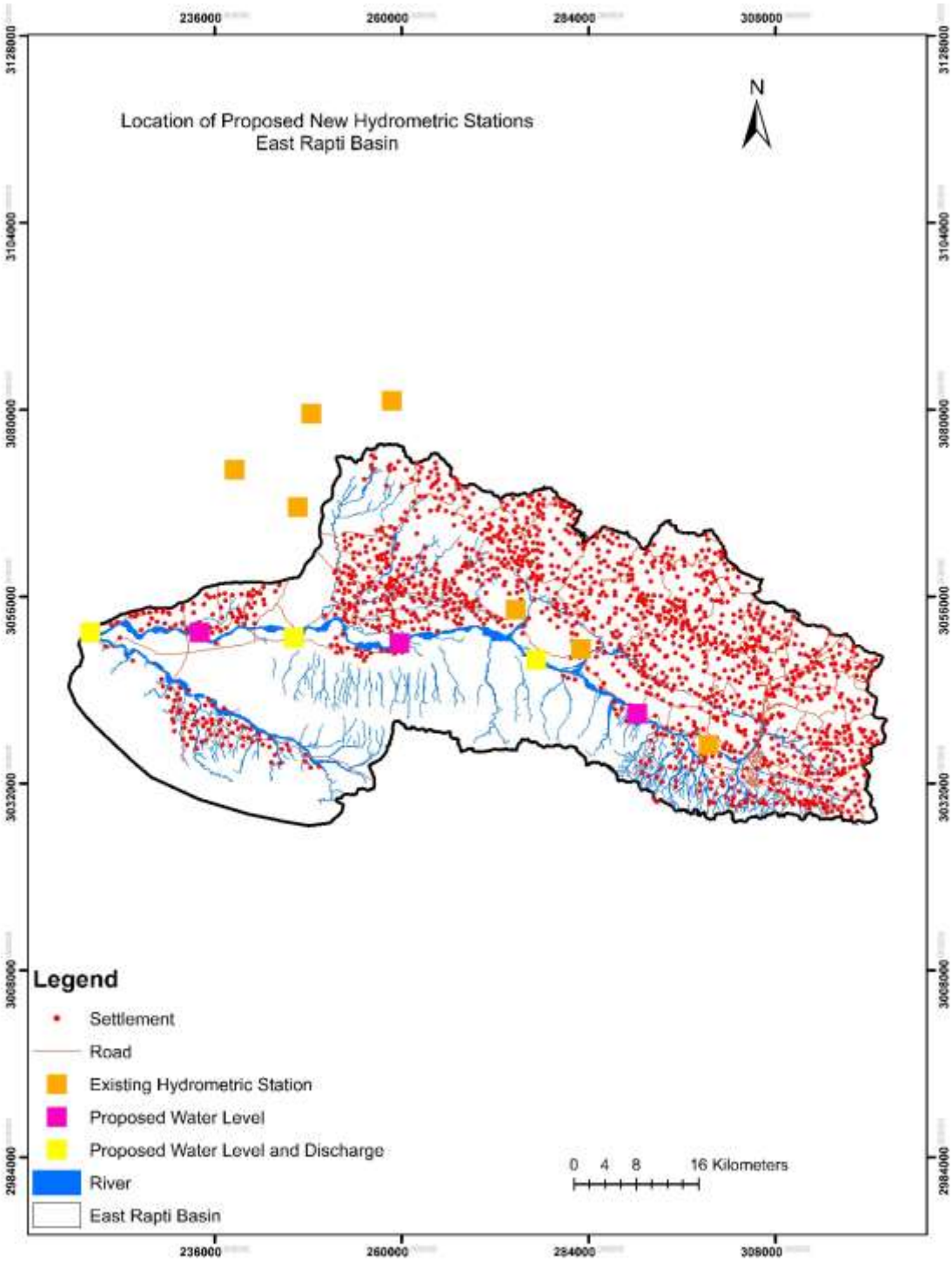

Figure 5Location of the proposed water level and discharge stations in East Rapti Basin

3Lakhandehi Basin

Table 8Location of the proposed telemetry rain gauge stations in Lakhandehibasin

Catchment/basin name	Rain gauge ID	Name of nearest settlement	Station coordinates	
			Longitude, E (deg)	Latitude, N (deg)
Lakhandei	L_Rain_01	Ghumne	85.673	27.138
	L_Rain_02	Bhoktini	85.606	27.104
	L_Rain_03	Karitol	85.556	27.052
	L_Rain_04	Baheriyan	85.507	26.954
	L_Rain_05	Sakraul	85.493	26.844

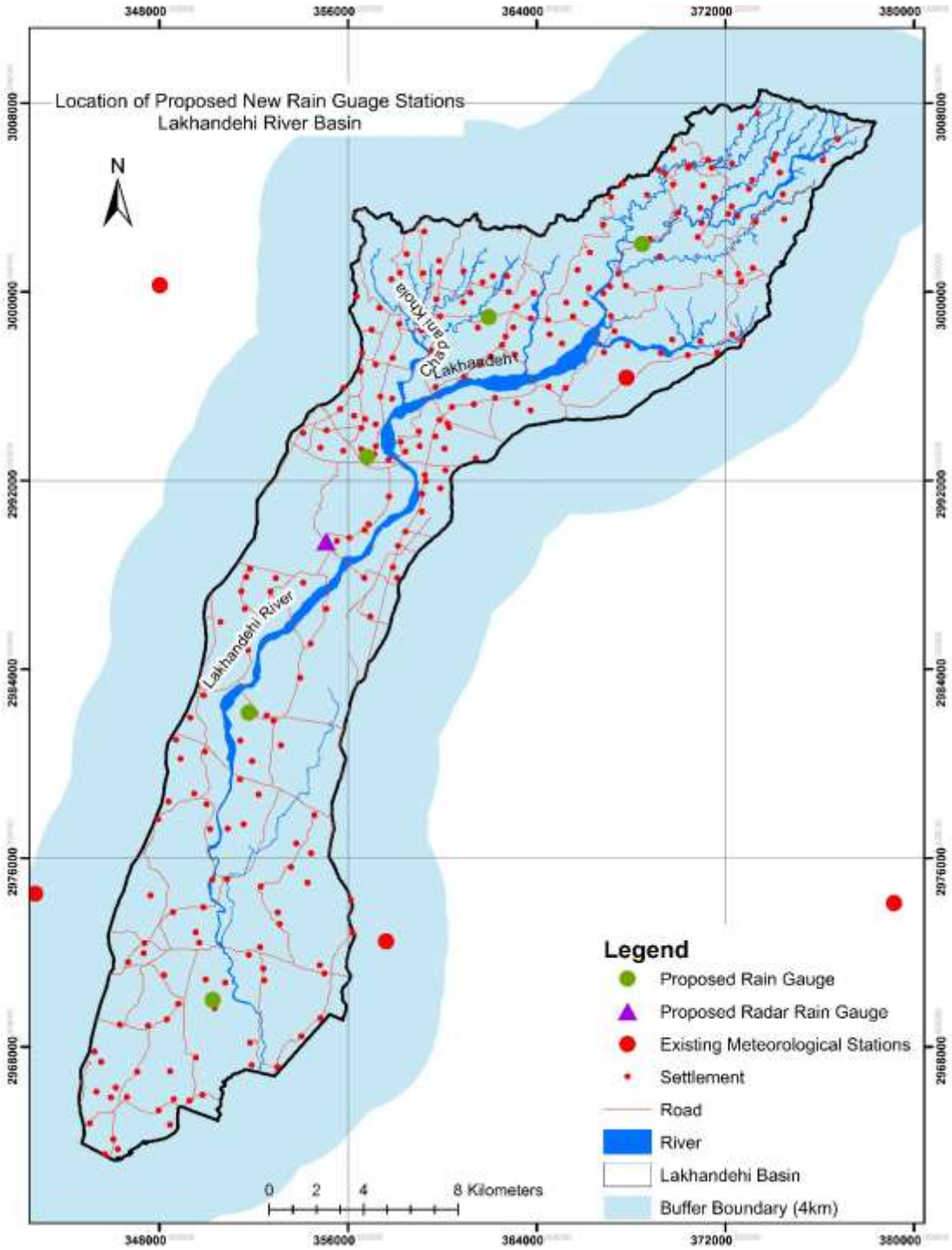

Figure 6Location of the proposed rain gauges in Lakhandehibasin (note: Radar Rain Gauge excluded from bid)

Table 9Location of the proposed water level and discharge stations in Lakhandehibasin

River name	Water level and discharge gauge ID	Gauge type	Name of nearest settlement	Station coordinates	
				Longitude, E (deg)	Latitude, N (deg)
Lakhandei	L_G_01	Water Level	Baheriyan	85.505	26.964
	L_GD_02	Water Level and Discharge	Daphkalitol	85.638	27.087
	L_GD_03	Water Level and Discharge	Pataura	85.577	27.036
	L_GD_04	Water Level and Discharge	Shivanagar	85.515	26.823

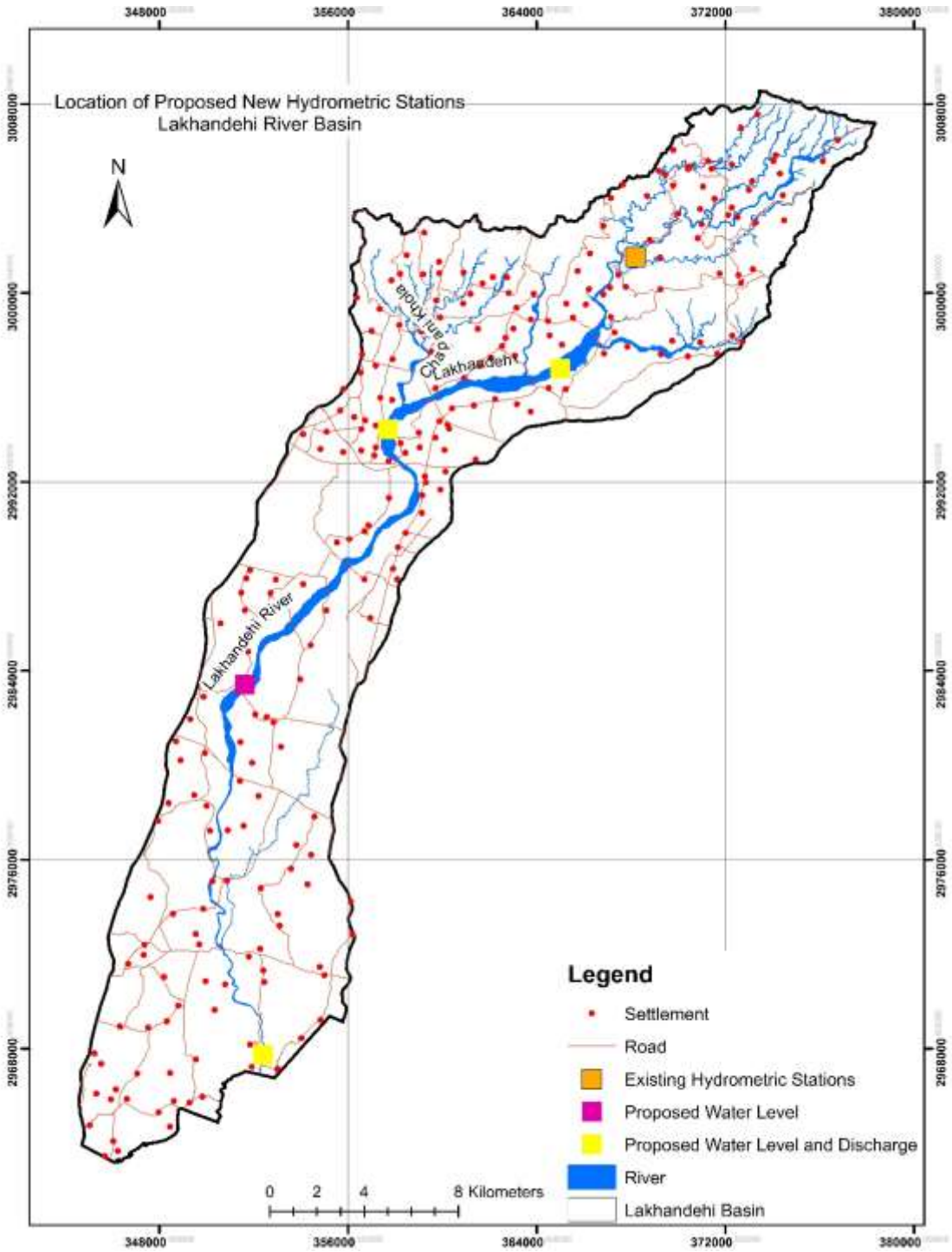

Figure 7Location of the proposed Water level and discharge stations in Lakhandehi basin

4Mawa-Ratuwa Basin

Table 10Location of the proposed telemetry rain gauge stations in Mawa-Ratuwabasin

Catchment/basin name	Rain gauge ID	Name of nearest settlement	Station coordinates	
			Longitude, E (deg)	Latitude, N (deg)
Mawa-Ratuwa basin	MR_Rain_01	Urlabari	87.634	26.653
	MR_Rain_02	Kohabara	87.655	26.541
	MR_Rain_03	Chisapani	87.679	26.877
	MR_Rain_04	Mahamai	87.795	26.731

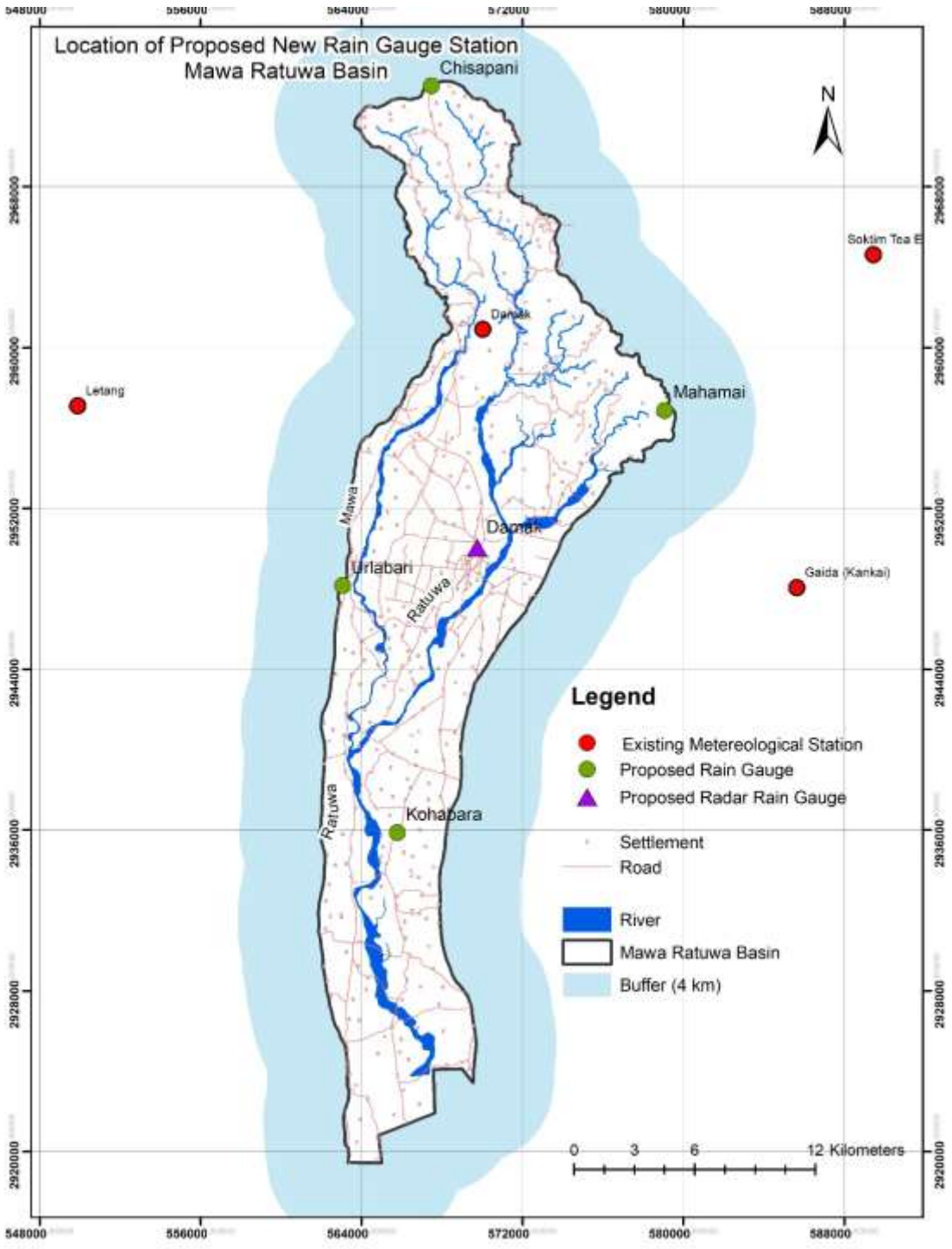

Figure 8Location of the proposed rain gauges in Mawa-Ratuwabasin (note: Radar Rain Gauge excluded from bid)

Table 11Location of the proposed water level and discharge stations in Mawa-Ratuwabasin

River name	Water level and discharge gauge ID	Gauge type	Name of nearest settlement	Station coordinates	
				Longitude, E (deg)	Latitude, N (deg)
Mawa	M_G_02	Water Level	TarabariDipu	87.655	26.685
Ratuwa	R_GD_01	Water Level and Discharge	Satmedi	87.643	26.562

River name	Water level and discharge gauge ID	Gauge type	Name of nearest settlement	Station coordinates	
				Longitude, E (deg)	Latitude, N (deg)
	R_GD_03	Water Level and Discharge	Damak	87.709	26.666
	R_GD_03	Water Level and Discharge	MalahaToli	87.678	26.439

Note: M_G: stands for Gauge only (water level) station in Mawa River; R_GD stands for gauge and discharge in Ratuwa river

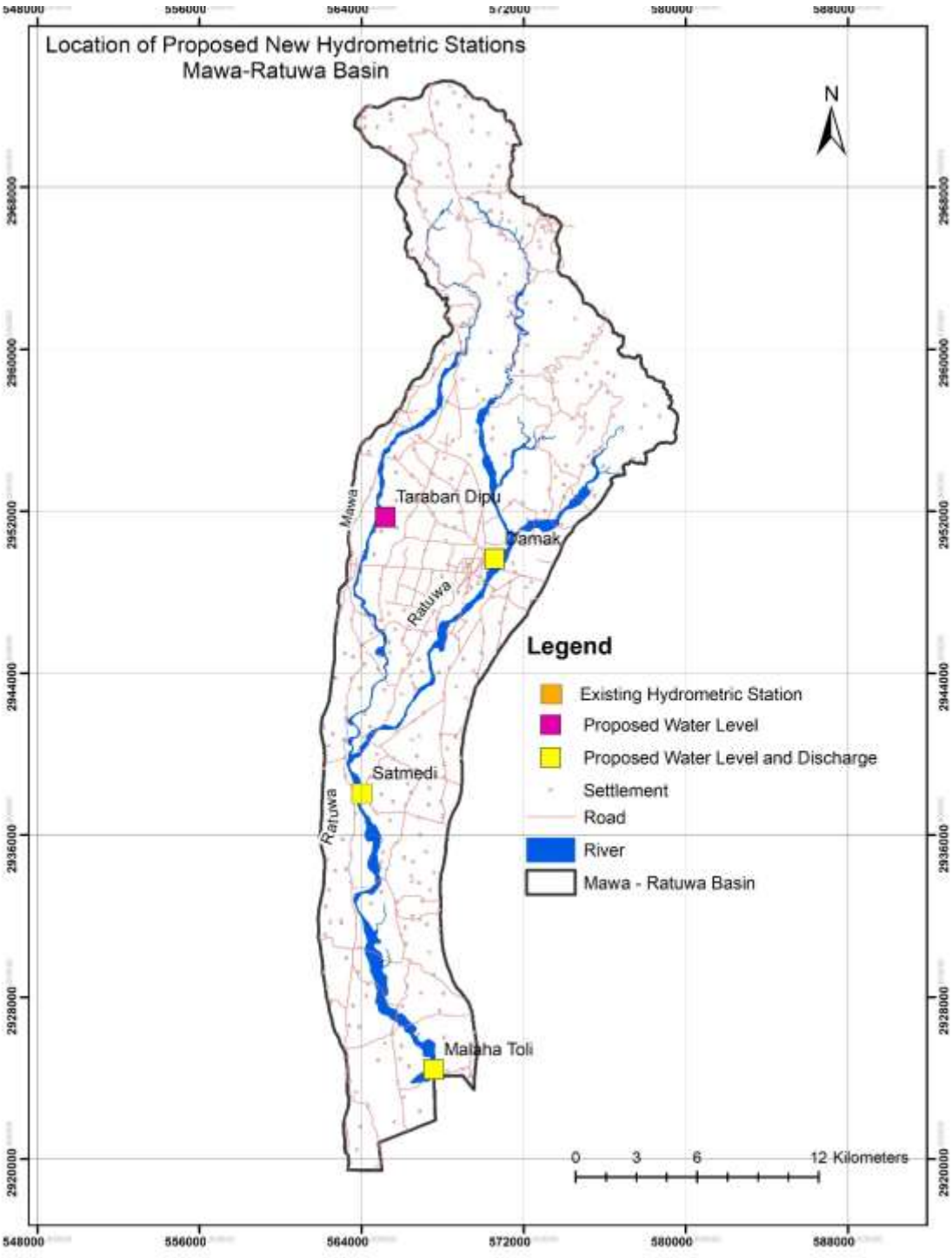

Figure 9Location of the proposed Water Level and Discharge Stations in Mawa-Ratuwabasin

5. Mohana-Khutiya Basin

Table 12Location of the proposed telemetry rain gauge stations in Mohana-Khutiya basin

Catchment/basin name	Rain gauge ID	Name of nearest settlement	Station coordinates	
			Longitude, E (deg)	Latitude, N (deg)
Mohana-Godawari-Monohara (MGM)	MGM_Rain_01	Tudela	80.517	28.886
	MGM_Rain_02	Lalpur	80.605	28.835
	MGM_Rain_03	Chunepani	80.577	28.875
	MGM_Rain_04	Bela	80.622	28.758
	MGM_Rain_05	Baluwaphanta	80.493	28.809
	MGM_Rain_06	Dubki	80.602	28.933
Khutiya-Shivaganga (KS)	KH_Rain_01	Koldanda	80.647	28.911
	KH_Rain_02	Katauje	80.679	28.978
	KH_Rain_03	Urmi	80.680	28.686
	KH_Rain_04	Shiva Ganga	80.720	28.798
	KH_Rain_05	Garbha Durbar	80.762	28.889

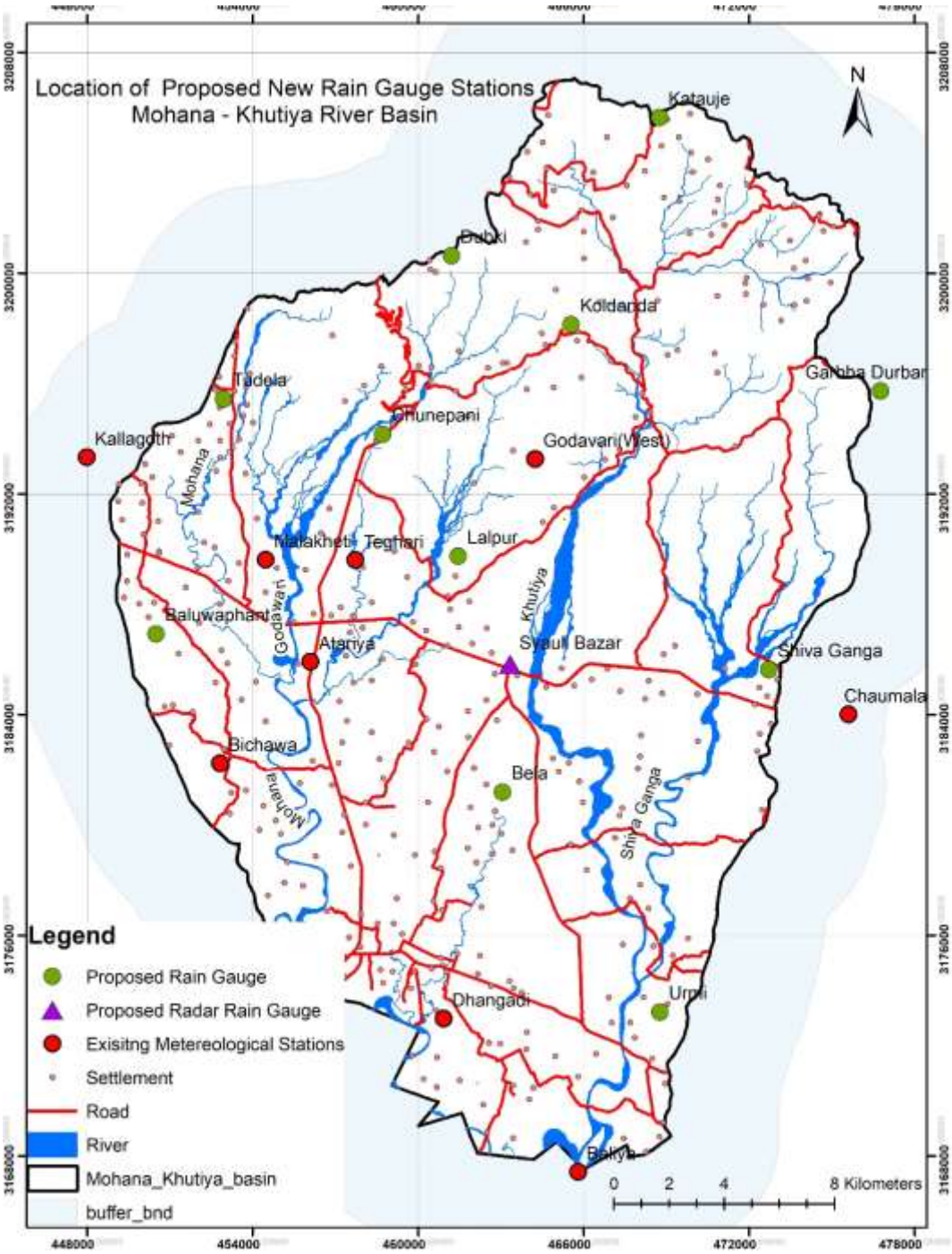

Figure 10Location of the proposed rain gauges in Mohana-Khutiya basin (note: Radar Rain Gauge excluded from bid)

Table 13Location of the proposed water level and discharge stations in Mohana-Khutiyabasin

River name	Water level and discharge gauge ID	Gauge type	Name of nearest settlement	Station coordinates	
				Longitude, E (deg)	Latitude, N (deg)
Mohana	M_G_01	Water level	Dhakhuwa	80.733	28.883
	M_G_02	Water level	Attariya	80.521	28.833
	M_GD_03	Water level and discharge	Geta	80.503	28.846
	M_GD_04	Water level and discharge	Jugeda Katan	80.543	28.813
	M_G_05	Water level	Chatakpur	80.540	28.765
Khutiya	K_G_01	Water level	Bandagada	80.616	28.645
	K_GD_02	Water level and discharge	Syauli Bazar	80.555	28.720
	K_G_03	Water level	Murkatti	80.649	28.849
	K_GD_04	Water level and discharge	Beli	80.635	28.793

Note: M_G: stands for Gauge only (water level) station in Mohana River; M_GD stands for gauge and discharge; same applies to the Khutiya river

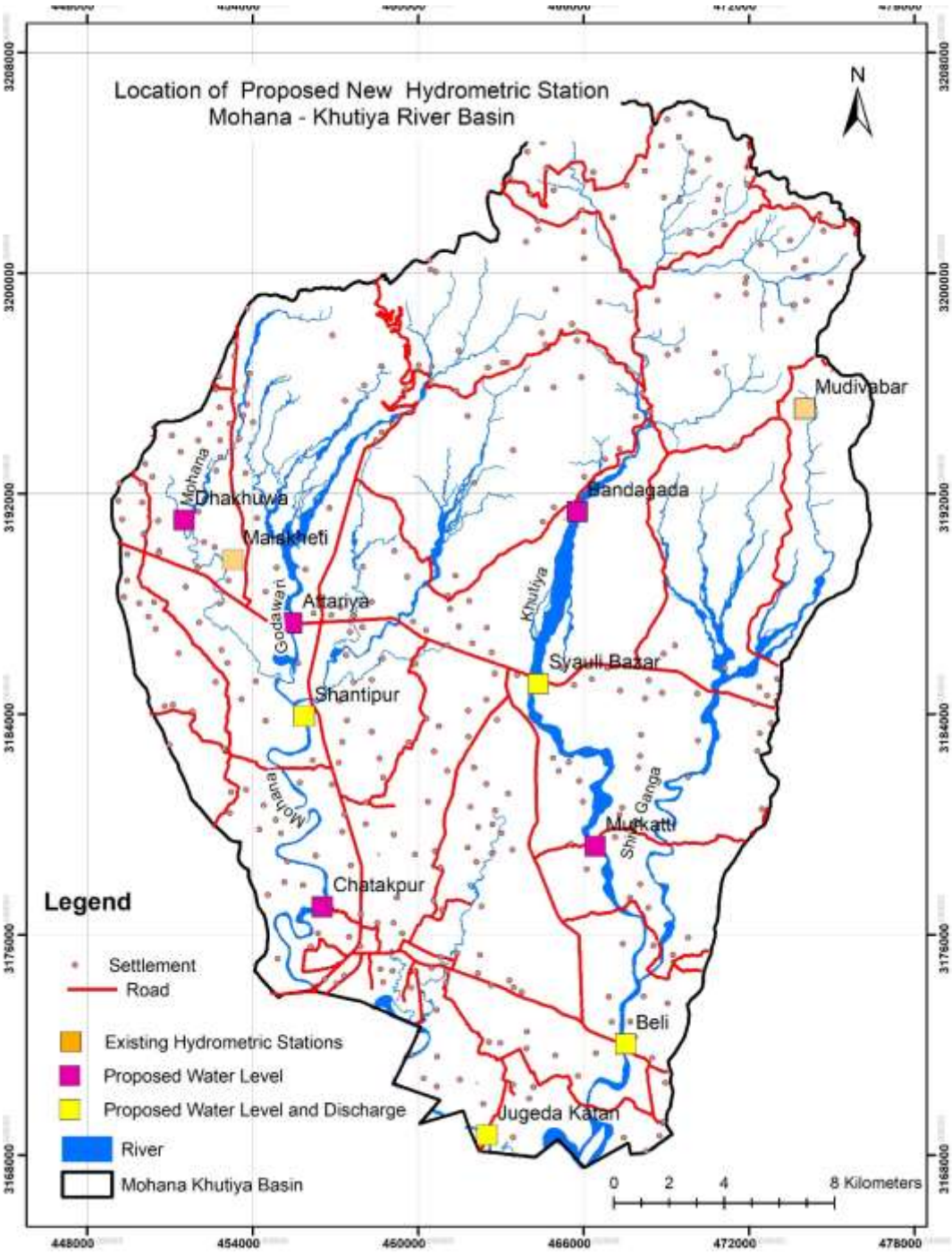

Figure 11Location of the proposed Water Level and Discharge Stations in Mohana-Khutiyabasin

Appendix B - Hardware Specifications

Telemetry field stations

General

The principal function of a remote telemetry station is to transmit measured hydrometric data to a central database. This is a process for collecting and transmitting data to be used as input to the FFEWS.

All equipment shall be new and in perfect working condition. Used demonstration, rebuilt or remanufactured equipment shall be unacceptable. All items in the specification shall be factory available; no aftermarket items will be accepted. All standard equipment and components necessary for normal operation and that are normally supplied shall be furnished by the manufacturer or dealer, even if not called out in the specifications.

Data measurements from the equipment required

The measuring conditions for data to be acquired shall be specified based on operational purposes.

The data items to be covered are:

1. DATA TYPE
   - (i) Date/Time in user defined format.
   - (ii) Rainfall **P** in mm
   - (iii) Water level **H** in m (relative to an agreed datum)
   - (iv) Daily rainfall in mm
   - (v) Intermediate Precipitation (P1hr, P3hr, P6hr, P12hr)
   - (vi) Battery Voltage in Volts.
   - (vii) Security Shed access status with date time stamp.
   - (viii) Sensor cable working condition status
   - (ix) Measurement: validity (if unit is receiving signals from sensor) or ERROR.
2. Timing of measurement,
   - (i) The water level should be measured and logged at user-defined time intervals, in each installation.
   - (ii) Transmission shall be user-definable for each location (some may merit more frequent reporting than others).
   - (iii) The central server will receive data continuity and will display the data in real time round the clock, with data as recent as the last hour.
3. Threshold values for detecting alarms, and
   - (i) ALARM of minimum and maximum values: Alarm output if values are lower than the predefined value. There shall be provision for user-definable thresholds for each location to quickly detect doubtful or unreliable data.
   - (ii) Electronics shed Forced open and signal wire cut status Alarms.

(iii) Data transmission alarms: e.g. working of Sim cards

Reliability

The rainfall and water level measurements shall be taken continuously (at user-defined frequency) throughout the day and night and shall be online throughout, particularly in the rainy season. System designs shall consider the reliability of data acquisition and data receipt confirmation with necessary checks and identifiers for non-receipt of data to identify data gaps, if any, and by automated resending of data or identifying the missed data and manually polling data from the field instruments. Consideration shall be made during system design and installation for the field instruments to perform continuously throughout the year with a reliable and long lasting power supply (robust battery charged with solar power) and choosing the strongest signal strength for good communication from the hybrid GSM/GPRS/satellite network provider. Redundancy in power supply and internet connectivity shall be provided to the main servers to ensure the important functions of data acquisition, data processing and data dissemination at the central monitoring station are continuous.

Equipment safety

Protection structure, grill, mesh, harness, etc., should be supplied and should be part of the installation.

Data permanence

The permanence of hydrometric data should be assured at both field level (for short duration) and at central monitoring center level (for long duration), since these are archived and will be used for water resources management in the long term.

Central Monitoring Station

Data Receiving Center (Central Monitoring Station): The developed system will receive data from the field stations, process, store, compare, analyze and allow interrogation by the forecast modelling system.

Data verification

All data shall be verified upon receipt to ensure the quality of collected data. The data verification process will examine properties of the hydrometric data, which can include (but not limited to) the upper and lower limits of data values and limits on rate of change. Since most of the threshold values of these items vary the system should be designed to enable threshold values to be user-defined for each data. These data verification processes should be handled automatically by the data processing system.

The system will generate a report that identifies potentially spurious data.

Data display and printing

The system shall have the functions of displaying data to screen and printing out data and information in tables and graphs.

For these functions, methods should be provided for displaying and printing data (i) immediately on receipt of each data, (ii) by user-defined start and end dates, and (iii) at regular intervals (such as daily).

Supervision of operational status

Data shall be continuously monitored using data verification techniques (threshold alarms and triggers of highs, lows and rate of change) to immediately detect any problems.Data problems should trigger an email alert to a user define email address for resolution.

The remote telemetry stations are to be installed geographically distributed and operated unmanned.

The operational status of the entire system including the remote telemetry stations should be monitored, and any problems should be detected remotely from the receiving center.

The remote telemetry stations should be designed to report the status of telemetry equipment, sensors and power supplies to the receiving center. The receiving center should check the contents of status reports from remote telemetry stations and inspect for any equipment malfunctions or no data receipts in the receiving center and provide notification of potential problems.

Operational requirement

General

To ensure a stable and sustainable system operation, specialists in hydrology and telecommunications technology should prepare various manuals and standards concerning the management, operation and maintenance of the Central Monitoring Station.

Operating and maintenance manual

The data management system should be determined for the whole system, including methods for long-term data storage and for recovery of data loss as well as ordinary operations. Methods for maintaining the system, hardware countermeasures against data errors and system failures, and methods for keeping and handling consumables and spare parts in stock should also be determined.

Security and maintenance

All sensors, transmitters and telemetry electronics with their accessories should be secured, vandal proof and well maintained.

Maintenance

For stable data acquisition over years, the system should have a preventive maintenance schedule. A year-on-year comparison of data will lead to improvements eventually.

Preventive maintenance consists of daily or periodical inspection and replace of parts. Daily inspection is to check whether the entire system is normally operating by referring to the printouts from the printer or displays at the receiving center. Periodical inspection consists of checking the system through visual checks and using testing instruments for preventive maintenance; inspection items differ depending on the inspection periods. If there are parts that have predefined life cycles, these parts are replaced.

Remote telemetry stations are usually operated unmanned. It is difficult to physically inspect such remote telemetry stations on a daily basis; these stations should be subject to periodical inspection. The intervals of periodical inspection (and the parts replaced) vary depending on the equipment and the climatic conditions at the site, but are usually several months, and at least before and after each flood season.

Remote connectivity charges on year to year basis

The responsibility of the Supplier includes; Choosing the service provider for GSM/GPRS connectivity, Internet connectivity for central monitoring stations, internet connectivity wherever it is deemed necessary at the DHM's field offices for monitoring, SMS and internet information dissemination. All connections shall be in the name of DHM and necessary papers will be provided as required by the Supplier and the service provider. Monthly internet bills for these connections over the duration of the contract shall be paid by the Supplier on time to ensure continual connectivity and the bills will be reimbursed on presentation of the actual bills. Interfacing with the internet service provider for reliable and continuous service is the responsibility of the Supplier for the initial 3 years and 3 years operation and maintenance period.

Automatic rain gauge

Tipping bucket Rain Gauge:

(i) **Housing:** Aluminum, coated, Rain Gauge with Impulse output.

(ii) World Meteorological Organization standards compliance.

(iii) Tipping bucket with single sided ball bearings for High precision.

(iv) With level and adjusting screw. Orifice 8", collecting area: 203cm2

(v) **Resolution:** 1 impulse = 0.1mm precipitation

(vi) **Output:** Reed contact impulse (potential free contact)

(vii) Tipping bucket material: Heavy duty plastic.

(viii) Bird protection - to prevent any interference of birds sitting or nesting at or inside the rain gauge

(ix) Rechargeable Battery: 12 V / The battery system must be capable of operating all components of monitoring station for 20 days without charging.

Final specifications to be confirmed with the DMH instrumentation section before purchase.

Water-level monitoring system

Radar Water Level Sensor

Bridge mounted Radar Water Level Sensor Specification				
Sl No	Equipment	Description & Specification.		
1	Radar Sensor	i)	Power in put	10-15 V DC
		ii)	Power consumption	≤ 15mA active, ≤ 10 mA sleep
		iii)	Range	0.8 - 35m
		iv)	Mounting Support	Required.
		v)	Accuracy	(Linearity, repeatability, hysteresis) 3mm or Less.
		vi)	Resolution	1 mm or Less
		vii)	Transmit frequency	≥24 Ghz
		viii)	Measuring Time	≤ 20second
		ix)	Beam angle	≥ 12º
		x)	Antenna type	Closed flat antenna
		xi)	Interface	RS485 (should work with cable lengths of at least 850 meters)
		xii)	Operating temperature	-40 to +60º C
		xiii)	Relative humidity	0 to 100%
		xiv)	Accessories	Cable and mounting should be included
	Re-Chargeable Battery	12 V/ The battery system must be capable of operating all components of monitoring station for 20 days without charging.		

Related Components: (Both for tipping bucket type rain gauges and Radar type water level sensors)

a. Enclosure

Item:	Technical specifications:
Site conditions	as specified above
Enclosure for equipment	• To accommodate data logger, sensor cards, battery and regulator, transmitter unit, over voltage protection devices, etc.

	• Solution should withstand hostile environment and provide protection against vandalism and be agreed with the purchaser. • protection IP65 (NEMA 4) or better • safety locks of good quality

Data Logger

Data loggers are required to store the data from the sensors and transmit the data to a central server using communication modules. For redundancy the data loggers should be capable to transmit the data simultaneously to two different servers. The data logger should be configurable, using the Internet. Since circuit switch data and fixed IP address are not offered as a service by communication providers in Nepal, the configuration changes should be done through a central server. The operators can make changes to the central server and the configurations would be synced to the data logger when the data logger communicates with the server.

Data Logger Specifications		
No	Item	Technical specifications
1	Site conditions	• ambient temperature: -20 to 55 degrees C • relative humidity: 0% to 100%, non condensing

2	Data logger	• well proven and widely used model, produced by a primary brand name and tested in a large number of installations. Provide manufacturer's certificate that the model proposed has been in production at least 1 year.
		• Open design, operating with a wide variety of sensors
		• multi tasking operating system capable of simultaneous data collection and transmission
		• change of setup do not affect logged data
		  • Non-volatile Flash memory of at least 4MB and expandable to a minimum of 8GB
		  • individual recording intervals
		  • user configurable alarms (triggering)
		  • Multi-tasking operating system-must log data and transmit at same time
		  • LCD display or Display that can be easily viewed in direct sunlight
		  • power supply 12 V DC
		  • monitoring of battery voltage level
		  • Internal clock with drift less than 2 seconds per day (can be accomplished with GPS or internet based time servers)

4	Input/Output	• 5 analogue channels • Minimum 1 SDI-12 port • Minimum 1 RS485 port • Other I/O to make the specified equipment operate • 3 output interfaces, one for permanent connection to the data communication device (GSM/GPRS), one for direct communication,

		programming, downloading of data, one for secondary communication or sensor. By no means is it acceptable to disconnect sensors, GSM/GPRS, etc., to program the data logger or retrieve data. • USB port for connecting to a laptop • USB port for downloading data to a memory drive
5	Housing for equipment	• to meet the requirements of the station infrastructure • protection IP65 (NEMA 4) or better
6	Software	• Windows software for system configuration/ communication • English language version • All required licenses included • System integrity check procedures
	Online Configuration	-
7	Accessories	• Cables for programming and data downloading when on site. It is highly desirable to have on-site communication occur wirelessly (i.e. Bluetooth), to reduce access issues to the sites. • all accessories (fixing units, etc.) as required
8	Tools and manuals	• full documentation and maintenance instructions in English (1 copy per station)

b. Weatherproof Equipment Housing

Item:	Technical specifications:
Site conditions	as specified above
Enclosure for equipment	• To accommodate data logger, communication modules, battery and solar charge regulator, etc. • Solution should withstand hostile environment and provide protection against vandalism and be agreed with the purchaser. • protection IP65 (NEMA 4) or better • safety locks of good quality

c. Data transmission/telemetry/communication

Since GPRS will be obsolete in a couple of years, the communication module should be compatible to modern communication technologies such as Edge and HSPA+, Due to Nepal's mountainous terrain two communication providers should be used in a redundant architecture.

Communication Module		
No	Item	Technical specifications
1	Specification	Communication Interface: RS232
		Communication Medium: Modem: Compatible to network providers in Nepal. Dual SIM: Modem should support dual SIM from two different mobile operators. Should use two modems supporting: GPRS, Edge and HSPA+, UMTS, GSM(2G/3G)
		Antenna: Round antenna fixed on the equipment housing or outdoor Yagi antenna as required according to the sites
		Redundant Architecture: The system should post using one communication provider and should automatically switch if the first provider is down.
		Specification for GPRS/EDGE/HSPA+/ UMTS • Dual Frequency: 900 Mhz and 1800 Mhz • For GSM 3G : 2100 Mhz • Data: Supporting internal TCP/IP stack • SMS: Supporting SMS text • SIM Interface: SIM card interface
		•
		Specification for Satellite communication medium:

SLA Based network Availability	99.90%
Narrowband IP	UDP and TCP/IP supported
Tower Mount Accessories	Included
Frequency Band:	TX 1626.5 to 1675.0 Mhz Rx 1518.0 to 1559.0 Mhz Typical latency < 2 sec 100 bytes
Connection:	Shielded Ethernet cables
IP	Real IP (Not store and forward)
Low latency:	Maximum 900 Ms
High level cyber security	(AES 256 or better)
Activation and commissioning	Included
Protection Category:	IP66 dust and spray proof in all directions

		Relative Humidity:	0 to 100% condensing at 45 C as per IEC 60068-2-30
		Operational Temperature:	-40 to +70 C
	Environment Conditions	• Ambient temperature: -20 to 55 C • Relative humidity: 0% to 100% non condensing	

d. Solar Charge Controller

A solar charge controller, or charge voltage regulator is basically a voltage and current regulator to keep batteries from overcharging. It should also prevent completely draining "deep discharging" a battery, to protect the battery life. Besides for remote monitoring, the solar charge controller should support digital interface so that the data logger can read out and log various parameters from the charge controller.

Solar Charge Controller		
Item:	Particulars	Technical specifications:
1	Nominal Voltage	12V
2	Regulator Preciseness	< 1%
3	Maximum Charging Current	5A
4	Self-Consumption	< 5ma
5	Load Disconnect Voltage	11.6V
6	Operating Temperature	-20°C to 60°C
7	Temperature Compensation	-4mV/cell°K
8	Communication Interface	SDI-12
9	Parameters that can be monitored	Battery voltage, Solar voltage, Load current, Charge current, Battery voltage

e. Anti-Theft sensors for Solar Panel and Equipment Housing

The safety of equipment is a big concern of remote stations in rural areas. Hence all the solar panels and Data collection platforms should include a sensor for theft and vandalism.

The required specifications for Anti-theft sensors are:

- Activated by the detection of movement or by detection of change in orientation
- Programmable threshold to avoid triggering by wind or other natural causes
- Should send out alerts using SMS and emails instantly

Surveillance Webcam

Capable to capture river gauge level or monitoring rain gauge performance during day and night, station surrounding and weather situation in the vicinity shall be established in each station.

Description	Specificaiton Required
Brand	Must be specified by Bidder
Model	Must be specified by Bidder
Country of Origin	Must be specified by Bidder
Resolution:	>= 24MP (Panoramic Images)
Wide dynamic range:	Greater than 118db
Optical zoom;	12X or greater
PTZ Pan Range:	360° full rotation capability
PTZ Titl range:	-30° to 30°
Infrared Mode:	Smart infrared mode for night time lapse images supporting upto 120 meters distance
Time period:	One image per 10 minutes
Defogging:	Should have features to defog when required
Time Lapse:	Programmable time lapse images from different pan, tilt and zoom levels. For example: get time laps image of staff gauge every one hour, river image every 10 minutes, 360 Paranomic image every half an hour.
Custom direction programming:	Should be able to program the camera to get images from a range of vertical and horizontal direction to create a panoramic image.
Storage capacity:	Should retain at least one months images when internet is not accessible and should transfer all the images when internet resumes.
Online configuration:	Should be able to reprogram, configure the camera online even without a fixed ip address.
Support of parallel image transfer:	Simultaneously to two servers.
Data posting to central server using:	FTP, SFTP and FTPS
Internet connectivity:	Ethernet, Wifi and Dual SIM GPRS/3G network with external antenna
Redundancy in connectivity:	Programmable netwok priority; e.g. try using wifi, if it wifi fails then use 3G using SIM 1, and if that does not work then try using GPRS using SIM2.
Installation:	Pedestal mounts
Working Temperature:	-20°C to 55°C
Protection rating:	IP66
Warranty:	3 years

Central Camera Image Management System

Description	Specificaiton Required
Brand	Must be specified by Bidder
Model	Must be specified by Bidder
Country of Origin	Must be specified by Bidder
Data Acquisition	Receive time lapse images from cameras with no limitation to the number of stations
Image metadata	Receive image metadata such as capture date and time, direction of camera
Image Data Management	Storing of images, searching of images by station, album, date, time, direction.
Image Viewing Tools	Tools to view images, display of images on a map and comparison of images.
Power supply monitoring	Support for data acquisition and monitoring of power supply parameters such as solar voltage and battery voltage

Solar Panel and Battery System

Description	Specificaiton Required
Solar Panel:	>= 200W or should charge full capacity in one day

Battey Packs (Lithium ion based):	12V, 100AH or battery should last for 3 days.
Battery Charging:	Solar and A/C main lines
Battery efficiency:	> 95%
Solar charge controller:	20A
Weather proof casing for power supply equipment	NEMA 4, IP 66, wall mounted
Online Battery volage monitoring:	Via internet, supporting email when battery voltage drops below threshold
Cycle Life:	> 2000 cylces @ 1C, 100% DOD
Charge and discharge temperature:	-20 to 60 C
Warranty:	5 years

Metal Mast

	Details
Pedestal Mast	2 meter galvanized (at least 2 inch diameter if cylindrical and 2" side if square)

Sediment measuring equipment

Depth integrated Sediment samplers

Suspended sediment samplers are required to get samples from rivers that will generally be suspended from current meter cableways. Two type of sampler are required; one for use by wading and one for use by suspension from cableway, bridge or from a survey boat. The instrument will be suspended on a hanger bar attached to a stainless steel cable and is lowered and raised by means of a current meter sounding reel mounted on a crane, cable car or boat.

	Description	**Specification Required**
Wading type	Weight	<2kg
	Body	Metal
	Description	Specification Required
	Dimension	<30 cm long
	Sample container size	0.5 liter - 50 No. required together with sealing caps
	Nozzle	0.64 cm size
	Carrying case	strong, protective (Wooden or equivalent)
	Operation mode	Wading rods (3m length set to be provided)
Suspension Type	Weight	10 kg to 25kg
	Body	Cast aluminum, bronze or brass streamlined body
	Dimension	> 60 cm long
	Sample container size	1 liter - 50 No. required together with sealing caps.
	Nozzle	0.64 cm size
	Carrying case	strong, protective (Wooden or equivalent)
	Operation mode	Suspension - must be attached to standard current meter sounding reel
Bottle for sediment sampler	Sampler material	Glass or plastic
	Capacity or sampler	1 liter; Numbers required shown above.
	size	Capable of fitting into the sampler

Automatic Evaporimeter

Item Name	Description	Specification required
Automatic Class A Evaporation Pan	Evaporation Pan Size	1200 mm diameter x 250 mm height
	Material	Anti Corrosive Stainless Steel
	Level measurement range	0 to 250 mm
	Water level accuracy	0.5 mm
	Resolution	0.1 mm
	Operational temperature range	-40 to 60° C
	Covering	Top of the pan to be covered with wire net to protect water in the pan from birds and cattles.
	Wooden Platform	Well seasoned 1.25m x 1.25m x 25mm
Data Collection Platform	Data Logging	Hourly and daily evaporation
	Memory	Enough memory to last a year
	Real Time Clock	Accurate real time clock that needs to be synchronized using NTP or GPS.
	Modem	Transmission of data to the central server using GPRS, 3G mobile network.
		Compatible to network providers in Nepal.
	Dual SIM	Modem should support dual SIM from two different mobile operators.
Power Supply	Solar panel:	Enough to fully charge the battery in one sunny day
	Battery backup	To last for one month without charging
	Solar charge controller	Compatible to provide battery and solar panel, solar and battery voltage should also be logged by the data logger.
	Enclosure	DCP and Power supply should be enclosed in a NEMA IP67 enclosure.

Staff gauge for water-level measurement

The staff gauge will be used for manual water level observation and for reference purposes in combination with in Radar Sensor and Data Logger rivers, lakes and reservoirs.

- The staff gauge shall be of such a design that it can be effectively used under the prevailing environmental conditions in Nepal. It needs to be readable for all possible water levels at site.
- The staff gauge shall generally comply with IS 4080-1994.
- The staff gauge shall be of a sturdy construction and its materials shall be non-corrosive

Specification		
1	**Material**	Stable Fiber Reinforced Plastic (FRP) plate
2	**Color**	White background, deep blue graduations
3	**Sizes (prior to coating)**	
4	**Width**	100 to 200 mm
5	**Thickness**	1.5 to 2.5 mm
6	**Length of one staff gauge**	1000 mm
7	**Smallest graduation**	0.01 m
8	**Distinction**	Cm, mm and m, index at 5 cm mark
9	**Temperature**	0 to 60° C, the accuracy shall be maintained over the full temperature range

The installation of staff gauge may be supported by a concrete or steel pole of sufficient length for stable installation on water banks and riverbeds. The pole shall have provisions to rigidly attach the staff gauges and a provision to adjust the staff gauges to the required elevation, tuning it to Datum. The width of the pole should be larger than the staff gauges width.

The concrete pole shall have a square cross-section. The concrete pole shall have such solidity that it can permanently sustain partial and/or full immersion in water. The steel pole may have a square or rectangular cross-section. The steel pole shall be epoxy paint coated.

Acoustic Doppler Current Profiler (ADCP)

The Acoustic Doppler Current Profiler (ADCP) shall be supplied with all accessories for discharge measurements on rivers and canals, including its own floating platform (trimaran) which can be towed by boat, from a cableway, from a bridge, from opposite banks or can possibly be remote controlled (remote controlled boat not included). The purpose of the ADCP is for typical river applications to measure the velocity-area data and to calculate total discharge at river locations including rivers in foothills and large rivers in flat terrain. The ADCP shall be deployed in a roving mode, being transported site to site. The system will normally be deployed on its own trimaran and towed. The trimaran should be included in the delivery.

The discharge measurement shall be conducted at the gauging stations as per the gauging schedule mentioned in section 2. The ADCP shall have a 4-year warranty period, during which, in the case of malfunction or other equipment breakdown, the ADCP shall be serviced by the Supplier and repaired or replaced. This equipment shall be used by the Supplier during the maintenance transition period and will be handed over in good working condition to DHM at the end of the project.

General Requirements

1. The ADCP shall be capable of being operated reliably and accurately under the prevailing environmental and hydraulic conditions in the Terai Region of Nepal.
2. The ADCP shall be easy to operate and maintain.
3. All materials on the ADCP exterior shall be non-corrosive.
4. The sensor-head shall be sturdy and impact resistant.
5. The ADCP shall utilize broadband signal processing to improve time, space and velocity resolution and accuracy in shallow water.
6. The ADCP shall have small dead zones at the surface and the bottom as it will be used in very shallow and deeper water.
7. A Laptop PC, meeting the requirements of the current profiler is to control the ADCP, to monitor the data acquisition process, to store the collected data and to visualize collected data files.
8. The ADCP shall support accurate Bottom Tracking.
9. The ADCP shall support use of DGPS to be used during moving bed conditions. Under normal conditions the extra DGPS will not be used.
10. The ADCP shall have an acoustic frequency and operating modes suitable for robust bottom tracking in the presence of re-suspended material near river bed and for deeper profiling in high sediment concentrations as well as a fast sampling mode.
11. A DGPS system shall be part of the delivery and included in the bid price. The DGPS shall be fully compatible with the ADCP system, hardware and software. The DGPS shall meet the following requirements.
    a. The DGPS shall be comprised of two receivers and a digital radio link to transport the reference data from the fixed station to the ADCP.
    b. The DGPS shall provide the position accuracy of ≤1.0 m and update rate of ≤1 second.
    c. The DGPS shall provide the position conversion to the co-ordinate system used for the streams.
    d. The DGPS shall have the proper and accurate referencing to boat in order to allow accurate conversion of Doppler velocity into actual water velocity (including direction).
    e. Combination of ADCP and DGPS systems shall meet the accuracy requirements as specified below under Specifications.

f. The DGPS shall be stand-alone power supply.

12. All data from ADCP, DGPS, compass, echo-sounder and other devices shall be stored on laptop PC for validation and post processing.
13. The Supplier shall provide adequate training at his work shop and on site so that the DHM staff can operate ADCP, DGPS, compass, echo-sounder and other related devices properly for discharge measurement.
14. The current profiler shall be supplied with the required accessories, software and operator's manual.

Parameter	**Specification**
Sensors Mode of operation	Real time from a sailing boat, from a cable way, from a bridge, or can be can possibly be remote controlled
Stream velocity range	±20 m/s max,-5 to 5 m/s
Stream velocity accuracy	≤0.5% , of measured velocity ±2 m/s
Resolution	≤0.10 cm/sec
Configuration	≥ 4 beams
Beam angle	≥20º and ≤30° in 90° azimuth increments
Acoustic frequency	Highest possible frequency for adequate bottom tracking of depths **upto25** m in fast flowing, sediment laden waters
Bottom Tracking	
Accuracy	±2 mm/s, ±0.25 %
Stream velocity range	0 to 5 m/s
Depth range	0.20 m to 25 m or greater
Tilt Sensor	
Range	-90° to +90°, both X and Y axis
Heading Accuracy	± 3°
Auxiliary	
Communication interface	The ADCP and DGPS shall communicate with the laptop PC. Connector for ADCP, DGPS and laptop PC, cables, internal rechargeable battery, antennae and waterproof cases are included in the delivery.
Power supply	10 to 36 VDC (4w to 11w)
Housing	Corrosion proof
Ingress protection	Waterproof, compliant with IP68
Operating temperature	- 5 to 45°C .
Humidity	0 to 100 %
Internal memory of ADCP to store data	4-8 GB

Hardware and Software	Robust Field Laptop PC: suitable for communicating with the ADCP, DGPS, and other devices for running the associated software in the field as well as post processing.
	Minimum Specification of laptop:
	• 8th Gen Intel® Core™ i5-8350U Processor (Quad Core, 6M Cache, 1.7GHz,15W, vPro) • Windows 10 Pro 64bit English • Intel® Core™ i5-8350U Processor Base with Integrated Intel UHD 620 Graphics • M.2 128GB PCIe NVMe Class 35 Solid State Drive • 8GB, 2x4GB, 2666MHz DDR4 Non-ECC • 14" FHD WVA (1920 x 1080) Anti-Glare Non-Touch • 3 Cell 51Whr Express Charge Capable Battery
Set-up	Preparation of the instrument for data collection, setting of depth-cell size, number of depth cells, averaging, storage interval. In case the instrument features has an in-built compass then software assisted compass calibration shall be supported. Also set-up of bottom tracking and/or on line DGPS
Data collection	The PC software shall control the data collection process, record the data in a file system on disk and report aberrations if any.
Monitoring	The collected data shall be graphically visualized.
Processing	Calculation of bin-wise discharge and total discharge user input/selection of extrapolation methods to bottom, surface and stream banks display of input data and processing results in graphical and numerical format.
Data export	Data export to ASCII formats shall be supported.
Deployment	The ADCP system will normally be deployed on its own bespoke trimaran/boat. The trimaran should have unbreakable/ impact resisting with a minimum 3 years warranty, a proven stable design, a waterproof electronics compartments and stainless steel fasteners and safety lines. Boat hardware and wiring modifications for the DGPS shall be included. A protective cover and hard case carrier for the trimaran is part of delivery.
Communication Module	-The ADCP should be able to communicate with the Laptop Computer through Direct connection from USB or RS232 Port
	-The ADCP should also be able to communicate through Wire Less Radio connection with the Laptop
	Wireless radio along with antenna and cables should be part of the supplies.
Wireless range	Laptop and ADCP- upto 1000 m or more
	-All necessary tethers and taglines should be supplied
	-Floating Platform and Boat mount should be part of supplies
	Tether line (Ropes of minimum length 500m per set) of high quality(eg: thin and strong mountaineering rope) should be part of the supplies

Accessories	Tools, Spare parts, Mounting brackets and Shipping case

River survey system

Bathymetric (Hydrographic) Survey Echo-Sounder

The echo-sounder is to measure the depth of the water bodies including oceans, seas, rivers and lakes, etc. and make the readings available to a data collection system.

General Requirement

1. The echo-sounder shall be of such a design that it operates reliably and accurately under the prevailing environmental and operational conditions.
2. The echo-sounder shall be easy to operate and maintain under the prevailing scope of technology in Nepal.
3. The echo-sounder shall be supplied with the accessories as needed for effective deployment.
4. All materials on the echo-sounder exterior shall be non-corrosive under climate in Nepal.
5. The echo-sounder shall be of a rugged design that can cope with the prevailing shock and vibration as experienced in mobile operations.
6. The echo-sounder shall have an expected technical lifetime of not less than 10 years.
7. The echo-sounder shall have the following specification:
8. Software should be easy to make layout plan, control during data collection and post processing of data.

Specifications		
1.	Frequency:	200 - 340 KHz
2.	Interface :	Integration capacity of External GPS/DGPS, Computer interface with real time visualization and different buttons for control mechanism
3.	Power supply:	10 - 30V D.C.
	Accuracy	1 cm (0.1% of depth value)
4.	Depth Range:	0.30-600 m
5.	Post processing software	Hypack or equivalent (Perpetual license)
6.	Accessories:	Transducer –Narrow beam (app 9°)
		Data cable –min 5 m

Specification for other Auxiliary Equipment for Bathymetric Survey:
a) Differential GPS

Supply DGPS along with downloading cable and software including standard accessories having the following specification:

Specifications		
1	Receiver Type	GNSS L1 DGPS Receiver with integrated beacon
2	Positioning Modes	DGPS, Autonomous
3	Update Rate/ Recording Interval	10 Hz
4	Positioning Accuracy	± 1 m
8	Satellite Tracking	GPS, GLONASS
9	Port	Serial Port 2 nos.
10	Radio	Base 1 x UHF, 35W Rover 1 x UHF, 2W (min)
11	Channels	Minimum 100
12	No. of Receivers	1 Set (1 Base and 1 Rover)
13	Power	10-30 DC Volt
15	Accessories	Standard: Cables, Antenna, Tripod, Tribarch etc.

Specification for computers and printers

Type	Minimum Specifications
Com-01: Server	i7-8700 3.2GHz 8thGen, 1TB SSD, 4TB 7200rpm HDD, 32GB Ram DDR4, Windows 10 (DVD-RW if required)
Com-02: Desktop PC	i7-87003.2GHz8thGen, 500GB SSD &4TB 7200rpm HDD, 16GB Ram DDR4,Dual screen Monitor 24", USB Keyboard and USB Mouse, Graphics card GTX 1050Ti 4GB,Window 10
Com-03: Laptop PC	i7-8500U 8thGen, 500GB SSD,2400MHz2.5" 1 TB 5400 rpm HDD, 16GB Ram DDR4, Wireless + Bluetooth, 14" HD Display, Graphics card 2GB ATI Radeon, Windows 10
Printer-01: Color Printer	Laser printer
Printer-02: Black& white Printer	Laser printer

Specification for the topographical survey software

Survey software shall have the following components & specifications

1	River Data Processing	- Database with ORACLE or MySQL - Processing & evaluation software - For automatic online transmission software - Internet module - Software Q

Security shed & safety for equipment in the field

All sites of telemetry rain gauges will have a shed 1.5 sq. meters in external dimension, 2 meters in height, with foundation, concrete flooring, and RCC slab. Steel door + locks + to prevent unauthorized / forced entry.

The protection features for the power supply and electronics should also include protection against over voltage, over load, wrong polarity and lightning. The instruments should have proper protection against insects, lizards, reptile, birds, pest gaining entry, protection against humidity and dust is a must.

1. The room should have proper ventilation but dust/ insects / entry should be avoided to fullest possibility.
2. Solar panels should be fitted to the roof in such a way that the same should not be easily removed by vandal.
3. Entry to the room should be difficult for vandals by making the walls & structure sufficiently strong.
4. Complete turnkey installation with all manpower, machines, tools, labor, transport, accommodation, material storage, rent. Ensuring proper installation against vandalism, should be robust and to sustain long term operations. Includes all electrical, instrumentation, electronics, software, hardware, safety, mechanical installation. Civil work including underground conduit laying, sensor bed foundation and instrumentation

mount foundation. Painting and finishing the installation site and consumables. Underground pipes of necessary lengths, digging & pipe laying, covering and finishing the bed and slope lining.

5. Sensor mounting plates + anchor bolts (corrosion resistant) Sensor mounting plates on the bed and or slope of the canal, non-degradable, non-corrosive and chemical proof. Reputed Anchor bolts of SS.
6. Solar panel grill for protection on both upper and bottom side with clamps and bolts with stand for tilt to the south direction.
7. Underground pipes from bed mounted sensor to the panel + time of flight will have to be complete for each site, and considering 3 path the same should be assessed by the bidder. Put together each installation will have all the cables running through underground conduits/pipes.
8. The Supplier shall arrange own Construction tools, consumables, water, power, machines, Manpower, transport, fuel, communication equipment, etc. during the contract period. Consumables include construction tools, construction material, cutting material tools, pipes, water sealants, water, power, etc.
9. The Supplier shall arrange necessary expertise, materials, and manpower in all locations of the installation.

The Supplier shall arrange and secure the sensors with fabricated frame. The frame will be embedded in canal bed and finished; Care should be taken not to obstruct water flow and turbulence. Mount the sensors on the canal bed or wall with proper mountings and security provisions during dry periods.

Make only narrow cuts in canal bed and wall, to run the conduits carrying the cables from the sensors to the foundation of the panel/enclosure which houses all the electronics. Finish the cut flush with the bed and offers no resistant to water flow.

Securing the electronics panel/enclosure to protect against vandalism, theft or break in during the flow seasons and also the dry seasons.

There should be sufficient design, fabrication work, and if necessary civil work (foundation, secure room, etc.) to be carried out to prevent and alert if any attempt is made to break / sever / disconnect / damage the equipment which results in no-power or no-signal or no-data situation.

All screws, bolts, nuts should be of stainless steel. Cable glands and sealing should be used where the cables enter and exit. Ensure, rats, snakes, bees, insects, water dust, and rain does not enter the enclosure.

Appendix C - Operations and Maintenance Specifications

General

Operation and maintenance specifications provide assurance that the system developed will be adequately maintained to ensure performance to a level required by the client. The operation and maintenance specifications include preventive, corrective, periodic cleaning and checks, and re-calibration by deploying on-site staff and the provision of spare-parts in order to control and minimize downtime and maximize data availability on a continuous basis.

On-site maintenance service is required for the entire project period.

Warranties for equipment, hardware and accessories, and annual maintenance for software should be supplied for at least 3 years after successful installation and commissioning.

Operation and maintenance specifications include:

(I) Sufficient Spares of equipment/items will be stocked as spares and will be the responsibility of the vendor during the beginning of maintenance period of 3 years and the required tools and manpower are to be deployed for immediate resolution of problems if any.

(II) The maintenance team shall have three (3) dedicated mobile phone numbers, in order to reach the maintenance team during emergency or a breakdown.

(III) Photographic evidence of all work completed, damages, replacements or service works carried shall be submitted immediately in electronic and paper form to the concerned officer in charge.

(IV) At the field level: cleaning the field sensors, fixing any electrical, electronic and software issues or problems immediately without impacting the water delivery operations.

(V) Provide the required manpower and maintenance tools, procedures, and expertise for immediate resolution of problems if any.

(VI) Round the clock support to be available at a location near to the installation.

(VII) Issues shall be fixed within 3 days normally and if there are critical issues, the issue will be fixed within 5 days complete with replacement of parts if necessary.

The maximum downtime (defined as number of days for which an item of equipment is not usable (void data, Incorrect data, Intermittent data) because of inability of the bidder to repair it) for any item is taken as 7 days. In case an item is not usable beyond the stipulated maximum downtime the bidder will be required to replace equipment.

(VIII) Breakdown issues will be categorized as major or minor based on the corrective actions required. Major issues will be closed within 24 hr hours and minor within 48 hours based on it's sensitivity toward making FFEWS operational. The criticality of the issue on the operations shall be assessed and categorized as critical and no-critical based on the impact on water delivery operations. The critical issues will be reported to the sub-division and divisional heads.

(IX) The maintenance schedule for preventive and calibrations has to be maintained by the Supplier and adhered to, in concurrence with the sub-division and divisional heads.

(X) The bidder should provide monthly maintenance reports during the course of O&M. (The monthly maintenance reports will cite system outages).

(XI) The bidder shall keep a complete maintenance log of all facilities provide under contract, including sensors and data logger. This maintenance log will be available online and will allow queries of problems/ observations at given sites as well as queries on the statuse of every piece of equipment that has a serial number.

(xii) On hand over of the complete system to DHM at the end of the maintenance period, the bidder shall supply a report specifying all faults experienced by system together with and account of how such faults have been rectified.

Replacements/Spares: Over time, the systems may require replacements (e.g. of antennas, batteries and damages to the enclosure units). Maintenance includes continuous replacements as and when required.

Signal cables: All the sites shall have underground signal cables and no cables will be exposed or seen running between the sensors and the electronics. If exposed or damaged the same shall be replaced as part of the maintenance activity.

Repainting and re-fixing of doors that have been damaged: From time-to-time all units need a fresh coat of paint, and doors and solar protection grills may need to be repaired if necessary.

Regular Checks: The sensors and the electronics shall send signals of vegetation or weed growth or disturbance caused due to debris settling near the site. In some cases, the sensors and electronics may stop sending signals, this happens if there is damage to the antenna that sends and receives signals, or the battery is not charging, or vandals have damaged or stolen equipment. This requires maintenance personnel to immediately go to site and physically undertake corrective measures.

Maintenance at the sites

SIM cards monthly payment: The SIM cards used in the telemetry system will be paid by the Supplier on a monthly basis to the service provider. It is the Supplier's responsibility to ensure that connectivity is continuously available, except when due to circumstances out of their control.

The maintenance work also includes identifying failure of a SIM card, replacement of the SIM card and restarting of the field electronics.

Battery Recharging: In all seasons, including monsoon season, all the batteries will have to be pro-actively checked and kept in peak operating condition. Spare batteries should be kept charged and carried by maintenance staff for replacement, where necessary.

Field Technicians at site: The field technicians shall be continuously available to receive requests from DHM on instrument malfunction - no data, not responding, wrong data transmission, instruments vandalized, etc. The technicians shall respond to complaints of instrument malfunction, so that repair or replacement can be completed within time. Field technicians' phone number and contact address are to be communicated appropriately to the concerned officer to be used, as required.

Maintenance at central real time data acquisition, monitoring and communication center

Server management and administration: The servers need to be continuously maintained by system administration staff to ensure the servers and software applications in good condition, including system back-up and ensuring sufficient space for the large data that arrives to the server from the field stations. The application software requires regular maintenance in terms of

database management, newer reports and responding to call from DHM seeking various types of data.

These servers require continuous running environment in terms of clean and cool rooms, with conditioned power supply for continuous operation, which will be provided by DHM. Necessary storage facility of records, papers, files and digital data shall be arranged by DHM. Necessary tables, racks, chairs, lighting, cabling trays, conduits shall be arranged by DHM as per the available space. The data backed up are indexed and stored in DVD as additional back up apart from regular hard disk.

Internet connection at the server end: The data from the field stations arrive to the server via the server internet connection. Further the server also allows users to access the application, the data and the reports via the internet. The internet connection has to be of sufficiently high bandwidth and continuously reliable. Any internet connectivity stoppage will create a cascade of issues which need to be addressed by the system administrators.

Section 7: General Conditions of Contract

Table of Clauses

1. Definitions

1.1 The following words and expressions shall have the meanings hereby assigned to them:

(a) "Contract" means the Agreement entered into between the Purchaser and the Supplier, together with the Contract Documents referred to therein, including all attachments, appendixes, and all documents incorporated by reference therein.

(b) "Contract Documents" means the documents listed in the Agreement, including any amendments thereto.

(c) "Contract Price" means the price payable to the Supplier as specified in the Agreement, subject to such additions and adjustments thereto or deductions therefrom, as may be made pursuant to the Contract.

(d) "Day" means calendar day.

(e) "Delivery" means the transfer of the IT products from the Supplier to the Purchaser in accordance with the terms and conditions set forth in the Contract.

(f) "Completion" means the fulfillment of the services by the Supplier in accordance with the terms and conditions set forth in the Contract.

(g) "Eligible Countries" means the countries and territories eligible as listed in Section 5.

(h) "GCC" means the General Conditions of Contract.

(i) "IT products" means all of the commodities, raw material, machinery and equipment, and/or other materials that the Supplier is required to supply to the Purchaser under the Contract.

(j) "Purchaser's Country" is the country specified in the Special Conditions of Contract (SCC).

(k) "Purchaser" means the entity purchasing the IT products and services, as specified in the SCC.

(l) "Services" means the services incidental to the supply of the IT products, such as insurance, installation, training and initial maintenance and other similar obligations of the Supplier under the Contract.

(m) "SCC" means the Special Conditions of Contract.

(n) "Subcontractor" means any natural person, private or government entity, or a combination of the above, including its legal successors or permitted assigns, to whom any part of the IT products to be supplied or execution of any part of the services is subcontracted by the Supplier.

(o) "Supplier" means the natural person, private or government entity, or a combination of the above, whose bid to perform the Contract has been accepted by the Purchaser and is named as such in the Agreement, and includes the legal successors or permitted assigns of the Supplier.

(p) "ADB" is the Asian Development Bank.

(q) "The Site," where applicable, means the place named in the SCC.

2. Contract Documents

2.1 Subject to the order of precedence set forth in the Agreement, all documents forming the Contract (and all parts thereof) are intended to be correlative, complementary, and mutually explanatory.

3. Fraud and Corruption

3.1 ADB's Anticorruption Policy (1998, as amended to date) requires Borrowers (including beneficiaries of ADB-financed activity), as well as Bidders, Suppliers, and Contractors under ADB-financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, ADB

(a) defines, for the purposes of this provision, the terms set forth below as follows:

(i) "corrupt practice" means the offering, giving, receiving, or soliciting, directly or indirectly, anything of value to influence improperly the actions of another party;

(ii) "fraudulent practice" means any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;

(iii) "coercive practice" means impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;

(iv) "collusive practice" means an arrangement between two or more parties designed to achieve an improper purpose, including influencing improperly the actions of another party;

(v) "abuse" means theft, waste, or improper use of assets related to ADB-related activity, either committed intentionally or through reckless disregard;

(vi) "conflict of interest" means any situation in which a party has interests that could improperly influence that party's performance of official duties or responsibilities, contractual obligations, or compliance with applicable laws and regulations;

(vii) "obstructive practice" means (a) deliberately destroying, falsifying, altering, or concealing of evidence material to an ADB investigation, or deliberately making false statements to investigators, with the intent to impede an ADB

investigation; (b) threatening, harassing, or intimidating any party to prevent it from disclosing its knowledge of matters relevant to a Bank investigation or from pursuing the investigation; or (c) deliberate acts intended to impede the exercise of ADB's contractual rights of audit or inspection or access to information; and

(viii) "integrity violation" is any act, as defined under ADB's Integrity Principles and Guidelines (2015, as amended from time to time), which violates ADB's Anticorruption Policy, including (i) to (vii) above and the following: violations of ADB sanctions, retaliation against whistleblowers or witnesses, and other violations of ADB's Anticorruption Policy, including failure to adhere to the highest ethical standard.

(b) will reject a proposal for award if it determines that the Bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations in competing for the Contract;

(c) will cancel the portion of the financing allocated to a contract if it determines at any time that representatives of the borrower or of a beneficiary of ADB-financing engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations during the procurement or the execution of that contract, without the borrower having taken timely and appropriate action satisfactory to ADB to remedy the situation;

(d) will impose remedial actions on a firm or an individual, at any time, in accordance with ADB's Anticorruption Policy and Integrity Principles and Guidelines, including declaring ineligible, either indefinitely or for a stated period of time, to participate[1] in ADB-financed, -administered, or -supported activities or to benefit from an ADB-financed, -administered, or -supported contract, financially or otherwise, if it at any time determines that the firm or individual has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations; and

3.2 All Bidders, consultants, contractors, suppliers and other third parties engaged or involved in ADB-related activities have a duty to cooperate fully in any screening or investigation when requested by ADB to do so. Such cooperation includes, but is not limited to, the following:

(a) being available to be interviewed and replying fully and truthfully to all questions asked;

(b) providing ADB with any items requested that are within the party's control including, but not limited to, documents and

[1] Whether as a Contractor, Nominated Subcontractor, Consultant, Manufacturer or Supplier, or Service Provider; or in any other capacity (different names are used depending on the particular Bidding Document).

other physical objects;

(c) upon written request by ADB, authorizing other related entities to release directly to ADB such information that is specifically and materially related, directly or indirectly, to the said entities or issues which are the subject of the investigation;

(d) cooperating with all reasonable requests to search or physically inspect their person and/or work areas, including files, electronic databases, and personal property used on ADB activities, or that utilizes ADB's Information and Communications Technology (ICT) resources or systems (including mobile phones, personal electronic devices, and electronic storage devices such as external disk drives);

(e) cooperating in any testing requested by ADB, including but not limited to, fingerprint identification, handwriting analysis, and physical examination and analysis; and

(f) preserving and protecting confidentiality of all information discussed with, and as required by, ADB.

3.3 All Bidders, consultants, contractors and suppliers shall ensure that, in its contract with its sub-consultants, Subcontractors and other third parties engaged or involved in ADB-related activities, such sub-consultants, Subcontractors and other third parties similarly undertake the foregoing duty to cooperate fully in any screening or investigation when requested by ADB to do so.

3.4 The Supplier shall permit ADB to inspect the Supplier's accounts and records relating to the performance of the Supplier and to have them audited by auditors appointed by ADB, if so required by ADB.

4. Interpretation

4.1 If the context so requires it, singular means plural and vice versa.

4.2 Incoterms

(a) The meaning of any trade term and the rights and obligations of parties thereunder shall be as prescribed by Incoterms.

(b) EXW, CIF, CIP, and other similar terms, shall be governed by the rules prescribed in the current edition of Incoterms, published by the International Chamber of Commerce at the date of the Invitation for Bids or as specified in the SCC.

4.3 Entire Agreement

The Contract constitutes the entire agreement between the Purchaser and the Supplier and supersedes all communications, negotiations, and agreements (whether written or oral) of parties with respect thereto made prior to the date of Contract.

4.4 Amendment

No amendment or other variation of the Contract shall be valid unless it is in writing, is dated, expressly refers to the Contract, and is signed by a duly authorized representative of each party thereto.

4.5 Nonwaiver

(a) Subject to GCC Subclause 4.5(b) below, no relaxation, forbearance, delay, or indulgence by either party in enforcing any of the terms and conditions of the Contract or the granting of time by either party to the other shall prejudice, affect, or restrict the rights of that party under the Contract, neither shall any waiver by either party of any breach of Contract operate as waiver of any subsequent or continuing breach of Contract.

(b) Any waiver of a party's rights, powers, or remedies under the Contract must be in writing, dated, and signed by an authorized representative of the party granting such waiver, and must specify the right and the extent to which it is being waived.

4.6 Severability

If any provision or condition of the Contract is prohibited or rendered invalid or unenforceable, such prohibition, invalidity, or unenforceability shall not affect the validity or enforceability of any other provisions and conditions of the Contract.

5. Language

5.1 The Contract as well as all correspondence and documents relating to the Contract exchanged by the Supplier and the Purchaser, shall be written in the language specified in the SCC. Supporting documents and printed literature that are part of the Contract may be in another language provided they are accompanied by an accurate translation of the relevant passages in the language specified in the SCC, in which case, for purposes of interpretation of the Contract, this translation shall govern.

5.2 The Supplier shall bear all costs of translation to the governing language and all risks of the accuracy of such translation.

6. Joint Venture

6.1 If the Supplier is a Joint Venture all of the parties shall be jointly and severally liable to the Purchaser for the fulfillment of the provisions of the Contract and shall designate one party to act as a leader with authority to bind the Joint Venture. The composition or the constitution of the Joint Venture shall not be altered without the prior consent of the Purchaser.

7. Eligibility

7.1 The Supplier and its Subcontractors shall have the nationality of an eligible country. A Supplier or Subcontractor shall be deemed to have the nationality of a country if it is a citizen or constituted, incorporated, or registered, and operates in conformity with the provisions of the laws of that country.

7.2 All IT products and services to be supplied under the Contract and financed by ADB shall have their origin in Eligible Countries. For the purpose of this clause, "country of origin" means the country where

the IT products have been grown, mined, cultivated, produced, manufactured, or processed; or through manufacture, processing, or assembly, another commercially recognized article results that differs substantially in its basic characteristics from its imported components.

8. Notices

8.1 Any Notice given by one party to the other pursuant to the Contract shall be in writing to the address specified in the SCC. The term "in writing" means communicated in written form with proof of receipt.

8.2 A Notice shall be effective when delivered or on the Notice's effective date, whichever is later.

9. Governing Law

9.1 The Contract shall be governed by and interpreted in accordance with the laws of the Purchaser's country, unless otherwise specified in the SCC.

10. Settlement of Disputes

10.1 The Purchaser and the Supplier shall make every effort to resolve amicably by direct informal negotiation any disagreement or dispute arising between them under or in connection with the Contract.

10.2 If the parties fail to resolve such a dispute or difference by mutual consultation within 28 days from the commencement of such consultation, either party may require that the dispute be referred for resolution to the formal mechanisms specified in the SCC.

11. Scope of Requirements

11.1 Subject to the SCC, the IT products and services to be supplied shall be as specified in Section 6 (Schedule of Requirements).

11.2 Unless otherwise stipulated in the Contract, the Scope of Supply shall include all such items not specifically mentioned in the Contract but that can be reasonably inferred from the Contract as being required for attaining Delivery and Completion of the IT products and services as if such items were expressly mentioned in the Contract.

12. Delivery

12.1 Subject to GCC Subclause 33.1, the Delivery of the IT products and Completion of the services shall be in accordance with the Delivery and Completion Schedule specified in the Section 6 (Schedule of Requirements). The details of shipping and other documents to be furnished by the Supplier are specified in the SCC.

13. Supplier's Responsibilities

13.1 The Supplier shall supply all the IT products and services included in the Scope of Supply in accordance with GCC Clause 11, and the Delivery and Completion Schedule, as per GCC Clause 12.

14. Purchaser's Responsibilities

14.1 Whenever the supply of IT products and services requires that the Supplier obtain permits, approvals, and import and other licenses from local public authorities, the Purchaser shall, if so required by the Supplier, make its best effort to assist the Supplier in complying with such requirements in a timely and expeditious manner.

14.2 The Purchaser shall pay all costs involved in the performance of its responsibilities, in accordance with GCC Subclause 14.1.

15. Contract Price

15.1 The Contract Price shall be as specified in the Agreement subject to any additions and adjustments thereto, or deductions therefrom, as

may be made pursuant to the Contract.

15.2 Prices charged by the Supplier for the IT products delivered and the services performed under the Contract shall not vary from the prices quoted by the Supplier in its bid, with the exception of any price adjustments authorized in the SCC.

16. Terms of Payment

16.1 The Contract Price shall be paid as specified in the SCC.

16.2 The Supplier's request for payment shall be made to the Purchaser in writing, accompanied by invoices describing, as appropriate, the IT products delivered and services performed, and by the documents submitted pursuant to GCC Clause 12 and upon fulfillment of all the obligations stipulated in the Contract.

16.3 Payments shall be made promptly by the Purchaser, no later than 60 days after submission of an invoice or request for payment by the Supplier, and the Purchaser has accepted it.

16.4 The currency or currencies in which payments shall be made to the Supplier under this Contract shall be specified in the SCC.

17. Taxes and Duties

17.1 For IT products supplied from outside the Purchaser's country, the Supplier shall be entirely responsible for all taxes, stamp duties, license fees, and other such levies imposed outside the Purchaser's country.

17.2 For IT products supplied from within the Purchaser's country, the Supplier shall be entirely responsible for all taxes, duties, license fees, etc., incurred until delivery of the contracted IT products to the Purchaser.

17.3 If any tax exemptions, reductions, allowances or privileges may be available to the Supplier in the Purchaser's Country, the Purchaser shall use its best efforts to enable the Supplier to benefit from any such tax savings to the maximum allowable extent.

18. Performance Security

18.1 The Supplier shall, within 28 days of the notification of Contract award, provide a Performance Security for the due performance of the Contract in the amounts and currencies specified in the SCC.

18.2 The proceeds of the Performance Security shall be payable to the Purchaser as compensation for any loss resulting from the Supplier's failure to complete its obligations under the Contract.

18.3 The Performance Security shall be denominated in the currencies of the Contract, or in a freely convertible currency acceptable to the Purchaser, and shall be in one of the forms stipulated by the Purchaser in the SCC, or in another form acceptable to the Purchaser.

18.4 The Performance Security shall be discharged by the Purchaser and returned to the Supplier not later than 28 days following the date of completion of the Supplier's performance obligations under the Contract, including any warranty obligations, unless specified otherwise in the SCC.

19. Copyright

19.1 The copyright in all drawings, documents, and other materials containing data and information furnished to the Purchaser by the Supplier herein shall remain vested in the Supplier, or, if they are furnished to the Purchaser directly or through the Supplier by any third party, including suppliers of materials, the copyright in such materials shall remain vested in such third party.

20. Confidential Information

20.1 The Purchaser and the Supplier shall keep confidential and shall not, without the written consent of the other party hereto, divulge to any third party any documents, data, or other information furnished directly or indirectly by the other party hereto in connection with the Contract, whether such information has been furnished prior to, during or following completion or termination of the Contract. Notwithstanding the above, the Supplier may furnish to its Subcontractor such documents, data, and other information it receives from the Purchaser to the extent required for the Subcontractor to perform its work under the Contract, in which event the Supplier shall obtain from such Subcontractor an undertaking of confidentiality similar to that imposed on the Supplier under GCC Clause 20.

20.2 The Purchaser shall not use such documents, data, and other information received from the Supplier for any purposes unrelated to the Contract. Similarly, the Supplier shall not use such documents, data, and other information received from the Purchaser for any purpose other than the design, procurement, or other work and services required for the performance of the Contract.

20.3 The obligation of a party under GCC Subclauses 20.1 and 20.2 above, however, shall not apply to information that

(a) the Purchaser or Supplier needs to share with ADB or other institutions participating in the financing of the Contract;

(b) now or hereafter enters the public domain through no fault of that party;

(c) can be proven to have been possessed by that party at the time of disclosure and which was not previously obtained, directly or indirectly, from the other party; or

(d) otherwise lawfully becomes available to that party from a third party that has no obligation of confidentiality.

20.4 The above provisions of GCC Clause 20 shall not in any way modify any undertaking of confidentiality given by either of the parties hereto prior to the date of the Contract in respect of the Supply or any part thereof.

20.5 The provisions of GCC Clause 20 shall survive completion or termination, for whatever reason, of the Contract.

21. Subcontracting

21.1 The Supplier shall notify the Purchaser in writing of all subcontracts awarded under the Contract if not already specified in the Bid.

Subcontracting shall in no event relieve the Supplier from any of its obligations, duties, responsibilities, or liability under the Contract.

21.2 Subcontracts shall comply with the provisions of GCC Clauses 3 and 7.

22. Specifications and Standards

22.1 Technical Specifications and Drawings

(a) The Supplier shall ensure that the IT products and services comply with the technical specifications and other provisions of the Contract.

(b) The Supplier shall be entitled to disclaim responsibility for any design, data, drawing, specification or other document, or any modification thereof provided or designed by or on behalf of the Purchaser, by giving a notice of such disclaimer to the Purchaser.

(c) The IT products and services supplied under this Contract shall conform to the standards mentioned in Section 6 (Schedule of Requirements) and, when no applicable standard is mentioned, the standard shall be equivalent or superior to the official standards whose application is appropriate to the country of origin of the IT products.

22.2 Wherever references are made in the Contract to codes and standards in accordance with which it shall be executed, the edition or the revised version of such codes and standards shall be those specified in the Section 6 (Schedule of Requirements). During Contract execution, any changes in any such codes and standards shall be applied only after approval by the Purchaser and shall be treated in accordance with GCC Clause 33.

23. Packing and Documents

23.1 The Supplier shall provide such packing of the IT products as is required to prevent their damage or deterioration during transit to their final destination, as indicated in the Contract. During transit, the packing shall be sufficient to withstand, without limitation, rough handling and exposure to extreme temperatures, salt and precipitation, and open storage. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the final destination of the IT products and the absence of heavy handling facilities at all points in transit.

23.2 The packing, marking, and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in the Contract, including additional requirements, if any, specified in the SCC, and in any other instructions ordered by the Purchaser.

24. Insurance

24.1 Unless otherwise specified in the SCC, the IT products supplied under the Contract shall be fully insured, in a freely convertible currency from an eligible country, against loss or damage incidental to manufacture or acquisition, transportation, storage, and delivery, in accordance with the applicable Incoterms or in the manner specified

in the SCC.

25. Transportation

25.1 Unless otherwise specified in the SCC, obligations for transportation of the IT products shall be in accordance with the Incoterms specified in Section 6 (Schedule of Requirements).

26. Inspections and Tests

26.1 The Supplier shall at its own expense and at no cost to the Purchaser carry out all such tests and/or inspections of the IT products and services as are specified in Section 6 (Schedule of Requirements).

26.2 The inspections and tests may be conducted on the premises of the Supplier or its Subcontractor, at point of delivery, and/or at the final destination of the IT products, or in another place in the Purchaser's country as specified in the SCC. Subject to GCC Subclause 26.3, if conducted on the premises of the Supplier or its Subcontractor, all reasonable facilities and assistance, including access to drawings and production data, shall be furnished to the inspectors at no charge to the Purchaser.

26.3 The Purchaser or its designated representative shall be entitled to attend the tests and/or inspections referred to in GCC Subclause 26.2, provided that the Purchaser bear all of its own costs and expenses incurred in connection with such attendance including, but not limited to, all traveling and board and lodging expenses.

26.4 Whenever the Supplier is ready to carry out any such test and inspection, it shall give a reasonable advance notice, including the place and time, to the Purchaser. The Supplier shall obtain from any relevant third party or manufacturer any necessary permission or consent to enable the Purchaser or its designated representative to attend the test and/or inspection.

26.5 The Purchaser may require the Supplier to carry out any test and/or inspection not required by the Contract but deemed necessary to verify that the characteristics and performance of the IT products comply with the technical specifications, codes, and standards under the Contract, provided that the Supplier's reasonable costs and expenses incurred in the carrying out of such test and/or inspection shall be added to the Contract Price. Further, if such test and/or inspection impedes the progress of manufacturing and/or the Supplier's performance of its other obligations under the Contract, due allowance will be made in respect of the Delivery Dates and Completion Dates and the other obligations so affected.

26.6 The Supplier shall provide the Purchaser with a report of the results of any such test and/or inspection.

26.7 The Purchaser may reject any IT products or any part thereof that fail to pass any test and/or inspection or do not conform to the specifications. The Supplier shall either rectify or replace such rejected IT products or parts thereof or make alterations necessary to meet the specifications at no cost to the Purchaser, and shall repeat the test and/or inspection, at no cost to the Purchaser, upon giving a notice pursuant to GCC Subclause 26.4.

26.8 The Supplier agrees that neither the execution of a test and/or inspection of the IT products or any part thereof, nor the attendance by the Purchaser or its representative, nor the issue of any report

pursuant to GCC Subclause 26.6, shall release the Supplier from any warranties or other obligations under the Contract.

27. Liquidated Damages

27.1 Except as provided under GCC Clause 32, if the Supplier fails to deliver any or all of the IT products or perform the services within the period specified in the Contract, the Purchaser may without prejudice to all its other remedies under the Contract, deduct from the Contract Price, as liquidated damages, a sum equivalent to the percentage specified in the SCC of the Contract Price for each week or part thereof of delay until actual delivery or performance, up to a maximum deduction of the percentage specified in the SCC. Once the maximum is reached, the Purchaser may terminate the Contract pursuant to GCC Clause 35.

28. Warranty

28.1 The Supplier warrants that all the IT products are new, unused, and of the most recent or current models, and that they incorporate all recent improvements in design and materials, unless provided otherwise in the Contract.

28.2 Subject to GCC Subclause 22.1, the Supplier further warrants that the IT products shall be free from defects arising from any act or omission of the Supplier or arising from design, materials, and workmanship, under normal use in the conditions prevailing in the country of final destination.

28.3 Unless otherwise specified in the SCC, the warranty shall remain valid for 12 months after the IT products, or any portion thereof as the case may be, have been delivered to and accepted at the final destination indicated in the SCC, or for 18 months after the date of shipment or loading in the country of origin, whichever period concludes earlier.

28.4 The Purchaser shall give Notice to the Supplier, stating the nature of any such defects together with all available evidence thereof, promptly following the discovery thereof. The Purchaser shall afford all reasonable opportunity for the Supplier to inspect such defects.

28.5 Upon receipt of such Notice, the Supplier shall, within the period specified in the SCC, expeditiously repair or replace the defective IT products or parts thereof, at no cost to the Purchaser.

28.6 If having been notified, the Supplier fails to remedy the defect within the period specified in the SCC, the Purchaser may proceed to take within a reasonable period such remedial action as may be necessary, at the Supplier's risk and expense and without prejudice to any other rights which the Purchaser may have against the Supplier under the Contract.

29. Patent Indemnity

29.1 The Supplier shall, subject to the Purchaser's compliance with GCC Subclause 29.2, indemnify and hold harmless the Purchaser and its employees and officers from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of any nature, including attorney's fees and expenses, which the Purchaser may suffer as a result of any infringement or alleged

infringement of any patent, utility model, registered design, trademark, copyright, or other intellectual property right registered or otherwise existing at the date of the Contract by reason of

(a) the installation of the IT products by the Supplier or the use of the IT products in the country where the Site is located; and

(b) the sale in any country of the products produced by the IT products.

Such indemnity shall not cover any use of the IT products or any part thereof other than for the purpose indicated by or to be reasonably inferred from the Contract, neither any infringement resulting from the use of the IT products or any part thereof, or any products produced thereby in association or combination with any other equipment, plant, or materials not supplied by the Supplier, pursuant to the Contract.

29.2 If any proceedings are brought or any claim is made against the Purchaser arising out of the matters referred to in GCC Subclause 29.1, the Purchaser shall promptly give the Supplier a notice thereof, and the Supplier may at its own expense and in the Purchaser's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim.

29.3 If the Supplier fails to notify the Purchaser within 28 days after receipt of such notice that it intends to conduct any such proceedings or claim, then the Purchaser shall be free to conduct the same on its own behalf.

29.4 The Purchaser shall, at the Supplier's request, afford all available assistance to the Supplier in conducting such proceedings or claim, and shall be reimbursed by the Supplier for all reasonable expenses incurred in so doing.

29.5 The Purchaser shall indemnify and hold harmless the Supplier and its employees, officers, and Subcontractors from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of any nature, including attorney's fees and expenses, which the Supplier may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright, or other intellectual property right registered or otherwise existing at the date of the Contract arising out of or in connection with any design, data, drawing, specification, or other documents or materials provided or designed by or on behalf of the Purchaser.

30. Limitation of Liability

30.1 Except in cases of gross negligence or willful misconduct,

(a) neither party shall be liable to the other party for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs, provided that this exclusion shall not apply to any obligation of the Supplier to pay liquidated damages to the Purchaser; and

(b) the aggregate liability of the Supplier to the Purchaser, whether under the Contract, in tort, or otherwise, shall not

exceed the amount specified in the SCC, provided that this limitation shall not apply to the cost of repairing or replacing defective equipment, or to any obligation of the Supplier to indemnify the Purchaser with respect to patent infringement.

31. Change in Laws and Regulations

31.1 Unless otherwise specified in the Contract, if after the date of the Invitation for Bids, any law, regulation, ordinance, order or bylaw having the force of law is enacted, promulgated, abrogated, or changed in the place of the Purchaser's country where the Site is located (which shall be deemed to include any change in interpretation or application by the competent authorities) that subsequently affects the Delivery Date and/or the Contract Price, then such Delivery Date and/or Contract Price shall be correspondingly increased or decreased, to the extent that the Supplier has thereby been affected in the performance of any of its obligations under the Contract. Notwithstanding the foregoing, such additional or reduced cost shall not be separately paid or credited if the same has already been accounted for in the price adjustment provisions where applicable, in accordance with GCC Clause 15.

32. Force Majeure

32.1 The Supplier shall not be liable for forfeiture of its Performance Security, liquidated damages, or termination for default if and to the extent that its delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure.

32.2 For purposes of this clause, "Force Majeure" means an event or situation beyond the control of the Supplier that is not foreseeable, is unavoidable, and its origin is not due to negligence or lack of care on the part of the Supplier. Such events may include, but not be limited to, acts of the Purchaser in its sovereign capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions, and freight embargoes.

32.3 If a Force Majeure situation arises, the Supplier shall promptly notify the Purchaser in writing of such condition and the cause thereof. Unless otherwise directed by the Purchaser in writing, the Supplier shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.

33. Change Orders and Contract Amendments

33.1 The Purchaser may at any time order the Supplier through Notice in accordance GCC Clause 8, to make changes within the general scope of the Contract in any one or more of the following:

(a) drawings, designs, or specifications, where IT products to be furnished under the Contract are to be specifically manufactured for the Purchaser;

(b) the method of shipment or packing;

(c) the place of delivery; and

(d) the services to be provided by the Supplier.

33.2 If any such change causes an increase or decrease in the cost of, or the time required for, the Supplier's performance of any provisions under the Contract, an equitable adjustment shall be made in the Contract Price or in the Delivery and Completion Schedule, or both, and the Contract shall accordingly be amended. Any claims by the Supplier for adjustment under this Clause must be asserted within 28 days from the date of the Supplier's receipt of the Purchaser's change order.

33.3 Prices to be charged by the Supplier for any services that might be needed but which were not included in the Contract shall be agreed upon in advance by the parties and shall not exceed the prevailing rates charged to other parties by the Supplier for similar services.

34. Extensions of Time

34.1 If at any time during performance of the Contract, the Supplier or its Subcontractors should encounter conditions impeding timely delivery of the IT products or completion of services pursuant to GCC Clause 12, the Supplier shall promptly notify the Purchaser in writing of the delay, its likely duration, and its cause. As soon as practicable after receipt of the Supplier's notice, the Purchaser shall evaluate the situation and may at its discretion extend the Supplier's time for performance, in which case the extension shall be ratified by the parties by amendment of the Contract.

34.2 Except in case of Force Majeure, as provided under GCC Clause 32, a delay by the Supplier in the performance of its Delivery and Completion obligations shall render the Supplier liable to the imposition of liquidated damages pursuant to GCC Clause 27, unless an extension of time is agreed upon, pursuant to GCC Subclause 34.1.

35. Termination

35.1 Termination for Default

(a) The Purchaser, without prejudice to any other remedy for breach of Contract, by Notice of default sent to the Supplier, may terminate the Contract in whole or in part,

(i) if the Supplier fails to deliver any or all of the IT products within the period specified in the Contract, or within any extension thereof granted by the Purchaser pursuant to GCC Clause 34; or

(ii) if the Supplier fails to perform any other obligation under the Contract.

(iii) if the Supplier, in the judgment of the Purchaser has engaged in integrity violations, as defined in GCC Clause 3, in competing for or in executing the Contract.

(b) In the event the Purchaser terminates the Contract in whole or in part, pursuant to GCC Clause 35.1(a), the Purchaser may procure, upon such terms and in such manner as it deems appropriate, IT products and services similar to those undelivered or not performed, and the Supplier shall be liable to the Purchaser for any additional costs for such similar IT

products and services. However, the Supplier shall continue performance of the Contract to the extent not terminated.

35.2 Termination for Insolvency

The Purchaser may at any time terminate the Contract by giving Notice to the Supplier if the Supplier becomes bankrupt or otherwise insolvent. In such event, termination will be without compensation to the Supplier, provided that such termination will not prejudice or affect any right of action or remedy that has accrued or will accrue thereafter to the Purchaser.

35.3 Termination for Convenience

(a) The Purchaser, by Notice sent to the Supplier, may terminate the Contract, in whole or in part, at any time for its convenience. The Notice of termination shall specify that termination is for the Purchaser's convenience, the extent to which performance of the Supplier under the Contract is terminated, and the date upon which such termination becomes effective.

(b) The IT products that are complete and ready for shipment within 28 days after the Supplier's receipt of the Notice of termination shall be accepted by the Purchaser at the Contract terms and prices. For the remaining IT products, the Purchaser may elect

(i) to have any portion completed and delivered at the Contract terms and prices; and/or

(ii) to cancel the remainder and pay to the Supplier an agreed amount for partially completed IT products and services and for materials and parts previously procured by the Supplier.

36. Assignment

36.1 Neither the Purchaser nor the Supplier shall assign, in whole or in part, their obligations under this Contract, except with prior written consent of the other party.

37. Respectful Work Environment

37.1 The Contractor shall ensure that its employees and Subcontractors observe the highest ethical standards and refrain from any form of bullying, discrimination, misconduct and harassment, including sexual harassment and shall, at all times, behave in a manner that creates an environment free of unethical behavior, bullying, misconduct and harassment, including sexual harassment. The Contractor shall take appropriate action against any employees or Subcontractors, including suspension or termination of employment or sub-contract, if any form of unethical or inappropriate behavior is identified.

37.2 The Contractor shall conduct training programs for its employees and Subcontractors to raise awareness on and prevent any form of bullying, discrimination, misconduct, and harassment including sexual harassment, and to promote a respectful work environment. The Contractor shall keep an up to date record of its employees and

subcontractors who have attended and completed such training programs and provide such records to the Purchaser at their first written request.

Section 8: Special Conditions of Contract

The following Special Conditions of Contract (SCC) shall supplement the General Conditions of Contract (GCC). Whenever there is a conflict, the provisions herein shall prevail over those in the GCC.

GCC 1.1 (f)	The intended date of completion for Phase I: Supply and installation of Goods with all related Services and commissioning of FFEWS will be 3 years from the date of commencement of work. Phase II: Operation and Maintenance period will be 3 years from the date of commencement of O&M.
GCC 1.1(j)	The Purchaser's country is: Nepal
GCC 1.1(k)	The Purchaser is: Department of Hydrology and Meteorology, Kathmandu, Nepal
GCC 1.1 (q)	The Site is: Kathmandu and six river basins (Mohana-Khutiya, Mawa- Ratuwa, Bakraha, Lakhandehi, East Rapti and West Rapti) in the Terai Region of Nepal. The river basins are shown on drawings in Section 6.
GCC 4.2 (b)	The version of Incoterms shall be: 2010
GCC 5.1	The language shall be: English The language for translation of supporting documents and printed literature is: English
GCC 8.1	For the attention: Bikram Shrestha Zoowa Title/position: Project Manager, PRBFRMP, PIU, DHM Purchaser: PRBFRMP, Project Implementation Unit (PIU) DHM Address: Babar Mahal, Kathmandu, Nepal Telephone: 977-1-4219052 (Ext: 129) E-mail address: prbfrmffews.dhm@gmail.com
GCC 9.1	The governing law shall be: Nepal
GCC 10.2	The formal mechanism for the resolution of disputes shall be: Arbitration **For a contract with a Foreign Supplier:** In the case of a dispute between the Purchaser and the Supplier, the dispute shall be settled by arbitration in accordance with the provisions of the United Nations Commission on International Trade Law (UNCITRAL) Arbitration Rules. Place of arbitration: Singapore **For a contract with a Local Supplier:**

	In the case of a dispute between the Purchaser and the Supplier, the dispute shall be settled by arbitration in accordance with the provisions of the local arbitration procedures in the Purchaser's country. Place of arbitration: Nepal
GCC 11.1	The Scope of Supply shall be as defined in: Section 6 (Schedule of Requirements)
GCC 12.1	Details of shipping and documents to be furnished by the Supplier shall be: **For Goods from within the Purchaser's country as per Incoterm EXW**; Upon delivery of the Goods to the transporter, the Supplier shall notify the Purchaser and send the following documents to the Purchaser: (a) 2 copies of the Supplier's invoice showing the description of the Goods, quantity, unit price, tax exemption (if any) and total amount; (b) delivery note, railway receipt, or truck receipt; (c) Manufacturers or Supplier's warranty certificate; (d) inspection certificate issued by the nominated inspection agency, and the Supplier's factory inspection report; (e) certificate of origin; (f) Insurance Certificate The Purchaser shall receive the above documents before the arrival of the Goods and, if not received, the Supplier will be responsible for any consequent expenses. **For Goods supplied from abroad as per Incoterms CIP**; Upon shipment, the Supplier shall notify the Purchaser and the Insurance Company the full details of the shipment, including Contract number, description of Goods, quantity, the vessel, the bill of lading number and date, port of loading, date of shipment, port of discharge, etc. The Supplier shall send the following documents to the Purchaser, with a copy to the Insurance Company: (a) 2 copies of the Supplier's invoice showing the description of the Goods, quantity, unit price, and total amount; (b) original and one copy of the negotiable, clean, on-board bill of lading marked "freight prepaid" and 2 copies of non-negotiable bill of lading; (c) 2 copies of the packing list identifying contents of each package; (d) insurance certificate; (e) Manufacturers or Supplier's warranty certificate; (f) inspection certificate, issued by the nominated inspection agency, and the Supplier's factory inspection report; and (g) Certificate of origin. The Purchaser shall receive the above documents at least one week before arrival of the Goods at the port or place of arrival and, if not received, the Supplier will be responsible for any consequent expenses.
GCC 15.2	The price adjustment shall be:

	Not Applicable
GCC 16.1	Payment of the Contract Price shall be made in the following manner: **Advance Payment**: Ten (10) percent of the PRICE OF IT PRODUCTS AND GOODS AND SERVICES (excluding Provisional Sum and Contingencies) within twenty-eight (28) days after receipt of valid bank guarantee. Payment shall be made provided the Supplier presents a request for payment accompanied by an Advance Payment Security which shall be valid until 3 years in the form of a bank guarantee for an amount equal to the amount of the payment. The security shall be in the form as specified in Section IX, Contract Forms. **For IT products and Goods (as per price schedules in Section 4 offered from within or outside the Purchaser's country):** (a) upon delivery and acceptance at respective sites, the Purchaser shall pay the Supplier fifty percent (50%) of the price. (b) upon completion and acceptance of installation and testing, the Purchaser shall pay the Supplier twenty percent (20%) of the price. (c) upon FFEWS complete system commissioning and acceptance, the Purchaser shall pay the Supplier twenty percent (20%) of the price. **For Services (asper price schedule for Services in Section 4):** (a) On Completion of item wise Related Services as listed in Section 6.2, Delivery and Completion Schedule, Completion Date column and upon certification by Project Manager, Project Implementation Unit of DHM: The Purchaser shall pay the Supplier eighty percent (80%) of the Price for the Services completed and accepted. (b) On Completion of FFEWS services period of first 3 years: Ten percent (10%) of the Price of Services completed and accepted shall be paid within twenty-eighty (28) days of receipt of the total Services upon submission of a claim supported by the acceptance certificate issued by The Purchaser. **For Operation and Maintenance period of years 4 to 6 (as per price schedule for Operation and Maintenance in Section 4):** At the end of the successful maintenance of every quarter of a year, 25% of that year's Price of Annual recurrent cost shall be paid upon certification by Project Manager, Project Implementation Unit of DHM within twenty-eighty (28) days of receipt of the Services upon submission of a claim supported by the acceptance certificate issued by The Purchaser.
GCC 16.4	The currencies for payments shall be: bid currencies.

GCC 18.1	The Supplier shall provide the Performance Security of ten percent of the Contract Price prior to contract signing. This Performance Security shall be valid for 73 months The Supplier may replace the original Performance Security with the Performance Security of five percent of the Contract Price after successful commissioning of FFEWS. The second Performance Security shall be valid for 37 months. The first Performance Security shall be returned to the Supplier upon providing second Performance Security. The Performance Securities shall be denominated in the following amounts and currencies: amounts and currencies of the performance securities shall be in proportion to the amounts and currencies of the contract price.
GCC 18.3	The forms of acceptable Performance Security are: A bank guarantee issued by a reputable bank located in the purchaser's country or abroad, in the format included in Section 9, contracts forms, or a cashier's or certified check. If the institution issuing the guarantee is located outside Nepal, they shall have a correspondent financial institution located in Nepal to make the guarantee enforceable.
GCC 18.4	Discharge of the Performance Security shall take place Pursuant to GCC sub clause 18.4 as follows: There shall be two separate conditions for discharge of Performance Securities. Case 1: The first Performance Security is replaced with a second one The second Performance Security of 5% of the Contract Price shall be returned to the Supplier within 28 days after successful completion of 3 years Operation and maintenance period. Case 2: The first Performance Security is not replaced with a second one The first Performance Security of 10% of the Contract Price shall be returned to the Supplier within 28 days after successful completion of the contract.
GCC 22.3 (New Clause)	a. In case the downtime is in excess of 7 days (as determined from the computer logs of data received) at any/all stations (only those listed in A.1 to A.3.6 Hydro-Meteorological Equipment in Section 6.1 List of IT Products, Goods and Related Services) an amount of NPR 1,000 per station-day shall be deducted from payment due to Contractor. This penalty calculation will be reset each year starting from the date of network commissioning. b. Quarterly O&M payments will be withheld if the flood forecasts during the operation and maintenance period do not meet the forecast performance to be identified and agreed between Purchaser and Contractor, based on actual FFEWS performance during the time of commissioning. Continuous discrepancy in the accuracy level below the agreed level of flood forecasts for the full season (within a calendar year, May-Oct) will lead to a penalty of NPR 2,000,000 in the first year of O&M, NPR 3,000,000 in the second year and NPR 4,000,000 in the third year.

GCC 23.2	The packing, marking, and documentation within and outside the packages shall be: 1. Manufacturers brand name / trade mark 2. Purchaser name: DHM, Nepal 3. Size 4. Inspection mark 5. Month and year of manufacture 6. Batch Number and Quality Mark
GCC 24.1	The insurance coverage shall be in accordance with: Pursuant to GCC, sub-clause 24.1, the supplier must insure the Goods in an amount equal to 110% of the CIP, or EXW price of the Goods from “Warehouse” to Ware house” on “All Risks” basis, including War Risks and Strikes.
GCC 25.1	Obligations for transportation of the Goods shall be in accordance with: INCOTERMS 2010.
GCC 26.2	Tests and Inspections specified in Section 6(Schedule of Supply), shall be carried out at the following times or milestones, and places: Test and Inspections to be carried out as per the relevant codes of Nepal Standards or in its absence, equivalent British Standard (BS)
GCC 27.1	The applicable rate for liquidated damages for delay shall be: 0.5% of the Contract price per week or part thereof.
GCC 27.1	The maximum amount of liquidated damages shall be: 10%
GCC 28.3	All the equipment, software, modeling system supplied and installed for FFEWS shall be guaranteed for replacement for 12 months from the date of commissioning, and then repair and maintenance under unavoidable replacement warranty for next 36 months. In case of any accidental incident or malfunctioning of components the contractor/bidder will be solely responsible in the guarantee/ warranty period for new replacement of the spares, components, software or connecting cables etc. as required for smooth and hassle-free operation of FFEWS. Bidder shall maintain an inventory of spare parts and tools for all critical equipment, as recommended by manufacturer(s), for ensuring smooth operation during currency of the contract.
GCC 28.5	The Supplier shall correct any defects covered by the Warranty within 15 days of being notified by the Purchaser of the occurrence of such defects.
GCC 30.1 (b)	The amount of aggregate liability shall be: 110% of the Contract Price.

New Clause 38.1 **Health and Safety Procedures**	The Supplier is responsible for providing site workers with safe and healthy working conditions and establish an operating system to prevent accidents, injuries, and disease. The Supplier is responsible for establishment of preventive and emergency preparedness and response measures to avoid, and where avoidance is not possible, to minimize, adverse impacts and risks of the construction site work to the health and safety of local communities. Within 28 days of the Commencement Date the Supplier shall submit a detailed Site Specific Health and Safety Management Plan (SSHSMP) for the Engineer's no objection showing how he/she intends to comply with the local Health and Safety laws and regulations and other specific requirements prescribed in the Contract, taking into account the Supplementary Information in Section 6-Employer's Requirements. Work shall not commence on the Site until the confirmation of no objection of the SSHSMP has been obtained from the Engineer and is being implemented. Such confirmation of no objection by the Engineer shall not relive the Supplier of any of his/her obligations or responsibilities under the Contract. Where unanticipated health and safety hazards or risks become apparent during the Contract, the Supplier is required to update the SSHSMP to outline the potential impacts to site works and associated mitigation measures for the Engineer's no objection. The Supplier shall comply with the approved SSHSMP and any corrective or preventative actions set out in safeguards monitoring reports that the Employer will prepare from time to time to monitor the implementation of the project EMP through the SSHSMP. In particular, the Supplier is required to provide all personnel on site including Employer's Personnel and visitors with personal protective equipment, including protection for feet (safety boots), head, eyes, ears (safety helmets) and hands, etc. , in accordance with the Supplier's SSHSMP. The Supplier should ensure that his Subcontractors comply with the SSHSMP and provide all such necessary equipment to their personnel. The Supplier shall bear the costs to ensure that such measures, requirements and actions are carried out. The Supplier shall submit semi-annual reports on the compliance of such measures to the Employer." Add after the third paragraph the following: "In the event of a significant injury involving medical treatment or hospitalization and fatal accident the Supplier shall notify the Engineer immediately by verbal communication and submit a formal report as soon as practicable after its occurrence. For all accidents, whether fatal or not, the Supplier shall also notify the appropriate local authorities in accordance with the Laws of the Country."

New Clause 38.2 **Protection of the Environment**	The Supplier shall comply with all applicable national, provincial, and local environmental laws and regulations. The Supplier shall also comply with all reasonable requests of the national and local authorities responsible for enforcing environmental controls. Within 28 days of the Commencement Date the Supplier shall submit a detailed Site Specific Environmental Management Plan (SSEMP) for the Engineer's no objection showing how he/she intends to comply with environmental laws and regulations and other specific requirements prescribed in the Contract, addressing all the monitoring and mitigation measures set forth in the "Initial Environmental Examination (IEE)" and the Environmental Management Plan ("EMP") of the project as indicated in Section 6- Employer's Requirements. Work shall not commence on the Site until the no objection of SSEMP has been obtained from the Engineer and is being implemented. Such acceptance by the Engineer shall not relive the Supplier of any of his obligations or responsibilities under the Contract. The Supplier shall (a) establish an operational system for managing environmental impacts, (b) comply with the approved SSEMP and any corrective or preventative actions set out in safeguards monitoring reports that the Employer will prepare from time to time to monitor the implementation of the project EMP through the SSEMP, (c) allocate the budget required to ensure that such measures, requirements and actions are carried out, (d) submit semi-annual reports on the compliance of such measures to the Employer. Where unanticipated environmental and social safeguards due diligence risks or impacts become apparent during the Contract, the Supplier is required to update the SSEMP to outline the potential impacts to site works and associated mitigation measures for the Engineer's approval.
GCC 38.3	The Supplier shall comply with the measures relevant to the Supplier set forth in the Social Safeguards Due Diligence report(Annex 1), Gender Equality and Social Inclusion Action Plan (Annex 2), and Project Administration Manual (Annex 3) attached hereto as (to the extent they concern impacts on affected people during the Services), and any corrective or preventative actions set forth in a Safeguards Monitoring Report.
GCC 38.4 **Safeguards-Related Provisions**	The Supplier shall adequately record the condition of roads, agriculturall and and other infrastructure prior to starting to transport materials and the Services.
GCC 38.5 **Safeguards Related Provisions**	The Supplier shall reinstate pathways, other local infrastructure, and agriculturall and to at least their pre-project condition upon the completion of the Services.

GCC 38.6 **Safeguards-Related Provisions**	The Supplier shall (a) comply with the Borrower's applicable labor law and regulations and incorporate applicable work place occupational safety norms; (b) not use child labor; (c) not discrimínate workers in respect of employment and occupation; (d) not use forced labor; (e) allow freedom of association and effectively recognize the right to collective bargaining; and (f) disseminate, or engage appropriate service providers to disseminate, informationon the risks of sexually transmitted diseases, including HIV/AIDS, to its employees engaged under the contract and to members of the local communities surrounding the Project area, particularly women.

Section 9: Contract Forms

Table of Forms

Notice of Intention for Award of Contract

[*on letterhead paper of the Purchaser*]

[*date of notification*]

To: [*name of the Bidder*]
Attention: [*insert name of the Bidder's authorized representative*]
Address: [*insert address of the Bidder's authorized representative*]
Telephone/Fax numbers: [*insert telephone/fax numbers of the Bidder's authorized representative*]
E-mail Address: [*insert e-mail address of the Bidder's authorized representative*]

This is to notify you of our intention to award the contract [*insert name of the contract and identification number, as given in the Bid Data Sheet*]. You have [*insert number of days as specified in ITB 42.1 of the BDS*] days from the date of this notification to (i) request for a debriefing in relation to the evaluation of your Bid; and/or (ii) submit a bidding-related complaint in relation to the intention for award of contract, in accordance with the procedures specified in ITB 48.1.

The summary of the evaluation are as follows:

1. List of Bidders

Name of Bidder	Bid Price as Read Out at Opening	Evaluated Bid Price

2. Reason/s Why Your Bid Was Unsuccessful

……
……
……

3. The Successful Bidder

Name of Bidder:	
Address:	
Contract Price:	
Duration of Contract:	
Scope of the Contract Awarded:	
Amount Performance Security Required:	

Authorized Signature: ……

Name and Title of Signatory: ……

Name of Agency: ……

Notification of Award

[*on letterhead of the Purchaser*]

Letter of Acceptance

[*date*]

To: [*name and address of the supplier*]

Subject: Notification of Award Contract No. [*please specify*]

This is to notify you that your Bid dated [*date*] for execution of the [*name of the contract and identification number, as given in the Bid Data Sheet*] for the Accepted Contract Amount of the equivalent of [*amount in words and figures and name of currency*], as corrected and modified in accordance with the Instructions to Bidders is hereby accepted by our Agency.

You are requested to furnish the Performance Security within 28 days in accordance with the Conditions of Contract and any additional security required as a result of the evaluation of your bid, using for that purpose the Performance Security Form included in Section 9 (Contract Forms) of the Bidding Document.

Authorized Signature: ……..

Name and Title of Signatory: ……..

Name of Agency: …….

Attachment: Contract Agreement

Contract Agreement

THIS AGREEMENT made on the *[insert date]*day of *[insert month]*, *[insert year]*, between *[insert complete name of the purchaser]*of *[insert complete address of the Purchaser]* (hereinafter "the Purchaser"), of the one part, and *[insert complete name of the supplier]* of *[insert complete address of the supplier]*(hereinafter "the Supplier"), of the other part:

WHEREAS the Purchaser invited Bids for certain IT products and services, viz., *[insert brief description of the it products and services]* and has accepted a Bid by the Supplier for the supply of those IT products and Services in the sum of *[insert currency or currencies and amount of contract price in words and figures]* (hereinafter "the Contract Price").

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:

1. In this Agreement, words and expressions shall have the same meanings as are respectively assigned to them in the Contract referred to.

2. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz.:

   (a) Letter of Acceptance;

   (b) Letter of Bid and the Price Schedules submitted by the Supplier;

   (c) Special Conditions of Contract;

   (d) List of Eligible Countries that was specified in Section 5 of the Bidding Document;

   (e) General Conditions of Contract;

   (f) Schedule of Requirements; and

   (g) any other documents shall be added here.

   This Contract shall prevail over all other Contract documents. In the event of any discrepancy or inconsistency within the Contract documents, then the documents shall prevail in the order listed above.

3. In consideration of the payments to be made by the Purchaser to the Supplier as indicated in this Agreement, the Supplier hereby covenants with the Purchaser to provide the IT products and services and to remedy defects therein in conformity in all respects with the provisions of the Contract.

4. The Purchaser hereby covenants to pay the Supplier in consideration of the provision of the IT products and services and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

   IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with the laws of *[indicated name of country]* on the day, month, and year indicated above.

Signed by *[insert authorized signature for the Purchaser]*(for the Purchaser)

Signed by *[insert authorized signature for the supplier]* (for the Supplier)

Performance Security

[*Bank's name, and address of issuing branch or office*]

Beneficiary: ……..[*Name and address of the Purchaser*]**……**

Date:……[*Insert date (as day, month, and year)*] **……..**

Performance Guarantee No.:……..

We have been informed that [*name of the supplier*](hereinafter called "the Supplier") has entered into Contract No. [*reference number of the contract*]dated [*date*]with you, for the execution of [*name of contract and brief description of it products and services*](hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, a performance guarantee is required.

At the request of the Supplier, we [*name of the bank*]hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of [*name of the currency and amount in words*][1][*amount in figures*] such sum being payable in the types and proportions of currencies in which the Contract Price is payable, upon receipt by us of your first demand in writing accompanied by a written statement stating that the Supplier is in breach of its obligation(s) under the Contract, without your needing to prove or to show grounds for your demand or the sum specified therein.

This guarantee shall expire, no later than the [*date*] dayof [*month*], [*year*],[2] and any demand for payment under it must be received by us at this office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458, except that subparagraph (ii) of Sub-article 20(a) is hereby excluded.[3]

. . . . . .
[*Signature(s) and seal of bank (where appropriate)*]

-- Note to Bidder --

If the institution issuing the performance security is located outside the country of the Purchaser, it shall have a correspondent financial institution located in the country of the Purchaser to make it enforceable.

---

1 The guarantor shall insert an amount representing the percentage of the contract price specified in the contract and denominated either in the currency(ies) of the contract or a freely convertible currency acceptable to the Purchaser.

2 Insert the date 28 days after the expected completion date. The Purchaser should note that in the event of an extension of the time for completion of the contract, the Purchaser would need to request an extension of this guarantee from the guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the Purchaser might consider adding the following text to the form, at the end of the penultimate paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [six months][one year], in response to the Purchaser's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."

3 Or the same or similar to this clause specified in the Uniform Rules for Demand Guarantees, ICC Publication No. 758 where applicable.

Advance Payment Security

[*insert complete name and number of contract*]

To: [*insert complete name of the Purchaser*]

In accordance with the payment provision included in the Contract, in relation to advance payments, [*insert complete name of the supplier*] (hereinafter called "the Supplier") shall deposit with the Purchaser a security consisting of [*indicate type of security*], to guarantee its proper and faithful performance of the obligations imposed by said Clause of the Contract, in the amount of [*insert currency and amount of guarantee in words and figures*].

We, the undersigned [*insert complete name of the guarantor*], legally domiciled in [*insert full address of the guarantor*] (hereinafter "the Guarantor"), as instructed by the Supplier, agree unconditionally and irrevocably to guarantee as primary obligor and not as surety merely, the payment to the Purchaser on its first demand without whatsoever right of objection on our part and without its first claim to the Supplier, in the amount not exceeding [*insert currency and amount of guarantee in words and figures*].

This security shall remain valid and in full effect from the date of the advance payment being received by the Supplier under the Contract until [*insert date (as day, month, year)*].

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458 [*or ICC Publication No. 758 as applicable*].

Name: [*insert complete name of person signing the Security*]

In the capacity of [*insert legal capacity of person signing the Security*]

Signed: [*insert signature of person whose name and capacity are shown above*]

Duly authorized to sign the security for and on behalf of [*insert seal (where appropriate) and complete name of the guarantor*]

Date: [*insert date of signing*]

-- Note to Bidder --

If the institution issuing the advance payment security is located outside the country of the Purchaser, it shall have a correspondent financial institution located in the country of the Purchaser to make it enforceable.

Social Safeguards Due Diligence Report

Project Number: 52195-001
September 2020

Nepal: Priority River Basins Flood Risk Management Project

Prepared by the Department of Water Resources and Irrigation, and the Department of Hydrology and Meteorology, Ministry of Energy, Water Resources and Irrigation for the Asian Development Bank.

CURRENCY EQUIVALENTS
(as of 11 August 2020)

Currency unit	–	Nepalese rupee/s (NRe/NRs)
NRe1.00	=	$0.00834
$1.00	=	NRs119.90000

ABBREVIATIONS

ADB	-	Asian Development Bank
AP	-	Affected person
CBDRM	-	Community-Based Disaster Risk Management
CBS	-	Central Bureau of Statistics
CDMC	-	Community Disaster Management Committee
DWRI	-	Department of Water Resources and Irrigation
FFEW	-	Flood Forecasting and Early Warning
GIS	-	Geographic Information System
GoN	-	Government of Nepal
GRC	-	Grievance Redress Committee
HH	-	Household
MOU	-	Memorandum of Understanding
NGO	-	non-governmental organization
PIU	-	project implementation unit
PMU	-	project management unit
PRBFRMP	-	Priority River Basins Flood Risk Management Project
PRTW	-	Proposed River Training Works
SPS	-	ADB's Safeguard Policy Statement
TA	-	Technical Assistance
VDC	-	Village Development Council
VDLUR	-	Voluntary Donation of Land Use Rights

WEIGHTS AND MEASURES

1ha (hectare)	–	Is equivalent to 29.58 katthas
km	–	kilometer

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GLOSSARY

Affected Person (AP) – Affected persons are people (households) who may lose their land use right or source of livelihood due to the project. It may be all or part of their physical and non-physical assets, irrespective of legal or ownership titles. The term has been used in this report to broadly indicate people (households) willing to voluntarily donate land use right for the project.

'Ailani Land'– All the land not registered as private land in the government record – people informally 'own' and transact this land – i.e. sell occupied govt land use rights to other informal people [de facto land use rights].

Economic Displacement – Loss of land, assets, access to assets, income sources, or means of livelihood as a result of (i) involuntary acquisition of land, or (ii) involuntary restriction on land use or on access to legally designated parks and protected areas.

Project Beneficiaries – People who stand to benefit from the project

Physical Displacement – Relocation, loss of residential land, or loss of shelter as a result of (i) involuntary acquisition of land, or (ii) involuntary restriction on land use or access to legally designated parks and protected areas.

Lalpurja – Title of Land Ownership Certificate which literally means "Red Certificate" – land ownership certificate officially distributed by the Land Revenue Office; also known as the land title in the international context.

Terai – Lowland region in southern Nepal that lies south of the outer foothills of the Himalayas, the Siwalik Hills and the north of Indo-Gangetic Plains.

Executive Summary

1. The Priority River Basins Flood Risk Management Project will implement physical infrastructure, including about 36 km of embankments, about 4.6 km of additional revetments and 430 spurs to protect against flooding and erosion. In addition, modelling for flood forecasting and early warning systems (FFEWSs) will be carried out and systems put in place to provide warning of impending floods to communities along the rivers. Community-based disaster risk management (CBDRM) measures will be implemented to provide communities with the warnings procedures to move themselves and their livestock safely to higher ground when flooding is imminent. Flood shelters will be designed and built in collaboration with local communities in each subproject area, especially for the population which will still be outside the protected areas after subproject implementation.

2. This social safeguards due diligence report has been prepared by the project's implementing agency, the Department of Water Resources and Irrigation (DWRI). The report demonstrates: (i) The project's approach to addressing social impacts and risks in relation to Safeguard Requirements; (ii) Involuntary Resettlement and Safeguard Requirements; and (iii) Indigenous Peoples.

3. The project is comprised of six subprojects: Mohana Khutiya, Mawa Ratuwa, East Rapti, West Rapti, Lakhandei and Bakraha River Basins. Safeguards due diligence screening is based on the most updated project designs as of December 2019. The Mohana Khutiya, and Mawa Ratuwa subprojects have detailed embankment design, West Rapti, Lakhandei and Bakraha have feasibility embankment design and the East Rapti and all other subprojects will involve community flood shelter design during the project implementation period. The findings of this report are subject to verification and/or updating by the implementing agency ahead of the construction season in all sub-projects, including the subprojects with detailed design. Project designs are subject to minor changes due to the monsoon season as the river course may erode lands earmarked for embankment. DWRI is required to submit finalized social due diligence to ADB for all subprojects ahead of construction starting.

4. DWRI undertook an extensive social safeguards due diligence screening between August and November 2018 and March and November 2019 to determine social impacts and risks associated with the project. The following safeguards screening methods were utilized in review of the six subprojects: (i) desk-based review of subproject technical plans, social assessment reports prepared by the TA consultants, analysis of secondary data sources; and (ii) primary data collection, including repeated field site visitations to all sub-projects; 432 total household surveys and 48 documented community consultations with 1,596 people total participants, of which 64% were male, 36% women and 66% indigenous (as per the ADB definition). Throughout the social safeguards screening exercise, ADB Social Safeguard Staff worked closely with DWRI and consultants to ensure that ADB's Safeguard Policy Statement (SPS 2009) due diligence requirements were met. Staff periodically participated in community consultations, provided DWRI with safeguards training and participated in the review and validation of due diligence findings.

5. This Social Safeguards due diligence report finds that the project is classified as category C for the Involuntary Resettlement safeguard in accordance with ADB's SPS 2009. Land for embankment construction will require approximately 58.79 ha of total land. The social safeguards screening identified 432 households with lands impacted by the embankment construction. Of this total, 182 households are private landowners and 250 households are non-title holders or encroachers occupying government lands on a seasonal basis to plants crops.

6. The report finds that no involuntary land acquisition, economic or physical displacement will be required for the project. No structures are present in the corridor of impact and crop losses will be avoided as local people unanimously agree to avoid planting seasonal crops in the project corridor ahead of the construction season. All 182 private landowners were found eligible to voluntarily donate land to the project; 179 memorandum of understanding (MOUs) for land use were signed by landowners and third party witnessed during the screening exercise. Two landowners were not present to undertake signing at the time of the due diligence exercise, however their family members expressed high willingness to donate lands for the project. The safeguard screening exercise finds that people who own and use the embankment lands are highly willing to contribute lands to the project. Household surveys confirm that the donation will not cause significant income losses or impoverishment. Rather, landowners and users will directly benefit as project works will increase utility and value of protected lands. Landowners or users will be able to plant year-round crops on the protected land and will have increased security.

7. The project is classified as category B for Indigenous Peoples safeguards in accordance with ADB's SPS 2009. Due diligence screening confirmed that the targeted beneficiary population are majority indigenous as per the ADB definition; ethically distinct and vulnerable. The Thru and Chaudhari are the ethnic minority groups identified in the sub-project areas; they are defined as indigenous according to the Nepal Federation of Indigenous Nationality.[1] Safeguards due diligence consultations with the Thru and Chaudhari highlight that the indigenous people groups interact and participate in the broader community activities however they also maintain their own local Tharu and Chaudhari languages, customs and rituals. They also maintain a collective attachment to place, but they do not consider their land ancestral territories, nor do they claim an indigenous or distinct attachment to any natural resources. The government has not specifically allocated any specific place only focusing on the ancestral domain. Rather in some places land has been allocated and even with ownership transfer for the victims of flood in the past and recently for the emancipated bandaged labors which also include other caste and ethnic groups.

8. The Thru and Chaudhari peoples participate in the same governance system to the broader community, including in the same educational, economic, and political activities and the broader community. They also participate in organization focused on their ethnic group, particularly initiatives that seek to contribute to their development, welfare, and cultural protection. While the stance of the Thru and Chaudhari ethnic groups has been improving since government reforms introduced in the 90s, these indigenous people groups have been historically marginalized, economically disempowered and socially excluded from the broader society as a result of their indigeneity. There is an Act on National Foundation for the upliftment of Aadibasi Janajati 2002 to consider these groups present in the project area as ethnic minority indigenous groups.

9. Consultations with the Thru and Chaudhari community members indicates that the proposed project works will provide direct benefit to the Indigenous people by protecting them from floods, land cutting, and loss of crop production. Protection of land, infrastructures such as a house, schools, health facilities, community structures and life from the flood. The social safeguards due diligence screening finds that that no adverse impacts are anticipated as a result of the project. The project will not physically displace indigenous people, affect indigenous

[1] http://www.nefin.org.np/list/Categorization-of-Indigenous-People-based-on-development-/5/95/6.

people common property resources or indigenous people ancestral lands. The indigenous people population expects to benefit from flood protection and enhanced disaster readiness.

10. As per Appendix 3, para. 17 of ADB's Safeguard Policy Statement, a separate indigenous peoples plan is not required, as indigenous peoples are the majority of direct project beneficiaries, and only positive impacts are identified. The project design has mainstreamed a culturally sensitive approach to information sharing, meaningful consultation, and benefit sharing.[2]

[2] ADB. 2009. *Safeguards Policy Statement*. Manila. See Appendix 3, Safeguards Requirements 3: Indigenous Peoples, para. 17.

I. Project Overview

1. Nepal is considered one of the most disaster-prone countries in the world. The Terai region, also known as the sub-Himalayan hills, at low altitude is severely affected by recurrent annual flooding that cause damage to infrastructure, crops and erodes agricultural land affecting the lives and livelihood of the population living in the area, public infrastructure and communities annually.

2. Communities vulnerable to floods in the Terai have been increasing due to migration of people from the mountains and hilly regions in search of better livelihood and settling in the flood prone areas. Farmers and communities are not fully prepared for flooding due to limited precautionary measures like; absence or limited river training works, preparedness to manage the issues associated with flood (e.g., skill of rescuing the flood victims and their rehabilitation, handling and rescuing of vulnerable persons like; women, senior citizens, children, lack of flood shelter house and warnings of impending flood events. The region's inadequate investment in disaster risk management including flood protection affects the poor and marginalized who are occupying the most hazard exposed areas along the river embankments.

3. The Priority River Basins Flood Risk Management Project aims to reduce the incidence and severity of flooding in the prioritized river basins in the Terai. It will contribute to a reduction in potential loss of life, economic and natural resource degradation. Various components under the project are (i) provide flood control through bio-engineering and river training infrastructure (ii) enhance flood forecasting and early warning systems (FFEWSs) and (iii) enhance emergency preparedness and response readiness; including investing in community-based disaster risk management (CBDRM) and capacity building for the Department of Water Resources and Irrigation (DWRI) officials, stakeholders and beneficiaries in best practice flood risk management

4. This social safeguards due diligence report aims to understand the social impacts and safeguards issues to support decision making about funding the proposed investment program. Social safeguards due diligence is one of the requirements of the Asian Development Bank (ADB) for project processing. This due diligence report addresses the Involuntary Resettlement and Indigenous Peoples safeguards assessment of the five subprojects with feasibility and detailed designs, including: (i) Mohana Khutiya; (ii) Mawa Taruwa; (iii) West Rapti; (iv) Lakhandei; and (v) Bakraha. Due diligence activities for the East Rapti subproject will be undertaken by the Project PMU during implementation as the subproject will involve design of community flood shelters during implementation. This due diligence report is based on the most updated project design as of December 2019. The report will require updating and finalization prior to embankment construction in each subproject as the river course is likely to have moved following the monsoon season and design modifications may be required.

5. DWRI is responsible for all protection works related to water-induced disasters. The Government of Nepal has requested the Asian Development Bank (ADB) to support the development of the 'Priority River Basins Flood Risk Management Project' which focuses on flood control and river training infrastructure in six rivers basins in the Terai region.[3] The location of the six river basins is shown in Figure 1 and a summary of the embankment technical detail is incorporated in Table 1.

[3] Mohana Khutiya basin, Mawa Ratuwa basin, Lakhandei basin, West Rapti basin, East Rapti basin and Bakraha basin.

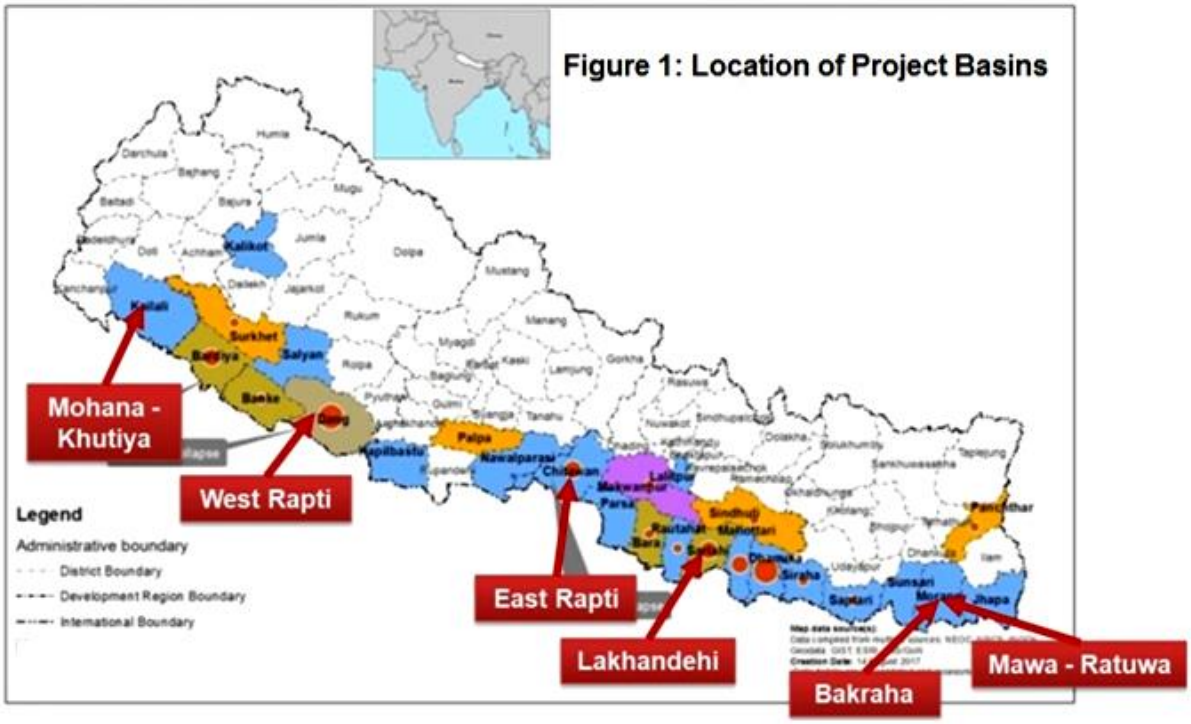


Figure 1: Location of Project Basins

6. The details of works to be carried out in the project river basins are summarized in Table-1 below.

Table 1: Summary Technical Detail of the Proposed Embankments[4]

River Basin	District	Number of embankments	Embankment Length (m)	Additional Revetments (m)	Spurs	Outlets
Mawa Ratuwa	Jhapa, Morang	13	10,485	1,330	188	19
Mohana Khutiya	Kanchanpur Kailali	11	10,280	2,150	146	16
West Rapti	Dang	6	12,530	0	36	-
Lakhandei	Sarlahi	2	1,600	1,160	27	-
Bakraha	Morang	8	4,365	0	42	-
East Rapti	Chitawan	0	-	-	-	-
Total		49	36,230	4,640	439	36

7. The project aims to achieve the following outputs.

(i) **Output 1- Flood protection infrastructure and maintenance system improved.** The project will reduce direct impacts from flooding through (i)

[4] Several embankments were dropped in the Lakhandei River Basin since this due diligence exercise was undertaken. This table will be updated to reflect actual figures once due diligence is finalized.

construction of flood control infrastructure (embankments, spurs, and outlet structures); (ii) planning and implementation of bioengineering of river embankments for enhanced flood risk management, using suitable vegetative methods to prevent soil erosion; and (iii) development of maintenance manuals and an asset management system for flood protection infrastructure..

(ii) **Output 2. Flood forecasting and response systems enhanced.** The project will support the government and communities in flood-prone areas to improve early flood warning systems through (i) installing about 40 rain gauges and 30 hydrometeorological stations, (ii) developing about 5 FFEWS, and (iii) improving maintenance of FFEWS.

(iii) **Output 3. Flood prevention and preparedness capacity improved.** This will be delivered by (i) undertaking an organizational capacity building program on flood risk management and infrastructure planning for the DWRI and local governments (municipalities, village municipalities and provincial governments); (ii) developing the capacity of local communities on disaster preparedness; (iii) constructing about 48 flood shelters with gender-responsive features; and (iv) developing CBDRM plans, in consultation with community stakeholders (including women) and in line with local development plans and budgets that integrate disaster risk information.

II. Social Due Diligence Methodology

8. This social safeguards due diligence report has been prepared to determine the social safeguards categorization for both Involuntary Resettlement and Indigenous Peoples. Impacts and mitigation measures were assessed and determined based on the following methods: (i) desk-based review of technical plans, social assessment reports prepared by the TA consultants, relevant secondary data; and (ii) primary data collection: household survey and focus groups discussions with local community and affected persons across the Mohana Khutiya river basin covering all the proposed construction sites.

9. Land use requirements and proposed arrangements were further investigated and verified by a team of two social safeguard officers who examined GIS maps of the sub-project designs against the cadastral maps. The social safeguards officers held community meetings along all the proposed embankments and spoke directly with families whose lands would be impacted by embankment construction to determine their eligibility and interest to donate lands to the project. Local government representatives and DWRI engineers also participated in this verification/due diligence exercise in order to explain the project and clarify questions from the beneficiary population. The following steps were involved in carrying out the due diligence.

10. **Step 1: Preparatory Activities** On 16 June 2019, ADB Social Development Consultants held a one-day training workshop at the DWRI project office, in Kathmandu to explain the requirements of ADB SPS 2009. The workshop was attended by the DWRI Dy. Project Director, the DWRI Sociologist, project engineers, and other field survey staff comprising male and female members to be deployed for safeguards due diligence. The ADB Social Development Consultants clarified the due diligence process requirements, including for community consultation and information sharing and the eligibility criteria and process for negotiated settlements and voluntary donation. During the training workshop, the participants developed a field work plan and reviewed survey tools for community consultations and household surveys, as well as the MOU in the event of voluntary land use donations. **Appendix 1** presents the list of participants in the workshop.

11. **Step 2: Fieldwork Verification.** The Project social safeguards team visited the project sites in July and August 2019 for due diligence assessments. The aim of the social safeguards due diligence was to consult local beneficiary communities about the project and anticipated impacts; determine the extent to which Indigenous Peoples were present and impacted by the project development and agree on an approach to land use. Field notes from all community consultations and household level surveys were recorded and stored at the DWRI office.

12. Prior to initiating the social safeguards due diligence, considerable effort was made to ensure affected persons (project beneficiaries) were present for community consultation and household meetings. First, the DWRI engineers and ward representatives contacted persons owning/occupying land at the proposed embankment construction sites and invited them to participate in the due diligence assessment. Landowners and users (both titled and non-titled) were identified by comparing the Priority River Training Works (PRTWs) designs against the cadastre maps. The cadastre maps had been earlier retrieved for the identified villages from District Land Survey Office. Second, local community members, including persons representing different caste and the ethnic groups; indigenous people, women, seniors, disabled persons etc were invited and informed about the consultation meetings and invited to participate.

13. Social safeguards assessments were carried out along proposed PRTWs. The assessment initially involved holding the community consultations, which were facilitated by the DWRI engineer, Ward representative and the Social Safeguards Officers. The community

consultations initially sought to inform local people about the proposed project works, its intended benefits and land use requirements. The meetings also focused on obtaining feedback from local people about any perceived adverse impacts, particularly to vulnerable and marginalized groups such as indigenous peoples, lower caste and women.

14. Detailed information on the fieldwork completed for each subproject is presented in Section III.

III. Subproject Description

15. The following section provides a brief description of the six subprojects and proposed project interventions. Common to all subprojects is the proposed flood control and river training infrastructure (embankments, spurs and outlets), Flood Forecasting and Early Warning Systems (FFEWSs) and a training program for Community Based Disaster Risk Management (CBDRM). The following activities and infrastructure are included under the FFEWS and CBDRM:

(i) Rain gauge network installation
(ii) Hydrometric gauge network installation
(iii) Hydrometric equipment
(iv) A topographic survey cross-section
(v) Training of trainers to guide the communities in the event of a flood warning and to increase their resilience to respond
(vi) Where not existing, a Community Disaster Management Committee (CDMC) per community will be established
(vii) An inventory of the different houses and buildings in the agreed community to identify the vulnerable and non-vulnerable places.
(viii) Community flood shelters

16. The community flood shelters will be designed under the CBDRM project component in collaboration with flood affected people. This component will be designed during the implementation phase and hence, DWRI will need to undertake social safeguards screening and reporting to ensure that lands for the community shelter will not trigger the SPS 2009 Involuntary Resettlement safeguard. In principle, the project will identify government lands to construct the shelters, or if preferred, local people will have the option to donate lands for the flood shelter where eligibility criteria is met. The project's principles for undertaking land negotiation and/or voluntary land use donation is included within the Project Administration Manual and meets the criteria of ADB, national and international best practice.

17. **The East Rapti Subproject.** For East Rapti Basin (Figure- 2) there will be no structural measures along the river. The catchment of the East Rapti Basin lies between Northing 3,024,000 m to 3,080,000 m (84°8'42.905"N to 27°20'22.455"N), and between Easting 219,000 m to 324,000 m (longitude 85°11'38.029 E– 27°46'56.346 E) in WGS 84, UTM Zone 45 N. the basin extends from the southern slopes of the Mahabharata Range in the north, Chure Hills (Siwalik Hills, also known as sub-Himalayan hills, at low altitude) in the Middle and in Terai (meaning low flat land) in the south up to the Indo-Nepal border. East Rapti is the main water body, which is joined by the Mahanahari, Lothar and Budhi Rapti in the west. In the east it is joined by the Karra Khola, and Khukreni Khola and in the Southwest by Riu Khola. The catchment covers an area of 2,963 km2 in the central Nepal, Province No. 3. East Rapti River system lies in the districts Makwanpur and Chitwan. The basin has 1,564 settlements distributed over rural and urban municipalities with a population about 610,000 and households (HHs) about 13,000 (CBS, 2011). Hetuada Municipality, Bhandara, Bhimphedi, Makwanpur Gadi, Bhainse, Bharatpur Metropolitan City, Ratnanagar, Ayodhapuri are the major cities, towns and settlements. East Rapti Basin has two valleys, i.e., East Rapti Valley and Madi Valley in the south. The famous Chitwan National Park, and a part of Parsa Wildlife reserve are located in this basin. As mentioned above, only FFEWS and CBDRM components will be developed in this sub-project. The project will need to perform a social due diligence screening when the locations for the community flood shelters are identified.

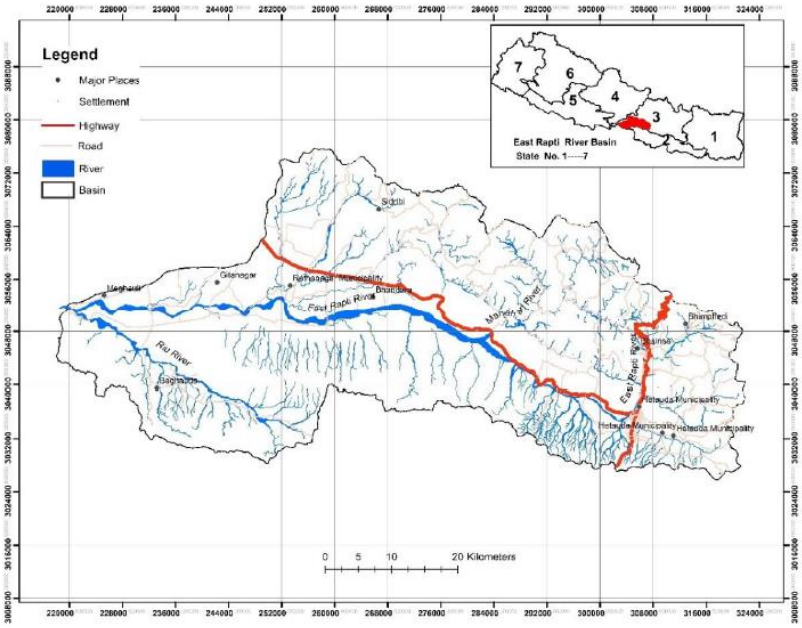


Figure 2: East Rapti River Basin

18. **The Mohana Khutiya Sub-project**. The Mohana Khutiya (Figure 3) extends from Chure Hills (Siwalik Hills, also known as sub-Himalayan hills, at low altitude) in the north and the Terai plains in the north to Nepal - India border in the south. The catchment covers an area of 702.4 km^2 and is located in the far west of Nepal. The Mohana - Khutiya basin system lies in the districts of Kailali and Kanchanpur in Province no 7. This river system has 359 settlements distributed over rural and urban municipalities with a population of 190,063 and 37,681 households (CBS, 2011). Dhangadhi and Atrariya are the two major towns located in this catchment.

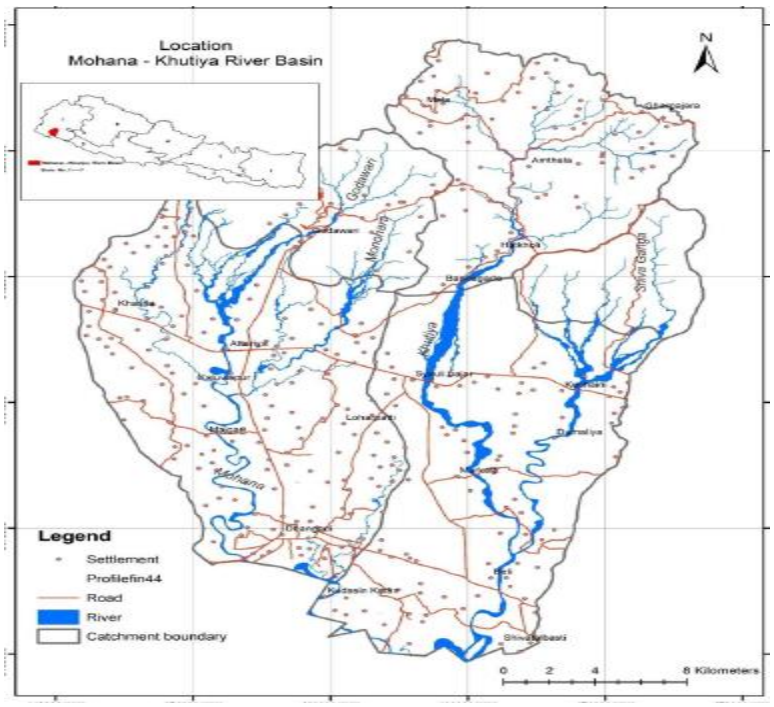


Figure 3 Mohana Khutiya

19. In addition to FFEWS and CBDRM mentioned in para. 15, the Mohana Khutiya Subproject will involve 12 PRTWs. The PRTW includes construction of embankments, revetments, spurs, and outlets. The embankments will be between 9 m–12 m wide and have gravel surfacing and used for road access, revetments, spurs, and outlets. Table 2 provides details of the proposed PRTWs in the Mohana Khutiya subproject.

Table 2: Details of Proposed Mohana Khutiya PRTW[5]

PRTW No	Location and Length		
	Nagar/ Village Palika and Ward No.	Village	Embankment' Length (m)
PRTW 01	Krishnapur- 7	Shantipur	700
PRTW 02	Krishnapur-7	Majgain	800
PRTW 03	Dhangadhi, Nagar Palika-13	Srilanka	330
PRTW 06	Godawari Nagar Palika -9	Arjun Tole	1630
PRTW 07	Godawari Nagar Palika -9	Murkatti	715
PRTW 08	Dhangadhi Nagarpalika -17	Uttar Khairini	800
PRTW 09	Dhangadhi Nagarpalika-15	Tarbaria	520
PRTW 10	Krishnapur Nagarpalika -9	Rajghat	400
PRTW 11a	Krishnapur Nagarpalika -9	Sanagaun	1345
PRTW 11b	Krishnapur Nagarpalika -9	Jorayal Tole	510
PRTW 12	Dhangadhi Nagarpalika -3	Chatakpur (Gaushala)	750
PRTW 13	Godawari Nagar Palika-9	Dhanchauri	1000

20. **The Mawa Ratuwa Subproject.** The Mawa Ratuwa catchment of the Mawa Ratuwa Basin (Figure-4) lies between Northing 2,919,087 m to 2,973,609 m (latitude 26°25′ 56.89″–26°49′ 05.14″N), and between Easting 561,528 m to 580,023 m (longitude 87°36'36.31″E–87°47′24.97″E) in WGS 84, UTM Zone 45 N. The basin extends from Chure Hills (Siwalik Hills, also known as sub-Himalayan hills, at low altitude) in the North and in Terai in the south up to the Nepal - India border. Ratuwa is the main water body, which is joined by the Mawa in the West, and Bidhawa and Chanju Khola in the East. The catchment covers an area of 413 km^2 is located in the East of Nepal. The Mawa Ratuwa Basin shares the districts of Morang and Jhapa, both in Province No. 1. The basin has 366 settlements distributed over rural and urban municipalities with a population of 165,260 and 36,871 households (CBS, 2011). Damak and Urlabari are the two major towns located in this catchment.

21. In addition to FFEWS and CBDRM mentioned in para 15, the Mawa Ratuwa subproject proposed to develop 17 PRTWs (Table 3). The embankments will be between 9 m–12 m wide and have gravel surfacing and used for road access, revetments, spurs, and outlets. Embankments are proposed at the following locations.

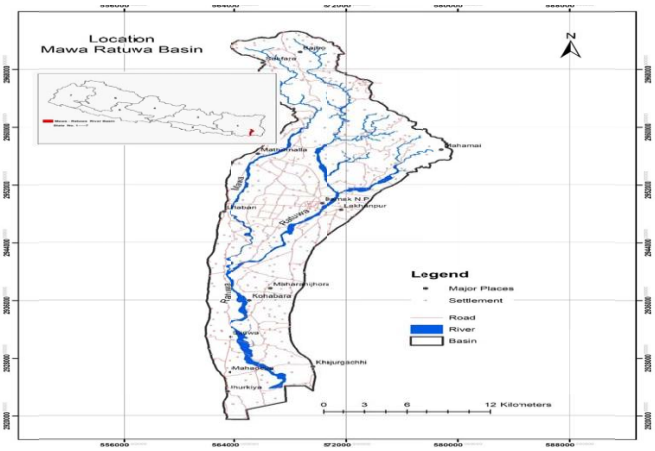


Figure 4: Mawa Ratuwa River Basin

[5] PRTW 4 and PRTW 5 have been excluded from the proposal for ADB funding.

Table 3: Details of Proposed PRTW in Mawa Ratuwa

PRTW	Site Name	Municipality/ Village	Ward No	Embankment Length (m)
01	Chandra Dovan	Gauradaha Municipality	5	2200
02	Mangalbare	Ratuwamai Village Municipality	10	825
03	Dumse	Damak Municipality	3	535
04	Shanti Tole	Urlabari Municipality	7	785
05 A	Tapu	Urlabari Municipality	1	470
05 B	Tapu	Urlabari Municipality	1	250
07	Mirchagadi	Urlabari Municipality	3	930
08	Chaukighat	Ratuwamai Municipality-	3&4	1330
09 (a)	Nayabasti, Triveni Tole	Damak Municipality	2	205
09 (b)	Nayabasti, Triveni Tole	Damak Municipality	2	820
9 (c)&(d)	Himalaya Tole	Damak Municipality	1	1005
10.	Rubber Plant Area	Damak Municipality	6	265
11.	Near Mahesh Chowk	Urlabari Municipality	9	650
12 LB	Khayarbari	Kamal Rural Municipality	6	500
12 RB	Panchthare Tole	Damak Municipality	10	500
13 LB	Udaya Tole	Damak Municipality	4	175
13 RB	Shanti Tole	Urlabari Municipality	7	370

Source: Census Survey, JulyAugust 2019

22. **The West Rapti Subproject:** West Rapti river drains Rapti Zone in the Mid-Western Region, Nepal and Purvanchal regions of India before joining the Ghaghara (Figure-5)- a major left-bank tributary of the Ganges known as the Karnali inside Nepal. It rises south of a prominent E-W ridgeline midway between the western Dhaulagiri Himalaya and the Mahabharat Range. A 3,500 meter (11,500 ft) summit on this ridgeline marks a triple divide. North of the triple divide the Karnali and Gandaki basins are adjacent; south of it the Rapti and similar but smaller Babai River separate the two larger basins. After crossing into India, the Babai and Rapti separately join the Karnali's continuation called Ghaghara. The Ghaghara ultimately joins the Ganges. The main river emerges from its gorge into the lower Siwalik Hills and Dang District at Bhalubang Bazaar, Nepal's east-west Mahendra Highway bridges the river.

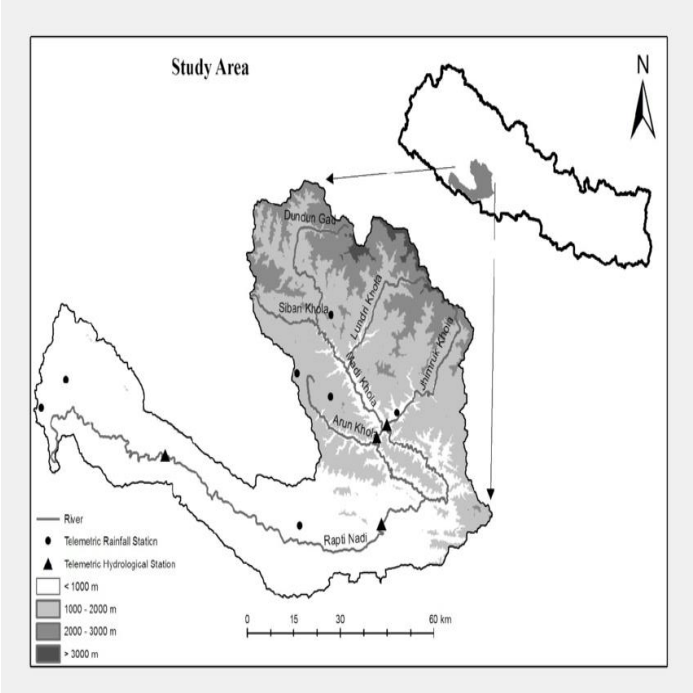


Figure 5: West Rapti River Basin

23. In addition to FFEWS and CBDRM mentioned in para. 15, the West Rapti subproject proposed to develop 8 PRTWs (Table-4). The embankments will be between 9-12 meters wide and have gravel surfacing and used for road access, revetments, spurs, and outlets. Embankments are proposed at the following locations.

Table 4: Details of Proposed PRTW in West Rapti

PRTW	Site Name	Municipality/ Village	Ward No	Embankment Length
01*	(a) Pachaha (b) Mahadeva (c) Kothari	Gadhawa, Rural Municipality-Ward -2	2	2340
02*	(a) Khadkapur (b) Chingatpur	Gadhawa, Rural Municipality	4	2100
03	(a) Parsiya (b) Lokharpur (c) Lokharpur	Gadhawa	2,3,5,7	5655
04	(a) Batkauwa (b) Semarhawa (below Rapti bridge)	Lamahi Municipality	4	500
05	(a) Balarampur (b) Dhikpur	Lamahi Municipality	7	500
06	(a) Kanchhi Gaun (b) Jharbaira	Gadhwa Village Municipality	7	750
07* & 08	(a) Nahartole (b) Kachanapur (c) Gurukhola	Rapti sonari Rural Municipality	2	500+730

Source: Feasibility Report by TA Consultants
**PRTW will not be funded under ADB project (after not passing economic assessment)*

24. For the subproject's FFEWS the project will install 12 rain gauge network installation and 9 Hydrometric gauge network installation. Flood shelters will also be constructed. At this stage, only four communities during the community consultations have desired to have floods rehabilitation shelters in their respective area as per Table 5.

Table 5: Flood Shelters Desired by Local Community in West Rapti Basin

S.N.	PRTW	Location	Land Available Place as suggested
1.	01	Gadhwa Rural Municipality-2 Kothari	The land is available at Kothari, Gadhwa-2
2	06	Lamahi Municipality-4 Batkauwa	Ailani land is available in the ward
3	07	Rapti Sonari Rural Municipality -2, Kachanapur	The land is available within Ward No. 2 itself. About 10 Kattha (3380 sqm) can be managed
4	08	Gadhwa Rural Municipality-7, Karchha Village	There is always a flood risk in this village. People are willing to donate land if there is no Ailani land available.

Source: Census Survey, July–August 2019

25. **Bakraha Subproject.** The Bakraha Basin is located in the eastern Terai region of Nepal. It is severely affected by floods causing loss of cultivating land, community infrastructure and even life and properties in the settlements along the basin. The Bakraha river basin extends from Chure Hills (Siwalik Hills, also known as sub-Himalayan hills, at low altitude) in the North and in Terai in the south up to the Nepal - India border. The catchment of the Bakraha Basin lies between latitude 26°25′ 56.89″–26°49′ 05.14″N, and between longitude 87°36'36.31″E–87°47′24.97″E in Morang district of Province No. 1. The basin has 366 settlements distributed over rural and urban municipalities with a population of 165,260 and 36,871 households (CBS, 2011). Damak and Urlabari are the two major towns located in this catchment.

26. In addition to FFEWS (6 rain gauges and 5 hydrometric gauges) and CBDRM mentioned in para 15, the Bakraha subproject proposed to develop 8 PRTWs (Table-6). The embankments will be between 9 m12 m wide and have gravel surfacing and used for road access, revetments, spurs, and outlets. Embankments are proposed at the following locations.

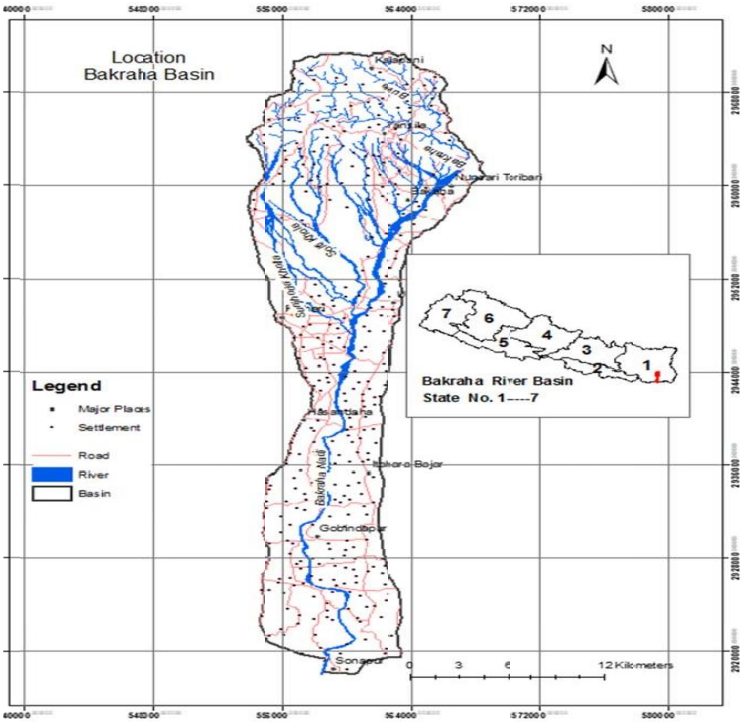


Figure 6: Bakraha River Basin

Table 6: Details of Proposed PRTW in Bakraha Basin

PRTW	Site Name	Municipality/ Village	Ward No	Embankment Length	Remarks
01*	Kasani	Miklajung, Morang	7	600	LB
02*	Chisapani	UrlabariMunicipality	1	250	RB
03*	Jhumra, Bishal Tole	Urlabari Municipality	4&5	380	LB
04	Thapadangi	Urlabari Municipality	4	200	RB
06	Bistadanda, Pipalchowk	Sanischare Municipality	3	1300	RB
07	Kaseni, Leti	Ratuwa Mai Municipality	5	2365	LB
08	Bardanga, Chauki tole	Sanbarasi Municipality-	6	500	RB
09*	Urlabari, Miklajung	Urlabari Municipality	9	1000	RB

Source: Census Survey, July–August 2019
**PRTW will not be funded under ADB project (after not passing ADB economic threshold)*

27. Based on community consultation, local community in 6 PRTW sites[6] expressed their need for the rehabilitation building. For this purpose, government and community lands is available and even in case of unavailability of such land the community is willing to voluntarily donate land for the shelters.

28. **Lakhandehi Subproject.** Lakhandehi River lies in the Central part of the country's province number 2 in Sarlahi district and is a tributary of Bagmati River. It originates in the Chure range of Central Nepal and flows in a southerly direction to the Nepal-Indian border. The river flows west of Lalbandi city which is one of the fast-growing cities of Central Nepal. The topography of the catchment area is steeped in the upper reaches of the basin and very mild in the lower part of the basin which is also referred to as the Terai region. The total catchment area of the Lakhandehi basin up to the Nepal-Indian border is 344km^2.

29. Lakhandehi River is a non-perennial river and the flooding in this river is characterized as being flashy in nature. There has been a history of 69 flood events between 1993 and 2015 with widespread damage and loss of life, particularly in the downstream part of the basin in the border region. In recent years, the river has experienced high sediment loads often aggravated by landslides in the upper catchment. This has led to a slow rise in the bed level over time.

30. The basin extends from Chure Hills (Siwalik Hills, also known as sub-Himalayan hills, at low altitude) in the North and in Terai in the south up to the Nepal - India border. The Sarlahi district has a population of 769,729 and 132,844 households (CBS, 2011). Lalbandi and Hariaun are the two major towns except the district headquarter Malangwa which is located in this catchment.

31. In addition to FFEWS (5 rain gauges and 4 hydrometerlogical stations) and CBDRM mentioned in para 15, the Lakhandei subproject proposed to develop 2 PRTWs (Table 7). The embankments will be between 9 m–12 m wide and have gravel surfacing and used for road access, revetments, spurs, and outlets. Embankments are proposed at the following locations.

Table 7: Details of Proposed PRTW in Lakhandehi

PRTW No	Site Name	Municipality/ Village	Ward No	Embankment Length	Remarks
01	Pattharkot, Jiyajor	Lalbandi Municipality	12	2324	RB
08	Kachhariya Tole	Haripur Municipality	8	420	LB

Source: Census Survey, July–August 2019

32. In case of the absence of appropriate buildings for use, flood shelters will be constructed. Based on community consultation, local community in both the PRTW sites expressed their need for the rehabilitation building. For this purpose, government and community lands is available and even in case of unavailability of such land the community is willing to voluntarily donate land for the shelters.

[6] 1) PRTW 01 Miklajung Rural Municipality-7 PRTW 2: rehab center necessary, but land uncertain), 2) PRTW 02:Chisapani, Urlabari-2, land available at ward No.2, 3)PRTW 04: Thapadangi, Urlabari-4, Land can be arranged for rehan center, 5) PRTW 06: Bistadanda, Sanischare-3, land can be managed, 6) PRTW 07: Bardanga-Sonbarsi-7, land can be made available at ward no 7 near temple.

IV. Subproject Social Due Diligence

Mohana Khutiya

33. **Fieldwork Verification.** The project social safeguards team visited the Mohana Khutiya basin from 22 to 28 July 2019. The aim of the social safeguards due diligence was to consult local beneficiary communities about the project and anticipated impacts; determine the extent to which Indigenous Peoples were present and impacted by the project development and agree on an approach to land use. Field notes from all community consultations and household level surveys were recorded and stored at the DWRI office.

34. Social safeguard assessments were carried out along all 12 proposed PRTWs. The assessment initially involved holding the community consultations, which were facilitated by the DWRI engineer, Ward representative and the Social Safeguards Officers. The community consultations initially sought to inform local people about the proposed project works, its intended benefits and land use requirements. They were also informed that the embankment would be used for road access to their agriculture fields and constructed in a way convenient to river access with provision of the ramp and other facilities depending upon the location and size of the embankment. The meetings also focused on obtaining feedback from local people about any perceived adverse impacts, particularly to vulnerable and marginalised groups such as indigenous peoples, lower caste and women.

35. The meetings also covered the topic of voluntary land donations and eligibility criteria (see details on voluntary donation eligibility on page 24). As the embankments would pass through sections of private lands, landowners and users of publics lands were asked about their willingness to donate lands to the project. The community consultation meetings were concluded after signing the minutes and attendance record of each participant including local Government representative (e.g. mayor/chairperson of rural municipality/ ward members and DWRI engineer). The meeting minutes contained texts in Nepali on all meeting details including the local people's general willingness to voluntarily donate land use right for the land at the embankment site to the project. The text was read out loudly to the community for their easy understanding.

36. A household survey was completed with present HHs in order to establish a baseline profile of the beneficiary population. Collected information included details such as the household size, major caste and ethnic composition of the population including Dalit, ethnic and disadvantaged groups, major occupation, information on flood and associated impacts and its management etc.

37. Ground verification of affected plot/ land parcel and its owners/occupants was conducted following the community consultation using data from GIS overlays on cadastral maps and other local information. The social consultants and the census team walked along the proposed embankment with a group of 5 to 10 local community members comprising the ward

representative, persons having land in the construction sites and DWRI engineer to invite additional participants to verify ownership details.

38. Two types of affected persons were identified during these walks i) persons with formal land title, known as 'lal purja' in Nepali language. It was observed that the cadastral maps were not always updated, with some persons having land titles in the construction site that were not formally mapped in the cadastral and ii) non-title holders' or persons without formal land title occupying Government/ Ailani land for agricultural activity that is likely to be affected.

39. The census team however, could not collect complete information from all the households likely to have their private lands in the proposed embankment sites as there were some absentees and some of the land parcels were not matching with the GIS overlay on the cadastral maps that are not updated. In such cases, information regarding land parcels of affected parties were collected from local government representatives and the local community. The social consultants explained that only the private landowner and/or non-title holder can give consent for land use arrangement and the project team would have to confirm eligibility and obtain signatures ahead of construction. **Appendix- 2** provides a sample English translation of the text read to the community.

40. In total, 12 community consultation sessions were organized, one at each PRTW location. Location of the consultation meetings and number of participants is presented in Table 8.

Table 8: Community Consultation Meetings and Participants

S.N.	Name of Place	District	Municipality /Village Palika	PRTW No	No. of Participants
1	Arjuntole	Kanchanpur	Godawari Municipality-9	06	47
2	Murkatti	Kanchanpur	Godawari Municipality-9	07	48
3	Uttarkhandini	Kanchanpur	Dhangadhi Submetropolitan-17	08	67
4	Tarvairiya	Kanchanpur	Dhangadhi Submetropolitan-15	09	65
5	Dhanchauri	Kanchanpur	Godawari Municipality-9	13	71
6	Srilanka	Dhangadhi	Dhangadhi Sub-metropolitan-14	03	58
7	Chatakpur, Gausala	Dhangadhi	Dhangadhi Sub-metropolitan-03	12	43
8	Rajghat	Dhangadhi	Krishnapur Municipality-9	10	44
9	Sanagaun	Kanchanpur	Krishnapur Municipality-9	11 (a)	64
10	Sanagaun	Kanchanpur	Krishnapur Municipality-9	11 (b)	28
11	Shantipur	Kanchanpur	Krishnapur Municipality-7	01	17
12	Majhgaun	Kanchanpur	Krishnapur Municipality-7	02	29
				Total Number of Participants	**581**

41. Each consultation session was attended by at least one local government personnel (ward representative) and the field engineer of DWRI. Of the total 581 participants, 238 (40.96%) were women and 243 (59.04%) were men. In terms of indigenous people and *Dalit;* the representation of indigenous people was 311 persons (53.53%) and 51 persons (8.78%) were Dalits. Table 8 presents summary details of participants in the consultation meetings and Key findings of the community consultation and issues raised are summarized in Appendix 3.

Table 9: Summary of Participants in Community Consultations

S.N.	Participants	No.	% of Total Participants
Participation by Gender			
1	Women	238	40.96
2	Men	343	59.04
3	**Total**	**581**	**100.00**
Participation by Vulnerable and Non-vulnerable Groups			
1	Dalit	51	8.78
2	Indigenous People	311	53.53
3	Brahmins and Other Caste Groups	219	37.69
4	**Total**	**581**	**100.00**

Source: Community Consultation Record, July 2019

42. The census team with the help of local representatives and community listed names of all affected persons covering those having land at the site of the proposed embankment with officially verified land ownership certificates as well as HHs not having verified land ownership certificate including the occupants of government or *Ailani* land. The census team collected socioeconomic information along with the details of assets owned by administering a semi-structured questionnaire. A set of the socio-economic questionnaire is presented in **Appendix 4**.

43. The census team also collected signatures of the landowner/occupant on the MOU for voluntary land use. The MOU was countersigned by a representative of local Government (independent third party) and the DWRI engineer.

1. Project Impacts to Land

44. The Safeguards due diligence finds that the project will not cause involuntary land acquisition or involuntary economic or physical displacement. Consultations with persons living along the river embankment and nearby communities highlighted that no structures are present at any site of the proposed 12 PRTW project sites. Further, no economic displacement will occur at the time of project construction as community members, landowners and non-title holders expressed their interest and willingness to avoid planting seasonal crops in the project corridor of impact ahead of construction. Local people will directly benefit from the embankments construction because they will have year-round access to the lands protected by the project works. Affected people expect that following the PRTW construction, they will increase their crop productivity as a result of year-round access to the remining land and the certainty that the land will not be washed into the river.

45. The estimated area required for construction of 12 embankments in Mohana Khutiya basin is 12.29 ha.[7] The social due diligence exercise involved interviews with 73 affected households, of which 13 households are private landowners and 60 HHs are non-title holders (*Ailani* land users). These HHs were identified as owning or using lands within the project corridor of impact. Details of the affected HHs, land parcels and estimated annual income loss as a result of not being able to plant crops in the project corridor of impact are provided in **Appendix 5.** All identified affected HHs were found to be eligible for voluntary donation and signed MOUs; all land use agreements (MOUs) made must be verified ahead of civil works. Table 10 outlines the total number of landowners and non-title holders. Note that no physical displacement is required for the project as no structures were located within or near the project

[7] As per estimate of GIS overlay on cadastral maps.

corridor of impact, hence non-title or Ailani land users will not be moved or restricted from ongoing use of the remaining government lands.

Table 10:Type of Land Owned/Occupied by Affected Households

Landowners Type	No. of Owning HHs
Private Land only	13
Encroachers	24
Squatters	36
Total	**73**

Source: Census Survey, July 2019

46. **Private Landowners:** Thirteen private landowners will be impacted by embankment construction in PRTW no. 2, 3 and 10. Six landowners were able to produce land ownership certificates (*Lal purja*) and were verified on the cadastral maps. The remaining seven landowners were not verified as their plots were not reflected on the cadastral map and/or they did not produce their certificate at the time of the census. All 13 households signed MOUs confirming their willingness to voluntarily contribute land use for the project purposes. Details of land parcels owned at the construction site is provided in Table 11**.**

Table 11:Details of Private Land ownership

S.N.	Interviewed Landowners	Land Parcel No.	Area in (Bigha-Kattha-Dhur)	Area in sq.m.	Land Type
Krishnapur Municipality-9, Rajghat, Kanchanpur District PRTW 10					
1	Deumani Dagaura#	11	1-19-5		Not Verified
		12	1-7-1		
Krishnapur Municipality-8, Majgain, Kanchanpur District PRTW 08					
2	Phulpati Dagaura	45	-	1,6940	Verified ownership and parcel number with GIS Sheet
3	Buddhiram Chaudhari	697		6,839	
4	Hargudi Dagaura	15	0-3-0		
		27	0-5-0		
5.	Bhangiram Dagaura	42	0-7-0		
6	Kabir Bhagat#				Not Verified
7	Nanda Lal Rana$	672			Not Verified
8	Banda Chaudhari$	Not having ownership document during census survey			Not Verified
9	Dhani Ram Chaudhari	16	-	03620	Verified
10	Jaggu Dagaura Chaudhari$				Not Verified
11	Phaku Ram Dagaura	17 & 28	-	15570	Verified
12	Bhaktaram Chaudhari	18 & 30	-	14872	
Dhangadhi Municipality – 13, Srilanka					
13	Ram Bahadur Chaudhari	Not having ownership document during census survey			Not Verified

Source: Census Survey, July 2019
not matching the parcel number with GIS
$ Could not produce ownership certificate during the survey

47. One man claimed to own a land plot affected by the project corridor of impact and stated that he did not want to donate lands to the project. The social due diligence team were unable to locate the man's land plot on the cadastral map as the man did not have any documentation and would not show the location of the plot. Community members and local officials could verify the location of this man's land holding. The man was requested to produce documentation, which will be verified ahead of construction. As per the voluntary donation eligibility criteria, if

this man is found to have land within the corridor of impact then the land cannot be donated to the project. The DWRI project director and design engineers are aware of this case (the only case in the whole project) and have agreed to find design solutions to avoid the land once verified. This verification will be finalized ahead of construction.

48. **Non-titleholders:** Sixty non-titled households were identified as using *Ailani* (government) land for economic purposes in the subproject. Socio economic information as well as information on the area of occupied *Ailani* land was estimated by the respondents and collected from all the 60 households. Of the 60 non-title holders encroaching on government land, 24 have private lands elsewhere and 36 are using land in the project corridor of impact for seasonal crops..

49. **Crop and associated income loss:** Sixty-seven households indicated that seasonal crops are planted on the affected land area (7 private landowners and 60 non-title holders). Crops generally include wheat, rice and maize. Affected households explained that paddy is generally planted between June and July, wheat in February and maize in April, Athe time of the social safeguard due diligence assessment during the monsoon season (June–August) few crops were present along the embankment. The impact to crops as a result of the project land use requirement was therefore estimated on the basis of the landowner and users feedback recorded in the household's survey.

50. **Appendix-5** indicates that affected households' livelihoods will not be significantly impacted by land use donation for the project. All households are expected to lose less than 10% annual income as a result of land use donation.[8] Screening activities highlighted that households already plant crops about 4 m–5 m form the river's edge to create a buffer zone between the crop and river. As the embankment construction is expected to take up about 9 m–12 m, embankment construction is expected to impact a strip of around 6 m–7 m of crop land. As agreed with the local communities, affected households will be given advance notice about the construction timeline so that they can avoid planning crops in the project corridor of impact. In the unlikely event that crops are planted in the corridor of impact, the contractor will pay for any damages at the prevailing district rate at the district level agriculture office. The provision is included in the contractor bidding documents.

2. Socio-economic Information and Profile of Affected Persons

51. A baseline socio economic survey was conducted covering 100% of the affected HHs: total 73 affected HHs. Key findings of the survey are summarized in the section below.

Demographic Characteristics

[8] For estimation of income loss by these households, the census team collected information on average annual income of the affected HHs from different sources including farming from all the land owned as well as from the ailani land. Total land requirement for each PRTW was available from the GIS overlay on the old cadastral map. As all the affected HHs were not identified in the GIS overlay, census team first estimated the government land available at each PRTW site with help of the local community and subsequently the gross total non-government land (private and ailani) required at each PRTW was estimated leaving out the government land available.This land required at the site was apportioned by the local community among the HHs required to donate land use right according to the total size of the land parcel that is affected. Income loss to the affected HHs is estimated by applying this loss of land to the total land owned by the HH and apportioning the percentage of land loss to the income from farming by the HHs. An estimation of Loss of Income by affected HHs and their vulnerability by category is provided in **Appendix 5**.

(i) Household and Population

52. Total population of the 73 affected HHs is 373 with 184 (49.33%) male and 189 (50.67%) females, with an average household size of 5.12 people.

(ii) Households by Caste and Ethnicity

53. There are two major ethnic groups in the project districts (Kailali and Kanchanpur). They are "Tharu" also known as Chaudhari, Rana Tharu, Dagaura Tharu and the hill community broadly known as "Pahadiyas" (including Brahmins, Chhetries, and other scheduled caste polulation). The census data presented in Table 12 shows that the proportion of indigenous people is higher both among private landholders as well as *Ailani* land occupants along the Mohana Khutiya basin. Percentage of indigenous people among the 13 private landowners is 92.31 percent and among the *Ailani* land occupiers it was 70%.

Table 12: Composition of HHs by Caste and Ethnic Groups

Caste and Ethnic Group	HH having Private Land in the project Area and also other places		HHs Owning *Ailani* Land	
	No	%	No	%
Ethnic minority/indigenous (Chaudhari, Rana Tharu, Dagaura Tharu)	12	92.31	42	70
Brahmin Chhetries and others (1 Bhagat)	1	7.68	17	28.33
Dalit and Disadvantaged	-	-	1	1.67
Total	**13**	**100.00**	**60**	**100.00**

Source: Census Survey, July 2019

(iii) Literacy and Educational Attainments

54. Illiterates (77 nos.) comprised 20.6% of the total population. Among the literates 262 nos. (88.51%) were educated maximum up to high school level. Only 6 nos (2.03%) were educated up to bachelors and above. Table 13 provides details of the level of education among the family members of affected HHs.

Table 13: Educational Status of the Affected Households

S.N.	Educational Status	Male		Female		Total	
		No	%	No	%	No	%
1	Illiterate	27	14.7	50	26.5	77	20.6
2	Literate	15	8.2	30	15.9	45	12.1
3	Primary	43	23.4	27	14.3	70	18.8
3	Lower Secondary	47	25.5	34	18.0	81	21.7
4	High School	35	19.0	31	16.4	66	17.7
5	10+ 2	14	7.6	14	7.4	28	7.5
6	Bachelor	2	1.1	3	1.6	5	1.3
7	Master and Above	1	0.5	0	0.0	1	0.3
Total		**184**	**100.0**	**189**	**100.0**	**373**	**100.0**

Source: Census Survey, July 2019

(iv) Average Landholding Size

55. The average landholding size of the 73 affected households is 0.80 Kattha (270.40 sqm). Majority households (44 HHs – 60.3%) had landholding size less than 0.5 Kattha (87.88 sqm), followed by 16 HHs (21.9%) owning land between 0.5 to 1 Katha. Only 13 out of the 73

HHs (17.8%) owned land above 1 Kattha. **Table 14** provides a summary of the landholding sizes of the affected households.

Table 14: Average landholding size of affected HHs

SN	Land Holding on Ranges	Households		Average Landholding Size	
		No.	%	Kattha	Sqm
1	< 0.5 Kattha	44	60.3	0.26	87.88
2	0.5 - 1 Kattha	16	21.9	0.72	243.36
3	1-1.5 Kattha	3	4.1	1.42	479.96
4	1.5-2 Kattha	2	2.7	1.97	665.86
5	2- 5 Kattha	7	9.6	2.93	990.34
6	> 5 Kattha	1	1.4	7.15	2416.70
Overall		**73**	**100.0**	**0.80**	**270.4**

Source: Census Survey, July 2019

(v) Major Occupation

56. Agriculture was reported as the major occupation of most households (106 nos-28.4%) followed by skilled labor (10.5%), wage labor (4%), overseas employment (6.4%) and service (2.4%). Students comprised 110 nos (29.5%) and 37 nos (9.9%) were housewives. Table 15 presents the occupation wise distribution of the affected HH members.

Table 15: Major Occupation of Affected HHs

S.N.	Occupations	Male		Female		Total	
		No	%	No	%	No	%
1	Agriculture	43	23.4	63	33.3	106	28.4
2	Student	49	26.6	61	32.3	110	29.5
3	Skilled Labour	35	19.0	4	2.1	39	10.5
4	Housewife		0.0	37	19.6	37	9.9
5	Overseas	23	12.5	1	0.5	24	6.4
6	Business	9	4.9	9	4.8	18	4.8
7	Wage Labour	12	6.5	3	1.6	15	4.0
8	Service	8	4.3	1	0.5	9	2.4
9	Teaching	1	0.5	1	0.5	2	0.5
10	Others	4	2.2	9	4.8	13	3.5
Total		**184**	**100.0**	**189**	**100.0**	**373**	**100.0**

Source: Census Survey, July 2019

(vi) Ownership of Household Assets/Amenities

57. All the affected households have their own houses for residential purpose. Ownership of bicycle, fan/cooler, and cell/mobile among the 73 HHs was 86.3%, 82.2%, and 89.0% respectively. About 26% households owned motor bike/scooter while 34% households have television in the house. Table 16 presents ownership of household amenities by the affected HHs.

Table 16: Major Assets/Amenities Owned by the Affected Households

S.N.	Type of HH Amenities	Total	
		No.	%
1.	Own Residential House	73	100
2.	Bicycle	63	86.3

3.	Motorbike/scooter	19	26.0
4.	Motor Car	0	0.0
5.	Jeep/van/Truck/Tractor	1	1.4
6.	Tempo	0	0.0
7.	TV	25	34.2
8.	Invertors	3	4.1
9.	Solar Panel	3	4.1
10.	Drinking-Water Tank	2	2.7
11.	Fan/cooler	60	82.2
12.	Cell/Mobile	65	89.0
13.	House on rent	0	0.0
14.	Other assets gave on rent (e.g. land, transport etc)	0	0.0
15.	Have land in other places	8	11.0

Source: Census Survey, July 2019

(vii) Households Income and Expenditure

58. Farming, service, wage earnings, foreign remittance, and small business are the major sources of household income. Average annual income from all sources works out to NRs223,095. Income from farming contributes 21.54 percentage of the average annual income followed by foreign remittance (15.01%), wage earnings (33.92%), sell of animals (36.39%) and so on. Table 17 provides source wise average share the annual household income.

Table 17: Average Annual Income of the Interviewed Households

S.N.	Sources of Income	Average Annual Income	
		Income (NRs)	Percentage
1	Farming	48,055	21.54
2	Service	29,726	13.32
3	Business/Small Industry	26,780	12
4	Wage earnings	75,685	33.92
5	Foreign Remittance	33,493	15.01
6	Interest	-	-
7	Rent received by renting house/ land etc	-	-
8	Sell of animal	8,041	36.39
9	Sell of Milk	-	-
10	Social Security Allowance	1,315	0.5
	Overall HH Income	**223,095**	**100.00**

Source: Census Survey, July 2019

59. The average annual expenses of the households are NRs**170,767** which is less than the average annual household income with an average surplus of NRs52,328. Major heads of expenses are food items (45.84%) followed by education (12.31%), celebrating festivals (12.70%), clothing (10.96%), and health care (7.25%). Table 18 provides breakdown of the average annual expenditures of the interviewed households.

Table 18: Average Annual Expenditure of the Affected HHs

S.N.	Expenditure Items	Average Annual Expenditure (NRs)	
		Expenditure (NRs)	Percentage
1	Food	78,287	45.84%
2	Education	21,027	12.31%
3	Health Care	12,383	7.25%
4	House Repair	80,00	4.68%
5	Clothing	18,726	10.96%
6	Festivals	21,685	12.70%
7	Sending family member abroad	34,24	2.00%
8	Loan/Interest Repayment	7,235	4.24%
9	Other Specify	-	-
Overall HH Expenditure		**170,767**	**100.00**

Source: Census Survey, July 2019

a. Vulnerable Households

60. ADB guidelines considers; indigenous people, Dalit (including scheduled caste) people, households headed by senior members, single women headed households, households with physically handicapped person, and Below Poverty Level (BPL) HHs as vulnerable. Similarly, these catagories of households have also been classified under constitution of Nepal. In Nepal, the standard method of calculating BPL has been determined by Central Bureau of Statistics (CBS) under the National Planning Commission (NPC). As per NPC/CBS[9] 2011 an individual in Nepal is considered poor if his/her per-capita total annual consumption is below NRs19,261. The socio-economic survey recorded one of the 73 affected HHs falling below this criterion to be termed as BPL.

61. Table 19 presents distribution of affected HHs by vulnerability types.

Table 19: HHs by Vulnerability Type

S.N.	Vulnerability Type	Existing	
		No. of HH	%
1	Below Poverty Line Households	1	1.37
2	IP Households	55	75.34
3	Dalit Households	1	1.37
4	HHs headed by senior citizens (>65 Years old)	12	16.44
5	Women Headed Households	3	4.11
6	Households with Disable Persons	1	1.37
8	**Total Vulnerable Households (All 73 Interviewed HHs)**	**73***	**100.00**

*Eight of these households have more than one vulnerability
Source: Census Survey, July 2019

3. Gender Impacts and Mitigation Measures

62. Among the affected HHs due to the project three female-headed HHshouseholds have been identified to have their land in the construction sites. Discussions carried out with the affected families and local communities showed concerns relating to gender inclusiveness in the project design and mitigation of adverse impacts especially to women. The concerns specifically related to access to river and use of natural resources (river water), extracting materials from

[9] National Planning Commission/Central Bureau of Statistics.

the river (e.g. boulders, sand etc) embankment safety, employment opportunity during construction and post-construction phases.

63. The project is categorized as 'Effective Gender Mainstreaming' and a Gender and Social Inclusion Action Plan (GESI-AP) has been prepared for the project. The DWRI will be responsible for overseeing the timely and appropriate implementation of the GESI-AP and any other technical assistance or grant-related funds/activities that may be mobilized for the project to optimize social and gender benefits. All consultative and participatory processes will be followed socially and gender inclusively, ensuring timely disclosure of information, and providing a platform for open, fair and transparent dialogue and communication.

Mawa Ratuwa Subproject

1. Field Work

64. The social safeguards team carried out fieldwork at Mawa Ratuwa basin from 20 August to 29 August 2019. During the site visit, the team carried out social safeguard assessments in the locations of all the proposed PRTWs. Stakeholder consultations were held with the local community (project beneficiaries) residing near each construction site followed by the census of affected families having land in the construction sites and collection of socioeconomic information of HHs.

65. Prior to conducting community sessions, DWRI engineers with assistance from the ward representatives, contacted persons owning/occupying land at the proposed embankment construction sites. Various sections/groups of the local community including persons representing different caste and the ethnic groups, indigenous people, women, etc participated in the consultation meetings held at all construction sites.

66. At the start of the field activities, the social consultants and the census team walked along the proposed embankment sites with a group of 5 to 10 local community members comprising the ward representative, persons having land in the construction sites and DWRI engineer. Ground verification of affected plot/ land parcel and its owners/occupants was conducted during the walk using data from GIS overlays on cadastral maps and other local information. It was observed that the cadastral maps were not updated and not matching in some cases with the GIS overlays; also, there were other persons having land in the construction site but have not been formally mapped in the cadastral. Two types of affected persons were identified during these walks: (i) persons with formal land title having 'lal purja.' Some of them were already mapped and some have not been formally mapped as the cadastral maps were not updated, and (ii) persons without formal land title but are occupying Government/Ailani land for agricultural activity that is likely to be affected.

67. The Social Development consultants with support of the DWRI engineer and Ward representative held consultations with the local community. Initially, the community was

informed about the proposed project works, its benefits and the need for voluntary permission for use of land. It was followed by collection of key socio economic baseline information of the construction sites (e.g. information of HHs size, major caste and ethnic composition of the population including Dalit, ethnic and disadvantaged groups, major occupation, information on flood and associated impacts and its management etc). They were also informed that the embankment would be used for road access to their agriculture fields and constructed in a way convenient to river access with provision of the ramp and other facilities depending upon the location and size of the embankment. The community consultation meetings were concluded after signing the minutes and attendance record of each participant including local government representative (e.g. mayor/chairperson of rural municipality/ ward members and DWRI engineer). Each signed document was officially attested by the relevant Government organizations in the project district. Among others the minute contained texts in Nepali on willingness to voluntarily donate land use right for the land at the embankment site to the project. The text was read out loudly to the community for their easy understanding.

68. The census team however, could not collect complete information from all the households likely to have their private land in the proposed embankment sites as there were some absentees and some of the land parcels were not matching with the GIS overlay on the cadastral maps that are not updated. In such cases, information regarding land parcels affected and consent for VDLUR at community level was collected with the support of local government representatives and the local community. **Appendix 2** provides a sample English translation of the text read to the community.

69. In total 15 community consultation sessions were organized, one at each PRTW location. Locations of the consultation meetings and number of participants in the meetings is presented in Table 20.

Table 20: Community Consultation Meetings and Participants

S.N.	Name of Place	District	Municipality /Village Palika	PRTW No	No. of Participants
1	Chapramari Bazaar	Jhapa	Gauradaha Municipality-5	01	37
2	Mangalbare Satmedi	Jhapa	Ratuwa Mai Municipality	02	34
3	Dumse	Jhapa	Damak Municipality-3	03	54
4	Shanti Tole	Morang	Urlabari Municipality-7	04	16
5	Tapu	Morang	Urlabari Municipality-1&7	5A,5B	23
6	Borderline	Morang	Urlabari Municipality-9	7	42
7	Chaukighat	Jhapa	Ratuwamai Municipality-3	8	27
8	Pragati Tole	Jhapa	Damak Municipality-2	9a,9b	44
9	Buddha Tole	Jhapa	Damak Municipality-1	9c	49
10	Srijana Tole	Jhapa	Damak Municipality-7	9D	50
11	Magar Tole	Jhapa	Damak Municipality-3	10	14
12	Mahesh Chowk	Morang	Miklajung Rural Municipality-9	11	52
13	Panchghare Tole	Jhapa	Damak Municipality-10	12	18
14	Khayar Bari	Jhapa	Kamal Rural Municipality-6	12L	21
15	Udaya Tole	Jhapa	Damak Municipality	13	15
				Total Number of Participants	496

70. Each consultation session was attended by at least one local government personnel (ward representative) and the field engineer of DWRI. Of the total 496 participants, 272 (54.83%) were men and 224 (45.17%) were women. In terms of IP and Dalit; the representation

of IP was 206 persons (41.53%) and 81 persons (16.33%) were Dalits. Table 21 presents summary details of participants in the consultation meetings and Key findings of the community consultation and issues raised are summarized in **Appendix 3.**

Table 21: Participants in Community Consultation

S.N.	Participants	No.	% of Total Involved
Participation by Gender			
1	Women	224	33.97
2	Men	272	66.03
3	**Total**	**496**	**100.00**
Participation by Vulnerable and Non vulnerable Groups			
1	Dalit	81	16.33
2	Indigenous People	206	41.53
3	Brahmins and Other Caste Groups	209	42.14
4	**Total**	**496**	**100.00**

Source: Community Consultation Record, July–August 2019

71. The census team with the help of local representatives and community, listed names of all affected persons covering those having land at the site of the proposed embankment with officially verified land ownership certificates as well as HHs not having verified land ownership certificate including the occupants of *Ailani* land. The census team collected socioeconomic information along with the details of assets owned by administering a semi-structured questionnaire. A set of the socio-economic questionnaire is presented in **Appendix 4**.

72. The census team also collected signature of the land owner/occupant on the MOU for voluntary permission of land use right to the project and also got countersigned by representative of local Government and DWRI engineer.

2. Scope of Impact on Land

a. Impact on Private Land

73. The estimated area required for embankment construction in Mawa Ratuwa basin is 118,521.8 square meters (m^2).[10] All together 85 HHs were recorded to be affected by the proposed construction of 12 embankments along prioritized sections along the basin. Out of these 85 HHs, 43 HHs are private landowners. These 43 affected HHs owning private land are of two types, ***type 1*** having land ownership certificate (*Lal purja*) matching with the parcel number arrived through GIS overlay on the cadastral, and ***type 2*** private land owners who could not be verified as they were not appearing in the list arrived through GIS overlay. The remaining 42 affected HHs were occupants of *Ailani* land without formal ownership over the land (***type 3*** affected HHs). Details of landowners and land parcels owned at the construction site are provided in **Appendix 5**.

74. Of the 43 affected HHs having private land 18 HHs were of type 1 who could be verified with their land ownership certificates at PRTWs 1,2,4,6,7,10 and 12. However, all these 43 households were interviewed for collecting socio economic data and MOUs were obtained for voluntary permission of land use right to the project authorities. Table 22 presents the types of affected HHs owning private land in Mawa Ratuwa basin.

[10] As per estimate of GIS overlay on cadastral maps.

Table 22:Types of Affected HHs owning private land

S.N.	Type of Affected Private Landowners	No. of HHs
Type 1	Private Land: Ownership Verified	18
Type 2	Private Land: Ownership but could not be verified	25
	Total	**43**

Source: Census Survey, July 2019

75. The affected lands are part of either remaining potions of land parcels after river erosion or land where the river was flowing earlier. Among them, some are being used for cultivation only once in a year at the owner/occupant's risk as it is uncertain when which part of the land will get affected by change in the flow of the river and some are left as fallow or abandoned for the purpose of protecting the remaining portion of the land parcel away from the river. Based on the information collected during community consultations it was evident that the increasing trend of floods and river erosion has been threatening the land put to cultivation and the residential areas in the main village habitation since the early seventies due to increased migration, deforestation and encroachment of river side area followed by practice of continuous uncontrolled and unmanaged exploitation of construction materials from the river bed. Therefore, people at all the construction sites of in Mawa Ratuwa basin expressed strong support for the project and their willingness to voluntary permission of land use right to the project authorities. It was also revealed that the local community had submitted demand to DWRI office for construction of embankments at critical locations.

b. Impact on Ailani Land

76. During survey 42 HHs were identified occupying *Ailani* land at different embankment construction sites. Socio economic information as well as information on the area of occupied *Ailani* land (estimated by the respondent) was collected from all the 42 HHs.

77. A breakup of the affected 42 HHs by land ownership is presented in Table 23. The data shows them to be of two categories: those owning both private and *Ailani* land, and only Ailani land respectively. About 50% of households having land in the construction sites belong to those who are occupying only *Ailani* land.

Table 23:Type of Land Owned/Occupied by affected Households

Landowners Type	No. of Owning HHs	%
Having both private and Ailani land	21	50.00
Ailani land only	21	50.00
Total	42	100.00

Source: Census Survey, July 2019

c. Affected Households by Caste and Ethnicity

78. There mixed population groups in the project districts (Morang and Jhapa). They are: indigenous groups (e.g., Tharu, Rajbansi, Dhimal, Satar, Newar, Magar, Rai, Limbu, etc) and caste groups; (e.g., Brahmin, Chhetries, Giri/Puri/Sanyasi, Yadav, Mandal, and other schedule caste subgroups. The census data presented in Table 24 shows that the proportion of Brahmin Chhetries and others is higher among the affected HHs. Percentage of Ethnic minority/indigenous people among affected HHs is 36.47%.

Table 24: Composition HHs by Caste and Ethnic Groups

Caste and Ethnic Group	HH having Private Land in the project Area and also other places	
	No	%
Ethnic minority/indigenous (Chaudhari, Rana Tharu, Dagaura Tharu)	31	36.47
Brahmin Chhetries and others (1 Bhagat)	48	56.47
Dalit and Disadvantaged	6	7.05
Total	**85**	**100.00**

Source: Census Survey, July–August 2019

d. Impact on Trees

79. Table 25 shows that altogether 3 households reported having trees in their land at the proposed embankment sites. Among them, two households have fruit trees while one has a fodder/firewood tree.

Table 25: Households having Trees in the Lands in Construction Sites

S.N.	Description	Total	
		No.	%
1.	Fruit Trees	2	66.66
2.	Fodder/ firewood Trees	1	33.33
3	Community Plantation	-	-
4	Community Plantation	-	-
5.	Others	-	-
Total		**3**	**100**

Source: Census Survey, July–August 2019

e. Loss of Income

80. During the transect walk along the proposed PRTW alignment local community members in different sections identified the government land available and households who are required to donate land use right for the project. For estimation of income loss by these households, the census team collected information on average annual income of the affected HHs from different sources including farming from all the land owned as well as from the ailani land. Total land requirement for each PRTW was available from the GIS overlay on the old cadastral map. As all the affected HHs were not identified in the GIS overlay, census team first estimated the government land available at each PRTW site with help of the local community and subsequently the gross total non-government land (private and ailani) required at each PRTW was estimated leaving out the government land available. This land required at the site was apportioned by the local community among the HHs required to donate land use right according to the total size of the land parcel that is affected. Income loss to the affected HHs is estimated by applying this loss of land to the total land owned by the HH and apportioning the percentage of land loss to the income from farming by the HHs. An estimation of Loss of Income by affected HHs and their vulnerability by category is provided in **Appendix 6.**

81. No structure or community property resources will be affected due to the project.

3. Socio-economic Information and Profile of Affected Persons

82. The baseline socio economic survey was conducted covering all the 85 affected HHs. Key findings of the survey are summarized in the section below.

a. Demographic Characteristics

(i) Household and Population

83. The total population of the 85 affected households is 443 with 235 (53.05%) male and 208 (46.95%) females. Average household size works out to 5.72.

(ii) Literacy and Educational Attainments

84. Illiterates (52 nos.) comprised 11.7% of the total population. Among the literates 295 nos. (66.59%) were educated maximum up to high school level. Only 33 nos (7.4%) were educated up to bachelors and above. Table 26 provides details of the level of education among the family members of affected households.

Table 26: Educational Status of the Interviewed Households

S.N.	Educational Status	Male		Female		Total	
		No	%	No	%	No	%
1	Illiterate	13	5.5	39	18.8	52	11.7
2	Literate	30	12.8	42	20.2	72	16.3
3	Primary	51	21.7	30	14.4	81	18.3
3	Lower Secondary	36	15.3	22	10.6	58	13.1
4	High School	49	20.9	35	16.8	84	19.0
5	10+ 2	37	15.7	26	12.5	63	14.2
6	Bachelor	12	5.1	12	5.8	24	5.4
7	Master and Above	7	3.0	2	1.0	9	2.0
Total		**235**	**100**	**208**	**100**	**443**	**100**

Source: Census Survey, July–August 2019

(iii) Average Landholding Size

85. The average landholding size of the 85 affected households is 16.09 Kattha (5,712.2 sqm). Majority households (58 HHs – 68.2%) had landholding size greater than 10 Kattha (3,380 sqm), followed by 19 HHs (22.3%) owning land between 1 to 10 Katha. Only 8 out of the 85 HHs (9.4%) owned land below 1 Kattha. Table 27 provides a summary of the landholding sizes of the affected households.

Table 27: Average landholding size of affected HHs

SN	Land Holding on Ranges	No of HHs	Average Landholding Size	
			Kattha	Sqm
1	Less than 1 Kattha	8	0.4	135.20
2	1-1.5 Kattha	1	1	338
3	1.5-2 Kattha	0	-	-
4	2- 5 Kattha	7	4.5	1521
5	5-10 Kattha	11	8.2	2,771.6
6	10 Kattha-20 Kattha (1 Bigha)	14	15.9	5,374.2
7	1 Bigha to 2 Bigha	14	31.0	1,0478
8	2 Bigha – 5 Bigha	27	63.4	21,429.2
9	>5 Bigha	3	12.4	4,191.2
Overall		**85**	**16.9**	**5,712.2**

Source: Census Survey, July 2019

(iv) Major Occupation

86. Agriculture was reported as the major occupation of most households (162 nos-36.6%) followed by overseas employment (9.7%) skilled labor (4.7%), business (4.7%) and service (4.3%). Students comprised 108 nos (24.4%) and 37 nos (84%) were housewives. Table 28 presents the occupation wise distribution of the affected HH members.

Table 28: Major Occupation of Affected HHs

S.N.	Occupations	Male		Female		Total	
		No	%	No	%	No	%
1	Agriculture	74	31.5	88	42.3	162	36.6
2	Wage Labor	8	3.4	3	1.4	11	2.5
3	Overseas	40	17.0	3	1.4	43	9.7
4	Business	12	5.1	9	4.3	21	4.7
5	Skilled Labor	19	8.1	2	1.0	21	4.7
6	Service	13	5.5	6	2.9	19	4.3
7	Teaching	1	0.4		0.0	1	0.2
8	Student	60	25.5	48	23.1	108	24.4
9	Housewife	0	0.0	37	17.8	37	8.4
10	Others	8	3.4	12	5.8	20	4.5
Total		**235**	**100.0**	**208**	**100.0**	**443**	**100.0**

Source: Census Survey, July–August 2019

(v) Ownership of Household Assets/Amenities

87. Of the total 85 households interviewed, 84 (99%) have their own houses for residential purpose; remaining 1 household was just separated from the joint family but sharing the same house. Ownership of bicycle, fan/cooler, and cell/mobile among the 85 HHs was 75.3%, 89.4%, and 97.6% respectively. About 35% households owned motor bike/scooter while 80% households have television in the house. Table 29 presents ownership of household amenities by the affected HHs.

Table 29: Major Assets/Amenities Owned by the Affected Households

S.N.	Type of HH Amenities	Total	
		No.	%
1.	Own Residential House	84	98.8
2.	Bicycle	64	75.3
3.	Motorbike/scooter	30	35.3
4.	Motor Car	4	4.7
5.	Jeep/van/Truck/Tractor	1	1.2
6.	Tempo	-	-
7.	TV	68	80.0
8.	Invertors	10	11.8
9.	Solar Panel	37	43.5
10.	Drinking-Water Tank	15	17.6
11.	Fan/cooler	76	89.4
12.	Cell/Mobile	83	97.6
13.	House on rent	7	8.2
14.	Other assets gave on rent (e.g. land, transport etc)	-	-
15.	Have land in other places	23	27.1

Source: Census Survey, July–August 2019

(vi) Households Income and Expenditure

88. Foreign remittance, wage earnings, farming, service and business are the major sources of household income. Average annual income from all sources works out to NRs352,762. Income from foreign remittance contributes 36.63 percentage of the average annual income followed by wage earnings (17.72%), farming (13.99%), service (12.99%) and business (9.54%). Table 30 provides source wise average share the annual household income.

Table 30: Average Annual Income of the Interviewed Households

S.N.	Sources of Income	Average Annual Income	
		Income (NRs)	Percentage
1	Farming	49,365.00	13.99
2	Service	45,835.00	12.99
3	Business/Small Industry	33,647.00	9.54
4	Wage earnings	62,529.00	17.72
5	Foreign Remittance	129,223.00	36.63
6	Interest		
7	Rent received by renting house/ land etc		
8	Sell of animal	16,658.00	4.72
9	Sell of Milk	12,000.00	3.40
10	Social Security Allowance	3,505.00	0.99
Overall HH Income		**352,762.00**	**100.00**

Source: Census Survey, July 2019

89. The average annual expenses of the households are NRs233,343 which is less than the average annual household income with an average surplus of NRs119,419. Major heads of expenses are food items (40.15%) followed by celebrating festivals (13.9%), education (12.5%), clothing (10.56%), and health care (7.36%). Table 31 provides breakdown of the average annual expenditures of the interviewed households.

Table 31: Average Annual Expenditure for the Interviewed HHs

S.N.	Expenditure Items	Average Annual Expenditure (NRs)	
		Expenditure (NRs)	Percentage
1	Food	93,695.00	40.15
2	Education	29,176.00	12.50
3	Health Care	17,188.00	7.36
4	House Repair	6,059.00	2.59
5	Clothing	24,659.00	10.56
6	Festivals	34,458.00	13.90
7	Sending family member abroad	12,470.00	5.34
8	Loan/Interest Repayment	15,638.00	6.70
9	Other Specify	-	-
Overall HH Expenditure		**233,343.00**	**100.00**

Source: Census Survey, July-August 2019

b. Vulnerable Households

90. ADB guidelines considers; Indigenous People (IP), Dalit (including scheduled caste) people, households headed by senior members, single women-headed households, households with physically handicapped person, and BPL HHs as vulnerable. Similarly, these catagories of households have also been classified under constitution of Nepal. In Nepal, the standard

method of calculating BPL has been determined by Central Bureau of Statistics (CBS) under the National Planning Commission (NPC). As per NPC/CBS[11] 2011 an individual in Nepal is considered poor if his/her per-capita total annual consumption is below NRs19,261. None of the HHs interviewed in Mawa Ratuwa basin fall BPL.

91. **Table 32** presents distribution of affected HHs by vulnerability types.

Table 32: HHs by Vulnerability Type

S.N.	Type	No. of HH	%
1	Below Poverty Line Households	0	0.00
2	IP Households	28	32.94
3	Dalit Households	11	12.94
4	HHs headed by senior citizens (>65 Years old)	22	25.88
5	Women Headed Households	9	10.59
6	Households with Disable Persons	4	4.71
7	**Total Vulnerable HHs (out of 85 Interviewed HHs)**	**74**	**87.06**

Source: Household Survey of Affected HHs, July–September 2019

4. Gender Impacts and Mitigation Measures

92. Among the affected HHs due to the project 12 female-headed households have been identified to have their land in the construction sites. Discussions carried out with the affected families and local communities showed concerns relating to gender inclusiveness in the project design and mitigation of adverse impacts especially to women. The concerns specifically related to access to river and use of natural resources (river water), extracting materials from the river (e.g., boulders, sand, etc.) embankment safety, employment opportunity during construction and post-construction phases.

93. The project is categorized as ‘Effective Gender Mainstreaming’ and a Gender and Social Inclusion (GESI) Plan has been prepared for the project. The DWRI will be responsible for overseeing the timely and appropriate implementation of the GESI and any other technical assistance or grant-related funds/activities that may be mobilized for the project to optimize social and gender benefits. All consultative and participatory processes will be followed socially and gender inclusively, ensuring timely disclosure of information, and providing a platform for open, fair and transparent dialogue and communication.

West Rapti Subproject

1. Field Work

94. The social safeguard team visited the West Rapti basin from Jul 29-Aug 7, 2019 for the field works. During the site visit, the team carried out social safeguard assessments in the locations of all the proposed PRTWs. Stakeholder consultations were held with the local community (project beneficiaries) residing near each construction site followed by the census of affected families having land in the construction sites and collection of socioeconomic information of HHs.

[11] National Planning Commission/Central Bureau of Statistics.

95. Prior to conducting community sessions, DWRI engineers with assistance from the ward representatives, contacted persons owning/occupying land at the proposed embankment construction sites. Various sections/groups of the local community including persons representing different caste and the ethnic groups, indigenous people, women, etc participated in the consultation meetings held at all construction sites.

96. At the start of the field activities, the social consultants and the census, the team walked along the proposed embankment with a group of 5 to 10 local community members comprising the ward representative, persons having land in the construction sites and DWRI engineer. Ground verification of affected plot/ land parcel and its owners/occupants was conducted during the walk using data from GIS overlays on cadastral maps and other local information. It was observed that the cadastral maps were not updated and not matching in some cases with the GIS overlays; also there were other persons having land in the construction site but have not been formally mapped in the cadastral. Two types of affected persons were identified during these walks: (i) persons with formal land title having 'lal purja'. Some of them were already mapped and some have not been formally mapped as the cadastral maps were not updated. (ii) persons without formal land title but are occupying Government/Ailani land for agricultural activity that is likely to be affected.

97. The Social Development consultants with support of the DWRI engineer and Ward representative held consultations with the local community. Initially, the community was informed about the proposed project works, its benefit and the need for voluntary permission for use of land. It was followed by collection of key socio economic baseline information of the construction sites (e.g., information of HHs size, major caste and ethnic composition of the population including Dalit, ethnic and disadvantaged groups, major occupation, information on flood and associated impacts and its management etc). They were also informed that the embankment would be used for road access to their agriculture fields and constructed in a way convenient to river access with provision of the ramp and other facilities depending upon the location and size of the embankment. The community consultation meetings were concluded after signing the minutes and attendance record of each participant including local Government representative (e.g. mayor/chairperson of rural municipality/ ward members and DWRI engineer). Each signed document was officially attested by the relevant Government organizations in the project district. Among others the minute contained texts in Nepali on willingness to voluntarily donate land use right for the land at the embankment site to the project. The text was read out loudly to the community for their easy understanding.

98. The census team however, could not collect complete information from all the households likely to have their private lands in the proposed embankment sites as there were some absentees and some of the land parcels were not matching with the GIS overlay on the cadastral maps that are not updated. In such cases, information regarding land parcels affected and consent for VLUDR at community level was collected with the support of local government representatives and the local community. **Appendix 2** provides a sample English translation of the text read to the community.

99. In total, 10 community consultation sessions were organized, one at each PRTW location except in the location of PRTW 04 where local people denied for responsive participation and to sign in the community consultation session and other associated activities (e.g signing on meeting minute, interviewing with the people having land in the construction site, preparation of memorandum of understanding for voluntary land use right, etc) expressing their disagreement for the proposed embankment location below the Rapti bridge. Location of the consultation meetings and number of participants in the meetings is presented in Table 33.

Table 33: Community Consultation Meetings and Participants

S.N.	Name of Place	District	Municipality /Village Palika	PRTW No	No. of Participants
1	Kothati	Dang	Gadhwa Village Palika-3	01 [a]	13
2	Mahadeva	Dang	Gadhwa Village Palika—2	01 [a]	18
3	Pachaha	Dang	Gadhwa Village Palika-2	02 [a]	15
4	Khadgapur	Dang	Gadhwa Village Palika-4	02 [a]	23
5	Parsiya	Dang	Gadhwa Village Palika-5	03	67
6	Semrahawa	Dang	Lamahi-4	04	NA[b]
7	Butkauwa	Dang	Lamahi-4	04	21
8	Dhikpur	Dang	Lamahi-7	05	12
9	Kanchhi Gaun	Dang	Gadhwa-7	06	29
10	Kanchhi Gaun	Dang	Rapti Sonari-2	07 [a] +08	20
				Total Number of Participants	**218**

Source: Census Survey July 2019

[a]PRTW will not be funded under ADB project (after not passing ADB economic threshold)

[b]Minutes not signed by participants.

100. Each consultation session was attended by at least one local government personnel (ward representative) and the field engineer of DWRI. Of the total 218 participants, 48 (22.02%) were women and 170 (77.98%) were men. In terms of IP and *Dalit;* the representation of IP was 194 persons (88.99%) and 1 person (0.45%) was Dalit. Table 34 presents summary details of participants in the consultation meetings and kKey findings of the community consultation and issues raised are summarized in **Appendix 3**

Table 34: Summary of Participants in Community Consultations

S.N.	Participants	No.	% of Total Participants
Participation by Gender			
1	Women	48	22.02
2	Men	170	77.98
3	**Total**	**218**	**100.00**
Participation by Vulnerable and Non-vulnerable Groups			
1	Dalit	1	0.46
2	Indigenous People	194	88.99
3	Brahmins and Other Caste Groups	23	10.55
4	**Total**	**218**	**100.00**

Source: Community Consultation Record, July–August 2019

101. The census team with the help of local representatives and community listed names of all affected persons covering those having land at the site of the proposed embankment with officially verified land ownership certificates as well as HHs not having verified land ownership certificate including the occupants of *Ailani* land. The census team collected socioeconomic

information along with the details of assets owned by administering a semi-structured questionnaire. A set of the socio-economic questionnaire is presented in **Appendix 4**.

102. The census team also collected signature of the land owner/occupant on the MOU for voluntary permission of land use right to the project and also got countersigned by representative of local Government and DWRI engineer.

2. Scope of Impact on Land

a. Impact on Private Land

103. The estimated area required for embankment construction in West Rapti basin is 203,508.4 m^2.[12] All together 170 HHs were recorded to be affected by the proposed construction of embankments in the basin. Out of these 170 HHs, 89 HHs are private land owners located at PRTW no. 1, 2, 3, 6, 7 and 8. These 89 affected HHs owning private land are of two types, ***type 1*** having land ownership certificate (*Lal purja*) matching with the parcel number arrived through GIS overlay on the cadastral, and ***type 2*** private land owners who could not be verified as they were not appearing in the list arrived through GIS overlay. Rest 81 affected HHs are occupants of *Ailani* land without formal ownership over the land (***type 3*** affected HHs).

104. Of the 89 affected households having private land, 74 households were of type 1 whose ownership certificates could be verified and the rest 15 HHs were of type 2 whose ownership certificates could not be verified. However, all these 89 households were interviewed for collecting socio economic data and MOUs were obtained for voluntary permission of land use right to the project authorities. Of the 89 private landowners 79 persons are male and 10 are women. Table 35 presents the types of affected HHs owning private land and Table 36 presents location wise verified number of private landowners in West Rapti basin.

Table 35: Types of Affected HHs owning private land

Types of Identified Land in the Construction Sites	No. of HHs Having Land	%
Ownership Verified Private Land	74	83.15
Private Land Required Ownership Verification	15	16.85
Total	89	100.00

Source: Census Survey, July–August 2019

Table 36: Distribution of HHs by Number of Verified Land in Locations

PRTW No	Location	No. of HHs with Verified Land	%
PRTW-1[a]	Gadhwa	49	66.22
PRTW-2	Gadhwa:Khadgapur	9	12.16
PRTW-3	Gadhwa:3 Lokharpur	3	4.05
PRTW-6	Gadhwa_Kanchi Gaun	8	10.81
PRTW-7[a] &8	Kachanapur	5	6.76
Sub Total of Ownership Verified HHs		74	83.15
Ownership Not verified HHs		15	16.85
Total Interviewed HHs Having Private Land		89	100

Source: Census Survey, July–August 2019

[a]PRTW will not be funded under ADB project (after not passing ADB economic threshold)

[12] As per estimate of GIS overlay on cadastral maps

105. The affected lands are part of either remaining potions of land parcels after river erosion or land where the river was flowing earlier. Among them, some are being used for cultivation only once in a year at the owner/occupant's risk as it is uncertain when and which part of the land will get affected by change in the river flow and some are left as fallow or abandoned for the purpose of protecting the remaining portion of the land parcel which are away from the river. Based on the information collected during community consultations it was evident that the increasing trend of floods and river erosion has been threatening the land put to cultivation and the residential areas in the main village habitation since the early seventies due to increased migration, deforestation and encroachment of river side area followed by practice of continuous uncontrolled and unmanaged exploitation of construction materials from the river bed. Therefore, people at all the proposed construction sites in West Rapti basin except at PRTW 4 expressed strong support for the project and their willingness to voluntary permission of land use right to the project authorities. The local community at the location of PRTW 4 had submitted demand to DWRI office for construction of embankment at a location closer to the river.

b. Impact on Ailani Land

106. During survey 81 HHs were identified occupying *Ailani* land at different embankment construction sites. **Appendix 5** provides detailed list of the 81 HHs. Socio economic information as well as information on the area of occupied *Ailani* land (estimated by the respondent) were collected from these HHs.

107. A breakup of the affected 81 HHs by land ownership is presented in Table 37. The data shows them to be of two categories: those owning both private and *Ailani* land, and others only Ailani land. About 35% of HHs having land in the construction sites belong to those who are occupying only *Ailani* land.

Table 37: Type of Land Owned/Occupied by affected Households

Landowners Type	No. of HHs	%
Occupying only Ailani land	28	34.57
Having both private and *Ailani* land	53	65.43
Total	81	100.00

Source: Census Survey, July 2019

c. Land Owning/Occupying Households by Caste and Ethnicity

108. There are two major ethnic groups in the project basin area; namely "Tharu" also known as Chaudhari, and the hill community broadly known as "Pahadiyas." The census data presented in Table 38 shows that the proportion of indigenous people is higher both among private landholders as well as *Ailani* land occupants. Percentage of indigenous people among the 89 private landowners is 97.7% and among the *Ailani* land occupiers it was 97.53%.

Table 38: Composition of HHs by Caste and Ethnic Groups

Caste and Ethnic Group	HH having Private Land in the project Area		HHs Owning *Ailani* Land	
	No	%	No	%
Ethnic minority/indigenous (Chaudhari/Tharu)	87	97.7	79	97.53
Brahmin Chhetries	2	2.3	2	2.47
Total	**89**	**100.00**	**81**	**100.00**

Source: Census Survey, July–August 2019

d. Impact on Tree

109. Table 39 shows that altogether 4 HHs reported having trees in their land at the proposed embankment sites.

Table 39: Households having Trees in the Lands in Construction Sites

S.N.	Description	No.	%
1.	Fruit Trees	4	100
2.	Fodder/ firewood Trees	0	0
3	Community Plantation	0	0
4	Community Plantation	0	0
5.	Others	0	0
Total		**4**	**100**

Source: Census Survey, July–August 2019

e. Loss of Income

110. During the transect walk along the proposed PRTW alignment local community members identified the government land available and households who are required to donate land use right for the project. For estimation of income loss by these households, the census team collected information on average annual income of the affected HHs from different sources including farming from all the land owned as well as from the ailani land. Total land requirement for each PRTW was available from the GIS overlay on the old cadastral map. As all the affected HHs were not identified in the GIS overlay, census team first estimated the government land available at each PRTW site with help of the local community and subsequently the gross total non-government land (private and ailani) required at each PRTW was estimated leaving out the government land available. This land required at the site was apportioned by the local community among the HHs required to donate land use right according to the total size of the land parcel that is affected. Income loss to the affected HHs is estimated by applying this loss of land to the total land owned by the HH and apportioning the percentage of land loss to the income from farming by the HHs. An estimation of Loss of Income by affected HHs and their vulnerability by category is provided in **Appendix 6**.

111. No structure or community property resources will be affected due to the project.

3. Socio-economic Information and Profile of Affected Persons

112. The baseline socio economic survey was conducted covering all the 170 HHs. Donating land use right for project. Key findings of the survey are summarized in the section below.

a. Demographic Characteristics

(i) Household and Population

113. The total population of the 170 affected HHs is 908 with 470 (51.76%) male and 438 (48.24%) females. Average HH size works out to 5.34.

(ii) Literacy and Educational Attainments

114. Illiterates (160 nos.) comprised 17.6% of the total population. Among the literate population, 209 persons (23%) have obtained education only up-to primary level and another

176 persons (19.4%) have acquired education up-to lower secondary level. The population obtaining their education up-to high school and above is 26.3%. Table 40 provides details of the level of education among the family members of affected households.

Table 40: Educational Status of the Affected Households

S.N.	Educational Status	Male		Female		Total	
		No	%	No	%	No	%
1	Illiterate	57	12.1	103	23.5	160	17.6
2	Literate	49	10.4	76	17.4	125	13.8
3	Primary	117	24.9	92	21.0	209	23.0
3	Lower Secondary	111	23.6	65	14.8	176	19.4
4	High School	83	17.7	61	13.9	144	15.9
5	10+ 2	32	6.8	27	6.2	59	6.5
6	Bachelor	16	3.4	13	3.0	29	3.2
7	Master and Above	5	1.1	1	0.2	6	0.7
Total		**470**	**100.0**	**438**	**100.0**	**908**	**100.0**

Source: Census Survey, July 2019

(iii) **Average Landholding Size**

115. The average landholding size of the 170 affected households is 32.7 Kattha (1,268.76 sqm). Majority households (74 HHs – 43.53%) had average landholding size of 10 kattha followed by 41 HHs (24.11%) owning average land between 1 to 2 bigha. Table 41 provides a summary of the landholding sizes of the affected HHs.

Table 41: Average landholding size of affected HHs

S.N.	Average Land Holding on Ranges	No. of HHs	Average Landholding Size	
			In Kattha	In sqm
1	Less than 1 Kattha	1	0.4	15.52
2	1-1.5 Kattha	2	1.2	46.56
3	1.5-2 Kattha	2	2	77.6
4	2- 5 Kattha	9	3.6	139.68
5	5-10 Kattha	22	8.5	329.8
6	10 Kattha 20 Kattha (1 Bigha)	74	15.6	605.28
7	1 Bigha-2 Bigha	41	29.4	1140.72
8	2 Bigha.-.5 Bigha	12	64.2	2490.96
9	>5 Bigha	7	312.1	12109.48
Total		**170**	**32.7**	**1268.76**

Source: Census Survey, July–August 2019

(iv) **Major Occupation**

Only 630 out of the 908 persons in affected HHs are involved in income-generating activities while the rest were students, housewives or senior citizen. Agriculture was reported as the major occupation of most households (391 nos- 43.1%) followed by skilled labor (8.3%), service (6.6%), wage labor (6.3%), business (2.9%). Students comprised 213 nos (23.5%) and 34 nos (3.7%) were housewives.

116. Table 42 presents the occupation wise distribution of the affected HH members.

Table 42: Major Occupation of Affected HHs

S.N.	Occupations	Male		Female		Total	
		No	%	No	%	No	%
1	Agriculture	149	31.7	242	55.3	391	43.1
2	Wage Labour	41	8.7	16	3.7	57	6.3
3	Overseas	22	4.7	1	0.2	23	2.5
4	Business	17	3.6	9	2.1	26	2.9
5	Skilled Labour	70	14.9	5	1.1	75	8.3
6	Service	45	9.6	15	3.4	60	6.6
7	Teaching	2	0.4	2	0.5	4	0.4
8	Student	110	23.4	103	23.5	213	23.5
9	Housewife	0	0.0	34	7.8	34	3.7
10	Others	14	3.0	11	2.5	25	2.8
Total		**470**	**100.0**	**438**	**100.0**	**908**	**100.0**

Source: Census Survey, July 2019

(v) Ownership of Household Assets/Amenities

117. Of the total 170 households interviewed, 169 (99.4%) have their own houses for residential purpose; remaining 1 household was just separated from the joint family but sharing the same house. Ownership of bicycle, fan/cooler, and cell/mobile among the 170 HHs was 86.5%, 89.4%, and 95.3% respectively. About 16% households owned motorbike/scooter while 32% households have television in the house. Table 43 presents ownership of household amenities by the affected HHs.

Table 43: Major Assets/Amenities Owned by the Affected Households

S.N.	Type of HH Amenities	Total	
		No.	%
1.	Own Residential House	169	99.4
2.	Bicycle	147	86.5
3.	Motorbike/scooter	27	15.9
4.	Motor Car	1	0.6
5.	Jeep/van/Truck/Tractor	9	5.3
6.	Tempo	1	0.6
7.	TV	55	32.4
8.	Invertors	6	3.5
9.	Solar Panel	7	4.1
10.	Drinking-Water Tank	11	6.5
11.	Fan/cooler	152	89.4
12.	Cell/Mobile	162	95.3
13.	House on rent	1	0.6
14.	Other assets gave on rent (e.g. land, transport, etc)		
15.	Have land in other places	16	21.9

Source: Census Survey, July–August 2019

(vi) Households Income and Expenditure

118. Farming, wage earnings, sell of animals, service and small business are the major sources of household income. Average annual income from all sources works out to NRs2,30,920. Income from wage earning contributes 30.66% of the average annual income

followed by service (27.2%), farming (23.34%) and small business (8.47%). Table 44 provides source wise average share the annual household income.

Table 44: Average Annual Income of the Affected Households

S.N.	Sources of Income	No. of Reported Households	Average Annual Income (NRs)	%
1	Farming	166	53,906	23.34
2	Service	58	62,812	27.20
3	Business/Small Industry	22	19,558	8.47
4	Wage earnings	106	70,802	30.66
5	Foreign Remittance	11	10,647	4.61
6	Interest			
7	The rental amount received by renting House/ land etc			
8	Sell of animal	68	10,877	4.71
9	Sell of Milk	5	1,000	0.43
10	Social Security Allowance	5	1,318	0.57
Overall		**441**	230,920	100.00

Source: Census Survey, July–August 2019

119. The average annual expenses of the households are NRs1,88,161 which is less than the average annual household income with an average surplus of NRs42,759. Major heads of expenses are food items (38.98%) followed by celebrating festivals (14.21%), education (13.78%), clothing (12.75%), and health care (6.67%). Table 45 provides breakdown of the average annual expenditures of the interviewed households.

Table 45: Average Annual Expenditure for the Affected HHs

S.N.	Expenditure Items	No. of Reported Households	Average Annual Expenses of the HHs (NRs)
1	Food	170	73,341
2	Education	129	25,926
3	Health Care	169	12,556
4	House Repair	17	9,747
5	Clothing	170	23,982
6	Festivals	170	26,732
7	Sending family member abroad	3	7,141
8	Loan/Interest Repayment	56	8,736
9	Other Specify	-	0
	Overall	-	188,161

Source: Census Survey, July–August 2019

b. Vulnerable Households

120. ADB guidelines considers; Indigenous People (IP), Dalit (including scheduled caste) people, households headed by senior members, single women headed households, households with physically handicapped person, and BPL HHs as vulnerable. Similarly, these catagories of households have also been classified under constitution of Nepal. In Nepal, the standard method of calculating BPL has been determined by Central Bureau of Statistics (CBS) under the National Planning Commission (NPC). As per NPC/CBS[13] 2011 an individual in Nepal is

[13] National Planning Commission/Central Bureau of Statistics

considered poor if his/her per-capita total annual consumption is below NRs19,261. The socio-economic survey recorded five of the 170 affected HHs falling below this criterion to be termed as BPL.

121. Table 46 presents distribution of affected HHs by vulnerability types.

Table 46: HHs by Vulnerability Type

S.N.	Vulnerability Type	No. of HH	%
1	Below Poverty Households	5	2.94
2	IP Households	166	97.65
3	Dalit Households	0	0.00
4	HHs headed by senior citizens (>65 Years old)	27	15.88
5	Women Headed Households	18	10.59
6	Households with disable persons	4	2.35
7	HHs having more than one type of vulnerability	-52	-30.59
8	**Total Vulnerable HHs (out of 170 interviewed HHs)**	**168**	**98.82**

Source: Census Survey, July–August 2019

c. Indigenous People and Project Impact:

122. Almost all households interviewed in the West Rapti river basin area belong to the ethnic minority groups known as Tharu/Chaudhari/Dagaura etc. This community has been defined as an indigenous group by the Nepal Federation of Indigenous Nationality[14]. The social safeguard team had detailed discussion with ethnic households belonging to Chaudhari/Tharu community and it revealed that they have been following the same socio-economic practices that are followed by other local community members. No involuntary physical or economic displacement is anticipated as the proposed project will be constructed in the existing “buffer” zone between the cultivated areas and the riverbank that is used by the local community to access the agricultural fields including the affected land. The project will not affect traditional lands. Furthermore, the project is unlikely to impact indigenous peoples’ identity, dignity, human rights, livelihood systems, or cultural uniqueness. The project will protect their land from erosion by recurring floods and positively contribute to improve their economic condition.

4. Gender Impacts and Mitigation Measures

123. Among the affected HHs due to the project three female-headed households have been identified to have their land in the construction sites. Discussions carried out with the affected families and local communities showed concerns relating to gender inclusiveness in the project design and mitigation of adverse impacts especially to women. The concerns specifically related to access to river and use of natural resources (river water), extracting materials from the river (e.g. boulders, sand etc) embankment safety, employment opportunity during construction and post-construction phases.

124. The project is categorized as ‘Effective Gender Mainstreaming’ and a Gender and Social Inclusion (GESI) Plan has been prepared for the project. DWRI will be responsible for overseeing the timely and appropriate implementation of the GESI and any other technical

[14] http://www.nefin.org.np/list/Categorization-of-Indigenous-People-based-on-development-/5/95/6.

assistance or grant-related funds/activities that may be mobilized for the project to optimize social and gender benefits. All consultative and participatory processes will be followed socially and gender inclusively, ensuring timely disclosure of information, and providing a platform for open, fair and transparent dialogue and communication.

A. Bakraha Subproject

1. Field Work

125. The social safeguards team carried out fieldwork at Bakraha basin during 18–27 August 2019. During the site visit, the team carried out social safeguard assessments in the locations of all the proposed PRTWs. Stakeholder consultations were held with the local community (project beneficiaries) residing near each construction site followed by the census of affected families having land in the construction sites and collection of socioeconomic information of HHs.

126. Prior to conducting community sessions, DWRI engineers with assistance from the ward representatives, contacted persons owning/occupying land at the proposed embankment construction sites. Various sections/groups of the local community including persons representing different caste and the ethnic groups, indigenous people, women, etc participated in the consultation meetings held at all construction sites.

127. At the start of the field activities, the social consultants and the census team walked along the proposed embankment sites with a group of 5 to 10 local community members comprising the ward representative, persons having land in the construction sites and DWRI engineer. Ground verification of affected plot/ land parcel and its owners/occupants was conducted during the walk using data from GIS overlays on cadastral maps and other local information. It was observed that the cadastral maps were not updated and not matching in some cases with the GIS overlays; also, there were other persons having land in the construction site but have not been formally mapped in the cadastral. Two types of affected persons were identified during these walks: (i) persons with formal land title having 'lal purja'. Some of them were already mapped and some have not been formally mapped as the cadastral maps were not updated. (ii) persons without formal land title but are occupying Government/ Ailani land for agricultural activity that is likely to be affected.

128. The Social Development consultants with support of the DWRI engineer and Ward representative held consultations with the local community. Initially, the community was informed about the proposed project works, its benefits and the need for voluntary permission for use of land. It was followed by collection of key socio economic baseline information of the construction sites (e.g., information of HHs size, major caste and ethnic composition of the population including Dalit, ethnic and disadvantaged groups, major occupation, information on flood and associated impacts and its management, etc). They were also informed that the embankment would be used for road access to their agriculture fields and constructed in a way

convenient to river access with provision of the ramp and other facilities depending upon the location and size of the embankment. The community consultation meetings were concluded after signing the minutes and attendance record of each participant including local government representative (e.g., mayor/chairperson of rural municipality/ ward members and DWRI engineer). Each signed document was officially attested by the relevant Government organizations in the project district. Among others the minute contained texts in Nepali on willingness to voluntarily donate land use right for the land at the embankment site to the project. The text was read out loudly to the community for their easy understanding.

129. The census team however, could not collect complete information from all the households who have their land in the proposed embankment sites as there were some absentees and some of the land parcels were not matching with the GIS overlay on the cadastral maps that are not updated. In such cases, information regarding land parcels affected and consent for VLUDR at community level was collected with the support of local government representatives and the local community. **Appendix 2** provides a sample English translation of the text read to the community.

130. In total, 7 community consultation sessions were organized, one at each PRTW location. Location of the consultation meetings and number of participants in the meetings is presented in Table 47.

Table 47: Community Consultation Meetings and Participants

S.N.	Name of Place	District	Municipality / Village Palika	PRTW No	No. of Participants
1	Kasheni	Morang	Miklajung-VP-7	01[a]	19
2	Chisapani,	Morang	Urlabari Municipality-1	02 [a]	41
3	Bishal Tile, Juhumra	Morang	Urlabari-4&5	03 [a]	23
4	Thapadangi	Morang	Urlabari Municipality-4	04	20
5	Pipalchowk, Bistadada	Morang	Sanischare Municipality -3	06	23
6	Bardanga Chauki Tole	Morang	Sunbarse Municipality-7	08	27
7	Katle	Morang	Urlabari Municipality-06	09 [a]	37
				Total Number of Participants	190

[a]PRTW will not be funded under ADB project (after not passing ADB economic threshold)

131. Each consultation session was attended by at least one local government personnel (ward representative) and the field engineer of DWRI. Of the total 190 participants, 160 (84.2%) were men and 30 (15.8%) were women. In terms of IP and *Dalit;* the representation of IP was 68 persons (35.8%) and 33 persons (17.4%) were Dalits. Table 48 presents summary details of participants in the consultation meetings and Key findings of the community consultation and issues raised are summarized in **Appendix 3**

Table 48: Participants in Community Consultation

S.N.	Participants	No.	% of Total Involved
Participation by Gender			
1	Women	30	15.79
2	Men	160	84.21
3	**Total**	**190**	**100.00**
Participation by Vulnerable and Non vulnerable Groups			
1	Dalit	33	17.37
2	Indigenous People	68	35.79
3	Brahmins and Other Caste Groups	89	46.84

4	**Total**	**190**	**100.00**

Source: Community Consultation Record, July–August 2019

132. The census team with the help of local representatives and community, listed names of all affected persons covering those having land at the site of the proposed embankment with officially verified land ownership certificates as well as HHs not having verified land ownership certificate including the occupants of *Ailani* land. The census team collected socioeconomic information along with the details of assets owned by administering a semi-structured questionnaire. A set of the socio-economic questionnaire is presented in **Appendix 4**.

133. The census team also collected signature of the land owner/occupant on the MoU for voluntary permission of land use right to the project and also got countersigned by representative of local Government and DWRI engineer.

2. Scope of Impact on Land

a. Impact on Private Land

134. The estimated area required for embankment construction in Bakraha basin is 130,993.2 sqm[15] All together 53 HHs were recorded to have land at the location of the 8 proposed embankments in the basin. The Memorandum of Understanding was signed between the identified private landowners and the DWRI engineer in the presence of the Ward representative for voluntary donation of land-use rights for construction of the PRTWs. In case of Ailani land owners, their consent for voluntary donation of land-use rights (VDLUR) was obtained through signing of community meeting minutes. Out of these 53 HHs, 23 HHs are private land owners. These 23 affected HHs owning private land are of two types, ***type 1*** having land ownership certificate (*Lal purja*) matching with the parcel number arrived through GIS overlay on the cadastral, and ***type 2*** private land owners who could not be verified as they were not appearing in the list arrived through GIS overlay. Rest 30 affected HHs were occupants of *Ailani* land without formal ownership over the land (***type 3*** affected HHs).

135. Of the 23 affected households having private land 18 HHs were of type 1 who could be verified with their land ownership certificates. However, all these 23 households were interviewed for collecting socio economic data and MOUs were obtained for voluntary permission of land use right to the project authorities. Table 49 presents the types of affected HHs owning private land in Bakraha basin.

Table 49: Types of Affected HHs Owning Private Land

S.N.	Type of Affected Private Landowners	No. of HHs
Type 1	Private Land: Ownership Verified	18
Type 2	Private Land: Ownership but could not be verified	5
Total		23

Source: Census Survey, July–August 2019

136. The affected lands are part of either remaining potions of land parcels after river erosion or land where the river was flowing earlier. Among them, some are being used for cultivation only once in a year at the owner/occupant's risk as it is uncertain when which part of the land will get affected by change in the flow of the river and some are left as fallow or abandoned for the purpose of protecting the remaining portion of the land parcel away from the river. Based on

[15] As per estimate of GIS overlay on cadastral maps

the information collected during community consultations it was evident that the increasing trend of floods and river erosion has been threatening the land put to cultivation and the residential areas in the main village habitation since the early seventies due to increased migration, deforestation and encroachment of river side area followed by practice of continuous uncontrolled and unmanaged exploitation of construction materials from the river bed. Therefore, people at all the construction sites of in Bakraha basin expressed strong support for the project and their willingness to voluntary permission of land use right to the project authorities. It was also revealed that the local community had submitted demand to DWRI office for construction of embankments at critical locations. Details of landowners and land parcels owned at the construction site are provided in **Appendix-5**.

b. Impact on Ailani Land

137. During survey 30 HHs were identified occupying *Ailani* land at different embankment sites. Socio economic information as well as information on the area of occupied *Ailani* land (estimated by the respondent) was collected from all the 30 households.

138. A breakup of these 30 HHs by land ownership type is presented in Table 50. The data shows them to be of two categories: those owning both private and *Ailani* land, and only Ailani land.

Table 50: Type of Land Owned/Occupied by affected Households

Landowners Type	No. of Owning HHs	%
Having both private and Ailani land	20	66.67
Ailani land only	10	33.33
Total	30	100.00

Source: Census Survey, July–August 2019

c. Affected Households by Caste and Ethnicity

139. There are mixed population groups in the project district (Morang). They are; indigenous groups (e.g. Tharu, Rajbansi, Dhimal, Satar, Newar, Magar, Rai, Limbu, etc) and caste groups; (e.g. Brahmin, Chhetries, Giri/Puri/Sanyasi, Yadav, Mandal, and other schedule caste subgroups. The census data presented in Table 51 shows that the proportion of Brahmin Chhetries and others is higher among the affected HHs. Percentage of Ethnic minority/indigenous people among affected HHs is 36.47 percent.

Table 51: Composition of HHs by Caste and Ethnic Groups

Caste and Ethnic Group	HH having Private Land in the project Area and also other places	
	No	%
Ethnic minority/indigenous (Chaudhari, Rana Tharu, Dagaura Tharu)	32	60.4
Brahmin Chhetries and others (1 Bhagat)	17	32.1
Dalit and Disadvantaged	4	7.5
Total	**53**	**100.00**

Source: Census Survey, July–August 2019

d. Impact on Trees

140. Table 52 shows that altogether 3 households reported having trees in their land at the proposed embankment sites. Among them, two households have fruit trees while one has a fodder/firewood tree.

Table 52: Households having Trees at the Embankment Sites

S.N.	Description	Total	
		No.	%
1.	Fruit Trees	1	11.1
2.	Fodder/ firewood Trees	5	55.6
3	Community Plantation	0	0
4	Others	3	33.3
Total		**9**	**100**

Source: Census Survey, July–August 2019

e. Loss of Income

141. During the transect walk along the proposed PRTW alignment local community members identified the government land available and households who are required to donate land use right for the project. For estimation of income loss by these households, the census team collected information on average annual income of the affected HHs from different sources including farming from all the land owned as well as from the ailani land. Total land requirement for each PRTW was available from the GIS overlay on the old cadastral map. As all the affected HHs were not identified in the GIS overlay, census team first estimated the government land available at each PRTW site with help of the local community and subsequently the gross total non government land (private and ailani) required at each PRTW was estimated leaving out the government land available. This land required at the site was apportioned by the local community among the HHs required to donate land use right according to the total size of the land parcel that is affected. Income loss to the affected HHs is estimated by applying this loss of land to the total land owned by the HH and apportioning the percentage of land loss to the income from farming by the HHs. An estimation of Loss of Income by affected HHs and their vulnerability by category is provided in **Appendix 6**.

142. No structure or community property resources will be affected due to the project.

3. Socio-economic Information and Profile of Affected Persons

143. The baseline socio economic survey was conducted covering all the 53 affected households. Key findings of the survey are summarized in the section below.

a. Demographic Characteristics

(i) Household and Population

144. The total population of the 53 affected HHs is 257 with 133 (51.75%) male and 124 (48.25%) females. Average household size works out to 4.84.

(ii) Literacy and Educational Attainments

Illiterates (32 nos.) comprised 12.41% of the total population. Among the literates 184 nos. (71.59%) were educated maximum up to high school level. Only 11 nos (4.3%) were educated up to bachelors and above.

145. Table 53 provides details of the level of education among the family members of affected households.

Table 53: Educational Status of the Interviewed Households

S.N.	Educational Status	Male		Female		Total	
		No	%	No	%	No	%
1	Illiterate	10	7.5	22	17.7	32	12.5
2	Literate	11	8.3	19	15.3	30	11.7
3	Primary	28	21.1	18	14.5	46	17.9
3	Lower Secondary	26	19.5	17	13.7	43	16.7
4	High School	37	27.8	28	22.6	65	25.3
5	10+ 2	14	10.5	16	12.9	30	11.7
6	Bachelor	6	4.5	4	3.2	10	3.9
7	Master and Above	1	0.8		0.0	1	0.4
Total		**133**	**100**	**124**	**100**	**257**	**100**

Source: Census Survey, July–August 2019

(iii) Average Landholding Size

146. The average landholding size of the 53 affected households is 16.9 Kattha (5712.2 sqm). Majority households (19 HHs – 35.84%) have landholding size between 1 to 2 Bigha), followed by 11 HHs (20.75%) each in the category 10 to 20 Kattha and 2 to 5 Bigha, 5 HHs (9.43%) between 5 to 10 Kattha, 4 HHs (7.55%) owning land above 5 Bighas and 3 HHs (5.66%) between 2 to 5 Katthas. Table 54 provides a summary of the landholding sizes of the affected households.

Table 54: Average landholding size of affected HHs

SN	Land Holding on Ranges	No of HHs	Average Landholding Size	
			Kattha	Sqm
1	Less than 1 Kattha	**-**	**-**	**-**
2	1-1.5 Kattha	-	-	-
3	1.5-2 Kattha	-	-	-
4	2- 5 Kattha	3	4.5	1,521.0
5	5-10 Kattha	5	8.3	2,805.4
6	10 Kattha-20 Kattha (1 Bigha)	11	16.5	5,577.0
7	1 Bigha to 2 Bigha	19	28.5	9,633.0
8	2 Bigha – 5 Bigha	11	66.6	22,510.8
9	> 5 Bigha	4	121.3	40,898.0
Overall		**53**	**37.7**	**12, 742.6**

Source: Census Survey, July–August 2019

(iv) Major Occupation

147. Agriculture was reported as the major occupation of most HHs (98 nos-38.1%) followed by overseas employment (7.8%). Business and service each contributed 3.9% of the occupations followed by skilled labor (3.5%), Students comprised 64 nos (24.9%) and 26 nos (10.1%) were housewives. **Table 55** presents the occupation wise distribution of the affected HH members.

Table 55: Major Occupation of Affected HHs

S.N.	Occupations	Male		Female		Total	
		No	%	No	%	No	%

1	Agriculture	53	39.8	45	36.3	98	38.1
2	Wage Labor	3	2.3	2	1.6	5	1.9
3	Overseas	17	12.8	3	2.4	20	7.8
4	Business	6	4.5	4	3.2	10	3.9
5	Skilled Labor	8	6.0	1	0.8	9	3.5
6	Service	6	4.5	4	3.2	10	3.9
7	Teaching	1	0.8	1	0.8	2	0.8
8	Student	35	26.3	29	23.4	64	24.9
9	Housewife		0.0	26	21.0	26	10.1
10	Others	4	3.0	9	7.3	13	5.1
Total		**133**	**100.0**	**124**	**100.0**	**257**	**100.0**

Source: Census Survey, July–August 2019

(v) Ownership of Household Assets/Amenities

148. All the total interviewed households 53 (100%) have their own houses for residential purposes. Ownership of bicycle, fan/cooler, and cell/mobile among the 53 HHs was 77.4%, 84.9%, and 96.2% respectively. About 24.5% households owned motor bike/scooter while 79.2% households have television in the house. Table 56 presents ownership of household amenities by the affected HHs.

Table 56: Major Assets/Amenities Owned by the Affected Households

S.N.	Type of HH Amenities	Total	
		No.	%
1.	Own Residential House	53	100.0
2.	Bicycle	41	77.4
3.	Motorbike/scooter	13	24.5
4.	Motor Car		0.0
5.	Jeep/van/Truck/Tractor	4	7.5
6.	Tempo		0.0
7.	TV	42	79.2
8.	Invertors	6	11.3
9.	Solar Panel	10	18.9
10.	Drinking-Water Tank	3	5.7
11.	Fan/cooler	45	84.9
12.	Cell/Mobile	51	96.2
13.	House on rent	1	1.9
14.	Other assets gave on rent (e.g. land, transport etc)		
15.	Have land in other places	10	18.9

Source: Census Survey, July–August 2019

(vi) Households Income and Expenditure

149. Foreign remittance, wage earnings, farming, service and business are the major sources of household income. Average annual income from all sources works out to NRs310,471. Income from foreign remittance contributes 24.55 percentage of the average annual income followed by farming (20.61%), wage earnings (20.52%), service (15.71%) and business (7.4%). Table 57 provides source wise average share the annual household income.

Table 57: Average Annual Income of the Interviewed Households

S.N.	Sources of Income	Average Annual Income	
		Income (NRs)	Percentage
1	Farming	63,981	20.61
2	Service	48,774	15.71
3	Business/Small Industry	22,981	7.40
4	Wage earnings	63,698	20.52
5	Foreign Remittance	76,226	24.55
6	Interest	0	
7	Rent received by renting house/ land etc	0	
8	Sell of animal	25,792	8.31
9	Sell of Milk	0	
10	Social Security Allowance	9,019	2.90
Overall HH Income		310,471	**100.0**

Source: Census Survey, July 2019

150. The average annual expenses of the households are NRs222,392 which is less than the average annual household income (310471) with an average surplus of NRs88079. Major heads of expenses are food items (39.51%) followed by celebrating festivals (12.81%), education (12.41%), clothing (9.9%), and health care (6.82%). Table 58 provides breakdown of the average annual expenditures of the interviewed households.

Table 58: Average Annual Expenditure for the Interviewed HHs

S.N.	Expenditure Items	Average Annual Expenditure (NRs)	
		Expenditure (NRs)	Percentage
1	Food	87,886	39.51
2	Education	27,604	12.41
3	Health Care	15,189	6.82
4	House Repair	13,019	5.84
5	Clothing	22,038	9.90
6	Festivals	28,490	12.81
7	Sending family member abroad	14,717	6.61
8	Loan/Interest Repayment	13,449	6.04
9	Other Specify	0	-
Overall HH Expenditure		222,392	**100.00**

Source: Census Survey, July–August 2019

b. Vulnerable Households

151. ADB guidelines considers; Indigenous People (IP), Dalit (including schedule caste) people, households headed by senior members, single women headed households, households with physically handicapped person, and BPL HHs as vulnerable. Similarly, these catagories of households have also been classified under constitution of Nepal. In Nepal, the standard method of calculating BPL has been determined by Central Bureau of Statistics (CBS) under the National Planning Commission (NPC). As per NPC/CBS[16] 2011 an individual in Nepal is considered poor if his/her per-capita total annual consumption is below NRs19,261. None of the HHs interviewed fall BPL.

152. Table 59 presents distribution of affected HHs by vulnerability types.

[16] National Planning Commission/Central Bureau of Statistics

Table 59: HHs by Vulnerability Type

S.N.	Vulnerability Type	No. of HH	%
1	Below Poverty Households	0	0.00
2	IP Households	32	52.46
3	Dalit Households	4	6.56
4	HHs headed by senior citizens (>65 Years old)	13	21.31
5	Women Headed Households	7	11.48
6	Households with disable persons	5	8.20
7	**Total Vulnerable HHs (out of 170 interviewed HHs)**	**61**	**100.00**

Source: Census Survey, July–August, 2019

c. Indigenous People and Project Impact:

153. Tharu/Chaudhari, Rajbansi, Rai, Limbu, Magar, Dhimal, Newar, etc have been defined as indigenous group according to the Nepal Federation of Indigenous Nationality[17]. The social safeguard team had detailed discussion with ethnic households belonging to these communities and it revealed that they have been following the same socio-economic practices that are followed by other local community members. No involuntary physical or economic displacement is anticipated as the proposed project will be constructed in the existing "buffer" zone between the cultivated areas and the riverbank that is used by the local community to access the agricultural fields including the affected land. The project will not affect traditional lands. Furthermore, the project is unlikely to impact indigenous peoples' identity, dignity, human rights, livelihood systems, or cultural uniqueness. The project will protect their land from erosion by recurring floods and positively contribute to improve their economic condition

4. Gender Impacts and Mitigation Measures

154. Among the affected HHs due to the project 12 female-headed households have been identified to have their land in the construction sites. Discussions carried out with the affected families and local communities showed concerns relating to gender inclusiveness in the project design and mitigation of adverse impacts especially to women. The concerns specifically related to access to river and use of natural resources (river water), extracting materials from the river (e.g. boulders, sand etc) embankment safety, employment opportunity during construction and post-construction phases

155. The project is categorized as 'Effective Gender Mainstreaming' and a Gender and Social Inclusion (GESI) Plan has been prepared for the project. The DWRI will be responsible for overseeing the timely and appropriate implementation of the GESI and any other technical assistance or grant-related funds/activities that may be mobilized for the project to optimize social and gender benefits. All consultative and participatory processes will be followed socially and gender inclusively, ensuring timely disclosure of information, and providing a platform for open, fair and transparent dialogue and communication.

[17] http://www.nefin.org.np/list/Categorization-of-Indigenous-People-based-on-development-/5/95/6.

E. Lakhandei Subproject

1. Field Works

156. The social safeguard team visited the Lakhandehi basin starting 7 September 2019 for the field works. During the site visit, the team carried out social safeguard assessments in the locations of all the 12 PRTWs. Stakeholder consultations were held with the local community (project beneficiaries) residing near each construction site followed by the census of affected families having land in the construction sites and collection of socioeconomic information of HHs.

157. Prior to conducting community sessions, DWRI engineers with assistance from the ward representatives, contacted persons owning/occupying land at the proposed embankment construction sites. Various sections/groups of the local community including persons representing different caste and the ethnic groups, indigenous people, women, etc participated in the consultation meetings held at all construction sites.

158. At the start of the field activities, the social consultants and the census team walked along the proposed embankment with a group of 5 to 10 local community members comprising the ward representative, persons having land in the construction sites and DWRI engineer. Ground verification of affected plot/ land parcel and its owners/occupants was conducted during the walk using data from GIS overlays on cadastral maps and other local information. It was observed that the cadastral maps were not updated and not matching in some cases with the GIS overlays; also, there were other persons having land in the construction site but have not been formally mapped in the cadastral. Two types of affected persons were identified during these walks i) persons with formal land title having 'lal purja'. Some of them were already mapped and some have not been formally mapped as the cadastral maps were not updated ii) persons without formal land title but are occupying Government/ Ailani land for agricultural activity that is likely to be affected.

159. The Social Development consultants with support of the DWRI engineer and Ward representative held consultations with the local community. Initially, the community was informed about the proposed project works, its benefits and the need for voluntary permission for use of land. It was followed by collection of key socio economic baseline information of the construction sites (e.g. information of HHs size, major caste and ethnic composition of the population including *Dalit*, ethnic and disadvantaged groups, major occupation, information on flood and associated impacts and its management etc). They were also informed that the embankment would be used for road access to their agriculture fields and constructed in a way convenient to river access with provision of the ramp and other facilities depending upon the location and size of the embankment. The community consultation meetings were concluded

after signing the minutes and attendance record of each participant including local Government representative (e.g. mayor/chairperson of rural municipality/ ward members and DWRI engineer). Each signed document was officially attested by the relevant Government organizations in the project district. Among others the minute contained texts in Nepali on willingness to voluntarily donate land use right for the land at the embankment site to the project. The text was read out loudly to the community for their easy understanding.

160. The census team however, could not collect complete information from all the households likely to have their private lands in the proposed embankment sites as there were some absentees and some of the land parcels were not matching with the GIS overlay on the cadastral maps that are not updated. In such cases, information regarding land parcels affected and consent for VDLUR at community level was collected with the support of local government representatives and the local community. **Appendix 2** provides a sample English translation of the text read to the community.

161. In total 2 community consultation sessions were organized, one at each proposed PRTW sites. Location of the consultation meetings and number of participants in the meetings is presented in Table 60.

Table 60: Community Consultation Meetings and Participants

S.N.	Name of Place	District	Municipality /Village Palika	PRTW No	No. of Participants
1	Kachhadiya Tole	Sarlahi	Haripur Municipality-8&2	8	36
2	Jiyajor	Sarlahi	Lalbandi Municipality-11,12,13	1	74
				Total Number of Participants	**110**

Source: Community Consultation Record, September 2019

162. Each consultation session was attended by at least one local government personnel (ward representative) and the field engineer of DWRI. Of the total participants in the community consultation; 34 (31%) were women and 76 (69%) were men. Representation of IP was 87 persons (79%) whereas in case of dalits it was 11 persons (10%). Table 61 presents summary details of participants in the consultation meetings and Key findings of the community consultation and issues raised are summarized in **Appendix 3.**

Table 61: Summary of Participants in Community Consultations

S.N.	Participants	No.	% of Total Participants
	Participation by Gender		
1	Women	34	31
2	Men	76	69
3	**Total**	**110**	**100.00**
	Participation by Vulnerable and Non-vulnerable Groups		
1	Dalit, Madhesi and Muslim	11	10
2	Indigenous People	87	79
3	Brahmins and Chhetri	12	11
4	**Total**	**110**	**100.00**

Source: Community Consultation Record, September 2019

163. The census team with the help of local representatives and community listed names of all affected persons covering those having land at the site of the proposed embankment with officially verified land ownership certificates as well as HHs not having verified land ownership certificate including the occupants of *Ailani* land. The census team collected socioeconomic

information along with the details of assets owned by administering a semi-structured questionnaire. A set of the socio-economic questionnaire is presented in **Appendix 4**.

164. The census team also collected signature of the landowner/ailani land occupant on the MoU for voluntary permission of land use right to the project and also got countersigned by representative of local Government and DWRI engineer.

2. Scope of Impact on Land

a. Impact on Private and Ailani Land

165. The estimated area required for embankment construction in Lakhandehi basin is 1312.55 sqm[18]. All together 51 HHs reported to have land in the proposed two embankment sites in the basin. Out of these 51 HHs, 6 HHs are private landowners, 8 are owners of both private and ailani Land and the rest 37 HHs have only *ailani* land.

166. Out of the 14 HHs reporting to have private land in the proposed construction area, none could be verified as their land ownership certificate did not match with old plot numbers in the cadastral obtained through GIS overlay. Among these 14 HHs, 6 (11.8%) have only private land and rest 8 HHs reportedly owned both private and Ailani land. Out of the total 51 HHs, Ailani land of 37 HHs will be affected.

167. The affected lands are part of either remaining potions of land parcels after river erosion or land where the river was flowing earlier. Among them, some are being used for cultivation only once in a year at the owner/occupant's risk as it is uncertain when which part of the land will get affected by change in the flow of the river and some are left as fallow or abandoned for the purpose of protecting the remaining portion of the land parcel away from the river. Based on the information collected during community consultations it was evident that the increasing trend of floods and river erosion has been threatening the land put to cultivation and the residential areas in the main village habitation since the early seventies due to increased migration, deforestation and encroachment of river side area followed by practice of continuous uncontrolled and unmanaged exploitation of construction materials from the river bed. Therefore, people at all the construction sites of in Lakhandehi basin expressed strong support for the project and their willingness to voluntary permission of land use right to the project authorities. Details of landowners and land parcels owned at the construction site are provided in **Appendix-5**.

b. Land owning/Occupying Households by Caste and Ethnicity

168. There mixed population groups in the project district Sarlahi under the Lakhadehi basin. They are indigenous groups (e.g., Chaudhari, Kachhadiya, Tamang, Majhi, Newar, Magar, and Rai, etc.) and caste groups; (e.g., Brahmin, Chhetries, Giri/Puri/Sanyasi, and other Dalit/Disadvantage caste subgroups like; Danuwar. The census data presented in Table 62 shows that indigenous people comprise 70% of the HHs having their land at the embankment construction sites.

[18] As per estimate of GIS overlay on cadastral maps

Table 62: Composition HHs by Caste and Ethnic Groups

Caste and Ethnic Group	HH having their Land at the Embankment Construction Sites	
	No	%
HHs having Private Land in Construction Sites		
Ethnic minority/indigenous (Danuwar, Cahudhari, Tamang, Majhi, and Newar,	44	86.3
Brahmin Chhetries and others	5	9.8
Dalit and Disadvantaged	2	3.9
Total	**51**	**100.00**

Source: Census Survey, September 2019

c. Impact on Tree

169. Table 63 shows that only 1 out of the 51 HHs interviewed reported trees in his land in the Proposed PRTW sites.

Table 63: Households having Trees in the Proposed PRTW Sites

S.N.	Description	HHs	
		No.	%
1.	Fruit Trees		
2.	Fodder/ firewood Trees	1	100
3	Community Plantation	0	0
4	Community Plantation	0	0
5.	Others	0	0
Total		**1**	**100**

Source: Census Survey, September 2019

3. Loss of Income

170. During the transect walk along the proposed PRTW alignment local community members identified the government land available and households who are required to donate land use right for the project. For estimation of income loss by these households, the census team collected information on average annual income of the affected HHs from different sources including farming from all the land owned as well as from the ailani land. Total land requirement for each PRTW was available from the GIS overlay on the old cadastral map. As all the affected HHs were not identified in the GIS overlay, census team first estimated the government land available at each PRTW site with help of the local community and subsequently the gross total non-government land (private and ailani) required at each PRTW was estimated leaving out the government land available. This land required at the site was apportioned by the local community among the HHs required to donate land use right according to the total size of the land parcel that is affected. Income loss to the affected HHs is estimated by applying this loss of land to the total land owned by the HH and apportioning the percentage of land loss to the income from farming by the HHs. An estimation of Loss of Income by affected HHs and their vulnerability by category is provided in **Appendix 6**

171. No structure or community property resources will be affected due to the project.

4. Socio-economic Information and Profile of Affected Persons

172. The baseline socio economic survey was conducted covering all the 51 HHs having their land (both private and *alani*) at the proposed embankment sites. Key findings of the survey are summarized in the section below.

a. Demographic Characteristics

(i) Household and Population

173. The total population of the 51 interviewed HHs is 308 with 162 male (52.6%) and 146 females (47.4%). Average HH size works out to 6.03.

(ii) Literacy and Educational Attainments

174. Illiterates (55 nos.) comprised 17.9% of the total population. Among the literates 190 nos. (61.69%) were educated maximum up to high school level. Only 14 nos (4.8%) were educated up to bachelors and above. Table 64 provides details of the level of education among the family members of the HHs donating for the project.

Table 64: Educational Status of the Interviewed Households

S.N.	Educational Status	Male		Female		Total	
		No	%	No	%	No	%
1	Illiterate	21	13.0	34	23.3	55	17.9
2	Literate	10	6.2	20	13.7	30	9.7
3	Primary	32	19.8	25	17.1	57	18.5
3	Lower Secondary	34	21.0	16	11.0	50	16.2
4	High School	29	17.9	24	16.4	53	17.2
5	10+ 2	28	17.3	20	13.7	48	15.6
6	Bachelor	7	4.3	6	4.1	13	4.2
7	Master and Above	1	0.6	1	0.7	2	0.6
Total		**162**	**100.0**	**146**	**100.0**	**308**	**100.0**

Source: Census Survey, September 2019

(iii) Average Landholding Size

175. The average landholding size of the 51 interviewed HHs is 28.9 Kattha (9,764.4m^2). Majority households (14 HHs – 27.45%) had landholding size between 10 to 20 Kattha (4,664.4 m^2), followed by 13 HHs (25.49%) owning land between 1 to 2 bigha (8,957.0 m^2). Table 65 provides summary of the landholding sizes.

Table 65: Average landholding size of HHs at Construction Sites

SN	Land Holding on Ranges	Households No.	Average Landholding Size	
			Kattha	Sqm
1	Less than 1 Kattha	Nil	0	0
2	1-1.5 Kattha	Nil	0	0
3	1.5-2 Kattha	Nil	0	0
4	2- 5 Kattha	6	3.4	1,149.2
5	5-10 Kattha	9	7.3	2,467.4
6	10 Kattha-20 Kattha (1 Bigha)	14	13.8	4,664.40
7	1 Bigha to 2 Bigha	13	26.5	8,957.0
8	2 Bigha – 5 Bigha	7	54.0	18,252.0
9	>5 Bigha	2	155.0	52,390.0
	Overall	**51**	**28.9**	**9,764.4**

Source: Census Survey, September 2019

(iv) Major Occupation

176. Agriculture was reported as the major occupation of most HHs (131 nos- 42.5%) followed by service (7.5%), skilled labor (6.5%), and business (4.2%). Students comprised 83 nos (26.9%) and 13 nos (4.2%) were housewives. Table 66 presents the occupation wise distribution of affected HH members.

Table 66: Major Occupation of Affected HHs

S.N.	Occupations	Male		Female		Total	
		No	%	No	%	No	%
1	Agriculture	51	31.5	80	54..8	131	42.5
2	Wage Labor	5	3.1	1	0.7	6	1.9
3	Overseas	11	6.8	1	0.7	12	3.9
4	Business	10	6.2	3	2.1	13	4.2
5	Skilled Labor	20	12.3	0	0.0	20	6.5
6	Service	17	10.5	6	4.1	23	7.5
7	Teaching	0	0.0		0.0	0	0.0
8	Student	43	26.5	40	27.4	83	26.9
9	Housewife		0.0	13	8..9	13	4.2
10	Others	5	3.1	2	1.4	7	2.3
Total		**162**	**100.0**	**146**	**100.0**	**308**	**100.0**

Source: Census Survey, September 2019

(v) Ownership of Household Assets/Amenities

177. All the affected HHs have their own houses for residential purpose. Ownership of bicycle, fan/cooler, and cell/mobile among the 51 HHs was 78.4%, 86.3%, and 96.1% respectively. About 43% HHs owned motor bike/scooter while approximately 69% households have television in the house. Table 67 presents ownership of household amenities by the affected HHs.

Table 67: Major Assets/Amenities Owned by the Affected Households

S.N.	Type of HH Amenities	Total	
		No.	%
1.	Own Residential House	51	100
2.	Bicycle	40	78.4
3.	Motorbike/scooter	22	43.1
4.	Motor Car	0	0.0
5.	Jeep/van/Truck/Tractor	2	3.9
6.	Tempo (three-wheeler vehicle)	2	3.9
7.	TV	35	68.6
8.	Invertors	3	5..9
9.	Solar Panel	24	47.1
10.	Drinking-Water Tank	4	7.8
11.	Fan/cooler	44	86.3
12.	Cell/Mobile	49	96.1
13.	House on rent	2	3.9
14.	Other assets gave on rent (e.g. land, transport, etc)	-	-
15.	Have land in other places	5	9.8

Source: Census Survey, September 2019

(vi) **Household Income and Expenditure**

178. The average annual income of the affected household is NRs291,430.00. Main sources of income are farming (20.43%), service (22.64%), wage labor (25.48%) and remittance (36.63%). Table 68provides source wise average annual household income.

Table 68: Average Annual Income of the Affected Households

S.N.	Major Sources of Income	Average Annual Income (NRs)	
1	Farming	59,549.00	20.43
2	Service	65,980.00	22.64
3	Business/small business	28,804.00	9.88
4	Wage	74,274.00	25.48
5	Remittances	36,255.00	36.63
6	Interest	-	-
7	Rental of house, land, vehicle, etc	-	-
8	Sell of animal	24,411.00	8.37
9	Other Sources	00.00	3.40
10	Social Security Allowance	2,157.00	0.74
	Overall HH Income	291,430.00	100

Source: Census Survey, September 2019

179. The average annual expenses of the households are NRs**190,020.00.** Major heads of expenses are food items (36.45%) followed by celebrating festivals (20.02%), education (15.81%), clothing (14.69%), and health care (9.01%). Table 69 provides breakdown of the average annual expenditures of the interviewed households. The average HH annual expenditure (NRs190,020.00) is NRs101, 410.00 less, than the average annual income (NRs291,430.00).

Table 69: Average Annual Expenditure for the Interviewed HHs

S.N.	Expenditure Items	Average Annual Expenditure (NRs)	
		Expenditure (NRs)	Percentage
1	Food	69,275.00	36.45
2	Education	30,060.00	15.81
3	Health Care	17,137.00	9.01
4	House Repair	0.00	0.00
5	Clothing	27922.00	14.69
6	Festivals	38,058.00	20.02
7	Sending family member abroad	0.00	0.00
8	Loan/Interest Repayment	7,568.00	3.98
9	Other Specify	-	-
Overall HH Expenditure		**190,020.00**	**100.00**

Source: Census Survey, September 2019

b. Vulnerable Households

180. ADB guidelines considers; Indigenous People (IP), Dalit (including schedule caste) people, households headed by senior members, single women headed households, households with physically handicapped person, and BPL HHs as vulnerable. Similarly, these catagories of households have also been classified under constitution of Nepal. In Nepal, the standard method of calculating BPL has been determined by Central Bureau of Statistics (CBS) under the National Planning Commission (NPC). As per NPC/CBS[19] 2011 an individual in Nepal is considered poor if his/her per-capita total annual consumption is below NRs19,261. As per the findings of the socio-economic survey, none of the 51 HHs interviewed fall BPL. Table 70presents distribution of affected HHs by vulnerability types.

Table 70: HHs by Vulnerability Type

S.N.	Vulnerability Type	No. of HH	%
1	Below Poverty Line Households	0	0.00
2	IP Households	44	86.27
3	Dalit Households	2	3.92
4	HHs headed by senior citizens (>65 Years old)	9	17.65
5	Women Headed Households	5	9.80
6	Households with disable persons	2	3.92
7	Households having more than one Vulnerability	-22	-43.14
8	**Total Vulnerable HHs (out of 51 interviewed HHs)**	**51**	**78.43**

Source: Census Survey, September 2019

[19] National Planning Commission/Central Bureau of Statistics

c. Indigenous People and Project Impact:

181. Chaudhari/Tharu, Rajbansi, Rai, Limbu, Magar, Dhimal, Newar, etc. are the mixed groups of people found in the river basin. Tharu/Chaudhari has been defined as indigenous group according to the Nepal Federation of Indigenous Nationality.[20] The social safeguard team had detailed discussion with ethnic households belonging to Chaudhari/Tharu, Rajbansi, Rai, Limbu, Magar, Dhimal, and Newar community and it revealed that they have been following the same socio-economic practices that are followed by other local community members. No involuntary physical or economic displacement is anticipated as the proposed project will be constructed in the existing "buffer" zone between the cultivated areas and the river bank that is used by the local community to access the agricultural fields including the affected land. The project will not affect traditional lands. Furthermore, the project is unlikely to impact indigenous peoples' identity, dignity, human rights, livelihood systems, or cultural uniqueness. The project will protect their land from erosion by recurring floods and positively contribute to improve their economic condition.

[20] http://www.nefin.org.np/list/Categorization-of-Indigenous-People-based-on-development-/5/95/6.

V. Grievance Redress Mechanism

182. A grievance redress mechanism has been proposed for the project. This grievance redress mechanism will have three levels: VDC Level, District/PIU level and PMU level. Simple and easily manageable grievances will be addressed at the VDC level and more complex grievances will be addressed at the District/PIU level. Grievances that could not be resolved at the VDC and PIU level will be referred to the PMU located at the project headquarters at Kathmandu. Further details have been provided in the Project Administration Manual.

183. The key functions of the GRCs are to (i) provide support for APs to lodge their complaints; (i) record the complaints, categories and prioritize them; (iii) settle the grievances in consultation with APs and project officials; (v) report to the aggrieved parties about the decision/solution; and (vi) forward the unresolved cases to higher authorities

VI. Voluntary Land Use Donation/Permission for land use

184. As per the SPS 2009, voluntary land donation should be limited to less than 10% of the total landholding. During the community consultations it emerged that some of the affected HHs will be losing more than 10% of their landholding. It was observed that the community has been suffering due to the loss of land and crops every year caused by recurring floods and river erosion. Local people are desperate to have the embankments built to save their existing assets located nearby the embankments.

185. It has been envisaged that the project will not seek voluntary land donation (title transfer) but only voluntary land use donation. The land will stay in the name of the private land owner so that in future when the river course changes, private land owners can re-gain access to their land and will not have the title cut in half from donation of a land strip to the project.

186. The transect walk along the embankment alignments and community consultations revealed that some affected landowners are very poor and were provided small land lots in the flood plain as part of the governments land for land less scheme. These people stand to lose a percentage of their livelihood source which could make them poorer. Providing cash compensation to people in these areas will cause complications due to jealousy and will also create a legacy for future embankment projects (both bank funded, and non-bank funded).

187. In view of the urgent requirement and community's eagerness for the project, meaningful criteria for voluntary donation here is not the percentage of land (use) loss, but the extent of (i) income loss and (ii) household vulnerability. The project risk is to people, who depended on income from the affected land plots, and particularly, people who have limited or no other livelihood source.

188. For the affected households, the project has an economic assistance programme integrated with the project construction and maintenance viz. ensuring that these people especially the vulnerable ones get employment as unskilled labor in the project during the construction, setting up nurseries to be maintained by them to supply plants to minimize river erosion through bio engineering measures etc.

189. The project also envisages to train and organized embankment neighbors having their land in the area, for the sustainability of embankment and effective/productive utilization of land along the embankment corridor. DWRI will examine options to facilitate the local community on forming maintenance groups, get training associated to embankment protection and utilization of land along the embankment side and, help to coordinate with relevant agencies at the district levels. There could be several options to implement the program during construction and post-construction phase (i) either under the regular program of DWRI or in collaboration with relevant district level relevant stakeholder agencies (e.g. district agricultural office, forest office, etc) or with the assistance of interested external sources. Some of the potential activities that can be carried out under such program may also include; (i) formation of embankment location and length specific Embankment Maintenance Groups, (ii) Train local people on regular maintenance of embankments, commercial utilization of the land along the corridor of embankment through agro-farming, agro-forestry, desert cultivation (watermelon, sugarcane, peanuts, pumpkins, ladies fingers, gourds) fish farming, etc for income generation.

190. Before the construction phase, final design drawings will require review as the river is likely to have moved and design modifications may be required. After the final verification, information of persons contributing their land to be recorded officially in the GIS database and linked to the project assistance program for the APs. Eligibility criteria for voluntary donation is available in the Project Administration Manual.

Proposed Procedure for Volunatary land donation or negotiated settlement

191. The project will satisfy land use requirements through a combination of government land, negotiated settlement and voluntary land contributions from direct project beneficiaries. The following paragraphs outline the project's procedures for undertaking negotiated land settlements and or voluntary land or land use donations in a transparent, consistent, and equitable manner so that people entering into agreements maintain the same or better income and livelihood status. Details are found in the project administration manual (PAM).[21]

192. **Procedure for voluntary land or land use donation**. Land for embankment construction will be contributed on a voluntarily basis by eligible project beneficiaries. Landowners and users are deemed eligible to contribute land or land use to the project when: (i) the donation is verified as voluntary and not resulting from coercion or force,[22] (ii) the donation is verified to not negatively impact or impoverished the land owner or user,[23] (iii) the project benefit will realistically offset the affected party's land or land use donation, (iv) the donation is verified in verbal and written records as confirmed and witnessed by an independent third party.24 Recognizing that landowners and users living in flood affected areas are majority poor and marginalized, the project will provide livelihoods enhancement training for all landowners and users that contributed to the project.[25] Private land owners will choose to transfer the contributed land title deed to the government or maintain the land title deed in their own name; whichever option is deemed preferable in the landowner interest.[26] All land and land user contributions must be verified by the field office Social Development Officers in collaboration with local representatives (ward members) before land is provided by PMU to the contractors. The PMU will ensure that all voluntary land and land use donations are documented, overseen by an independent third party and reported within the project's semi-annual Social Safeguards Monitoring Reports.

193. **Procedure for negotiated settlement.** Where landowners or users are ineligible or do not wish to donate land, the project has the option to enter into a negotiated settlement. Compensation for the negotiated settlement will be provided in the form of replacement of assets (land for land) or cash compensation. Embankment user associations will be formed with the ward representative to identify cases and appropriate compensation provisions. As per ADB SPS 2009, negotiated settlement is achieved by providing fair and appropriate compensation and other incentives to the willing seller, negotiated through meaningful and well documented consultations. To the extent negotiation is based on the concept of willing buyer and willing

[21] Project Administration Manual (accessible from the list of linked documents in Appendix 2 of the report and recommendations of the President).

[22] Including from other community members, government authorities or any other party.

[23] Donations resulting in a loss of more than 10% of the household annual income *OR* a loss of more than 10% of the household total land holding cannot be contributed on a voluntary basis to the project, irrespective of the affected party's willingness to do so. Furthermore, no structures including residential, business, animal or food storage can be donated to the project on a voluntary basis.

[24] An independent third party is a designated nongovernmental organization, government or legal authority who does not serve to benefit from the Project and is impartial to the donation outcome.

[25] The Social Safeguard Focal will be responsible for overseeing the design, preparation and implementation of the livelihood's enhancement for eligible households. A budget has been assigned to the activities; a time-bound work plan will be submitted to ADB following the verification of land use arrangements.

[26] Landowners will not be obliged to transfer their land title deeds to the government as the river course will change in time and the landowner may be able to reclaim their land. As per the Memorandum of Understanding, landowners will only be able to access the donated land once the embankment is no longer functional. The expected life of the embankment is 25 years.

seller, negotiated settlement is voluntary (footnote 24). If negotiations fail, the project must avoid the affected asset by changing the project design. The project management will ensure that negotiated settlements are documented, overseen by an independent third party and reported within the project's semi-annual Social Safeguards Monitoring Reports.

VII. Gender Impacts and Mitigation Measures

194. Discussions carried out with the affected families and local communities showed concerns relating to gender inclusiveness in the project design and mitigation of adverse impacts especially to women.[27] The concerns specifically related to access to river and use of natural resources (river water), extracting materials from the river (e.g. boulders, sand etc) embankment safety, employment opportunity during construction and post-construction phases.

195. The project is categorized as Effective Gender Mainstreaming' and a Gender and Social Inclusion (GESI) Plan has been prepared for the project. The DWRI will be responsible for overseeing the timely and appropriate implementation of the GESI and any other technical assistance or grant-related funds/activities that may be mobilized for the project to optimize social and gender benefits. All consultative and participatory processes will be followed socially and gender inclusively, ensuring timely disclosure of information, and providing a platform for open, fair and transparent dialogue and communication.

[27] Among the affected HHs due to the project female-headed households have been identified to have their land in the construction sites – Mawa Ratuwa – 12 HHs; West Rapti 3 HHs, Bakraha – 12, Lakhandei – 3 HHs

VIII. Indigenous People and Project Impact:

196. Tharu/Chaudhari, Tamang, Newar, Rajbansi, Rana Tharu, has been defined as indigenous group according to the Nepal Federation of Indigenous Nationality.[28] The social safeguard team had detailed discussion with ethnic households belonging to Chaudhari/Tharu and other indigenous community and it revealed that they do not have differentiated impacts or expectations of the project compared to other local community members. No involuntary physical or economic displacement is anticipated as the proposed project will be constructed in the existing "buffer" zone between the cultivated areas and the riverbank that is used by the local community to access the agricultural fields including the affected land. The project will not affect traditional lands. Furthermore, the project is unlikely to impact indigenous peoples' identity, dignity, human rights, livelihood systems, or cultural uniqueness. The project will protect their land from erosion by recurring floods and positively contribute to improve their economic condition. The anticipated positive impact to indigenous people's livelihoods has triggered the project as a category B for IP.

197. ADB's SPS 2009 indigenous people safeguard seeks to ensure that indigenous peoples (i) receive culturally appropriate social and economic benefits, (ii) do not suffer adverse impacts as a result of projects, and (iii) can participate actively in projects that affect them. As per ADB's SPS 2009, the project in not required to produce a separate indigenous people plan when the majority of direct project beneficiaries are indigenous peoples and only positive impacts are identified.[29] The project meets these criteria and as such, the indigenous people plan elements have been integrated throughout the project design. The following paragraphs describe how the project has ensuring meaningful and ongoing consultations with indigenous people and culturally appropriate benefit sharing mechanisms

[28] http://www.nefin.org.np/list/Categorization-of-Indigenous-People-based-on-development-/5/95/6.

[29] ADB. 2009. *Safeguards Policy Statement*. Manila. See Appendix 3, Safeguards Requirements 3: Indigenous Peoples, para. 17.

IX. Social Due Diligence Conclusions

198. The Mohana Khutiya and the Mawa Ratuwa subprojects were screened for involuntary resettlement and indigenous peoples impacts based on the detailed design. The Lakhandehi, West Rapti and Bakraha subprojects were screened for involuntary resettlement impacts and indigenous peoples impacts based on the feasibility design.

199. The objective of the screening exercise was to determine the impacts and appropriate mitigation measures to avoid or reduce adverse impacts to local people and increase the benefits.

200. No physical displacement will occur as the proposed project will be constructed in the existing "buffer" zone or abandoned land between the agriculture fields and the riverbank or on the land given for user right to the DWRI. The social safeguard team noted that the proposed project is unlikely to trigger involuntary resettlement (IR) safeguards and would be **category 'C'** as per the SPS 2009. The project is also unlikely to impact indigenous peoples' identity, dignity, human rights, livelihood systems, or cultural uniqueness. On the other hand, it will protect their land from erosion by recurring floods and positively contribute to improve their economic condition. Thus, the project would be **category 'B'** as per the SPS 2009 for impact on indigenous people.

201. Following are some of the key findings of the field surveys:

(i) Each year land is eroding into the river system therefore landowners are losing their land and no compensation is provided from the government.

(ii) Once the embankments are built, landowners (and non-title holders or 'Alaini' land users) will directly benefit by gaining all year-round access to the remaining portion of land. Land value would likely increase, and people can potentially plant crops in the monsoon season as well.

(iii) No physical displacement will occur.

(iv) No structures are located on the land earmarked for embankment construction and this is because of the recurrent annual flooding.

(v) Local people are desperate to have the embankments built to save their existing assets located nearby the embankments.

202. During the field surveys and consultations with local community the social safeguard team held focus group discussions with communities along all proposed embankments and available landowners and non-title holders using embankment land. All affected households have agreed to donate land for construction of the embankment and signed MoUs in presence of local Government representative and DWRI engineer.

203. A four-tier grievance redress mechanism will be in place for addressing any grievance that may arise. Land use agreements (MoUs) will be verified by the DWRI PMU/PIU ahead of construction.

APPENDIXES

Appendix 1: Participants of the Orientation Workshop

WRPPF: Nepal Terai Flood Project
Surveyors' Orientation Workshop
June 16, 2019

Participants Attendance Sheet

S.N.	Name	Designation	Office	Contact Cell No	Signature
1	Bindeshwar Pd. yadav			9841474428	
2	Sushil K. Joshi			9841236899	
3	Tej bdr. Khadka			9841789131	
4	Anita Gautam			9849287122	
5	Pramila Karki			9861790053	
6	Tirtha Gautam.			9851058958	
7	Kripendra Bhatta			9841696851	
8	Hari Sharan Suwal			9854040723	
9	Simran Adhikari			9860536320	
10	Ravnika Khatri			9851206717	
11	Rabiprabha Awasthi	Sub-engineer	WRPPF	9860614750	
12	Shabnam Sama	Sociologist	WRPPF	9841623280	
13	Bijila Parajuli	GIS	WRPPF	9849238954 9842238954	
14	Rabindra Bdr. Thapa	WRDPP	WRPPF	9841311037	
15	Sunil K.C.	Engineer	WRPPF	9841878337	

16	P K Kar				
17	Sachin Upadhyaya	ADB Consultant		9841368251	
18	Rabin Dhakal	"		9851023454	
19	Manoj Magrati	Accountant		9844228736	
20	Kamala Shah	Accountant			
21	Saraswati Dangol			9841378489	
22	Urmila Regmi			9841469565	
23	Parbati K.C			9880985541	
24	Ujwal K.C			9841.023589	Ujwal
25	Dipak Raj Acharya			9841.955767	
26	[illegible]			9841852590	
27	[illegible]			9858986826	
28					
29					

Appendix 2: Sample Meeting Minute of Social Consultation (Translation from Nepali)

This minute has been signed today on the date of 08-04-2076 (.....) at Arjun Tole of Godawari Municipality in Kailali district, after a social consultation chaired by Mr. Lahanu Chaudhari, Chairperson of the Ward regarding construction of an embankment along the Mohana Khutiya basin at Arjun Tole under the Nepal Priority River Basin Flood Risk Management Project to be implemented by Department of Water Resources and Irrigation (DWRI). The meeting was also participated by the Government engineer representing DWRI.

All the participants in the social consultation meeting have been found happy after knowing about an embankment construction in this section along the basin. Construction of the proposed embankment will ensure the protection of life and properties in this area from the likely inundation including loss of life and properties due to floods. On the other hand, this will also let the local people get freely involved in the cultivating activities being free from the fear of floods and associated problems protecting from the likely floods and other water-induced disasters.

The construction works of embankments and other structures will be carried out mainly at the bank of river focusing on river way or Ailani land. However, private lands may also be required at several locations for embankment construction. Nevertheless, such land will be limited only up to the extent required to construct embankment and associated project structures to protect the valuable cultivating land in the area owned by the titleholders in the construction sites and even for protecting others' life and properties. In consideration of the benefits of embankment on protecting the lands in the area mainly owned by local people, they have unanimously voluntarily agreed to delegate their users' right to use the portion/s of their land likely to be influenced by the design drawing of the proposed embankment. However, the ownership of the land will remain intact in the name of respective titleholders/users and the landowners will also not be supposed to pay any sort of tax or fees for the embankment construction.

Appendix-3: Key Findings of Social Consultations

Key Findings of Social Consultations in Mohana Khutiya

Following are some of the key findings derived from the consultation carried out will local community in the construction locations are summarized in Table below:

<table>
<tr><th>S.N.</th><th>Variables:</th><th>Findings</th></tr>
<tr><td>1</td><td>Estimated number of Immediately beneficiary HHs</td><td>2447</td></tr>
<tr><td>2</td><td>Caste and ethnic composition</td><td><table><tr><th>IP</th><th>Brahmin/ Chhetries /Other</th><th>Dalit</th><th>Total</th></tr><tr><td>62.21%</td><td>22.72%</td><td>15.07%</td><td>100%</td></tr></table></td></tr>
<tr><td>3</td><td>Type of land owned</td><td>Both private and Government land (Ailani)</td></tr>
<tr><td>4</td><td>Use of land</td><td>Cultivation and settlement</td></tr>
<tr><td>5</td><td>Dominant Cast and ethnic group</td><td>Chaudhari, Brahmin/Chhetries, Dalits</td></tr>
<tr><td>6</td><td>Settlement composition</td><td>Mostly mixed group with a majority of ethnic groups Chaudhari and in someplace all ethnic group (Chaudhari).</td></tr>
<tr><td>7</td><td>Major sources of HH income</td><td>Agriculture, wage labor, seasonal migration to India overseas migration and small business.</td></tr>
<tr><td>5</td><td>Major existing infrastructures in the area</td><td>Ward office, public structures like; temple and shrines, community building, health facility building, and the local club, women’s cooperative group in some community.</td></tr>
<tr><td>6</td><td>Flood related experiences</td><td>The community in all locations experience flood</td></tr>
<tr><td>7</td><td>Gender role in managing flood</td><td>Generally, both male and female of the household facing flood use to get involved in rescuing life. However, women were found with more difficulties due to several roles they have to play in the family-like: taking care of senior family members, children, cattle, managing energy and grins for food, managing safe drinking water, etc. As learned from the discussion pregnant women and mothers of young children have even more physical difficulties during the flood and its impact up-to household level and even due to spread of several diseases like; fever, diarrhoea, scabies, fever to themselves and family members. Next, this sort of situation may also cause serious loss of stored grains required for day to day consumption.</td></tr>
<tr><td>8</td><td>Experience of flood</td><td>As responded by the community in all sections, they experience flood each year. However, generally, the flood becomes sever only if there is heavy rain in the upstream area bringing the result of; (i) riverbank and land cutting, (ii) deposition of silt in cultivated land, (iii) occasional impact on</td></tr>
</table>

		residential houses also swiping away depending upon its extremity.
9	Average land loss due to the flood	Based on information culled from community consultation on and average within five years the flood had affected agricultural land ranging from 10 to 50 Bigha [1 Bigha = 1621.344 sqm].
10.	Methods being adopted to combat flood's effect	In some community, local people were found trained on rescuing and managing during the flood. Red Cross support in the task of rescuing the people and distributing the materials of immediate needs to some extent (e.g. instant foods, biscuits, blankets etc).
11.	Provision/system of notifying about flood	No flood notification found.
12	Type of diseases that use to be spread during flood	Diarrhoea, fever, skin diseases, eye infection, etc
13	Knowledge about upcoming embankment construction.	Most of the people were aware of the program as they have also submitted their request to DWRI through local government.
14.	Information about the upcoming embankment construction program	All people were found familiar about the project.
15	People's expectation after the embankment construction	People expect to get relieved permanently from the flood
16	Peoples willingness to get involved in embankment protection and small-scale community development program.	People showed interest and willingness on embankment protection and other small-scale community development program
17	People's felt need for rehabilitation centers	People expect rehabilitation center in all sites as they don't have any such center which may be useful in several difficult situations (fire, flood, earthquake, gathering for social works, etc.)
18	Availability of land for community rehabilitation centers.	Availability of land will not be an issue for constructing community rehabilitation centers as there is adequate government land in all construction site in Mohna-Khutiya basin.

Key Findings of Community Consultation in Mawa Ratuwa

Following are some of the key findings derived from the consultation carried out will local community in the construction locations are summarized in Table below:

Summary of Key Findings of the Social Consultation

<table>
<tr><th>S.N.</th><th>Variables:</th><th>Findings</th></tr>
<tr><td>1</td><td>Estimated number of Immediately beneficiary HHs</td><td>1939 HHs</td></tr>
<tr><td>2</td><td>Caste and ethnic composition</td><td><table><tr><th>IP</th><th>Brahmin/ Chhetries /Other</th><th>Dalit Others</th><th>Total</th></tr><tr><td>206 (41.53%)</td><td>209 (42.14%)</td><td>81 (16.33%)</td><td>496 (100)</td></tr></table></td></tr>
<tr><td>4</td><td>Type of land owned</td><td>• Both private and
• Government land (Ailani)
• In some cases, the proportion of HHs having Ailani land is higher than private land ownership (e.g. PRTW 9A,9B, 9c, 9d, 11 etc)</td></tr>
<tr><td>5</td><td>Use of land</td><td>• Cultivation and
• Settlement</td></tr>
<tr><td>6</td><td>Dominant Cast and ethnic group</td><td>• Chaudhari,
• Rajbansi
• Dhimal
• Rai,
• Limbu,
• Magar, Tamang
• Brahmin/Chhetries,
• Dalits, and other disadvantaged groups like Madhesi and Muslims</td></tr>
<tr><td>7</td><td>Settlement composition</td><td>• Mostly mixed group. In some caes In some construction sites proportion of IP has been notices (eg. PRTW 5a&5b, PRTW8, PRTW 9a, 9b, 9c,9d,11, PRTW 3 etc)</td></tr>
<tr><td>8</td><td>Major sources of HH income</td><td>• Agriculture
• wage labor,
• seasonal migration and
• overseas migration (in some places it is higher after agriculture)
• small business.</td></tr>
<tr><td>9</td><td>Major existing infrastructures in the area</td><td>• Ward office,
• Public structures like; temple and shrines, community building, health facility building, and the local club,
• Cooperative group in some community.</td></tr>
<tr><td>10</td><td>Flood related experiences</td><td>• Generally, the community in all location have experience flood directly or indirectly</td></tr>
<tr><td>11</td><td>Gender role in managing flood</td><td>• Both male and female of the household facing flood and use to get involved in rescuing life,
• Women were found feeling more difficulties due to several roles they have to play in the family-like; taking care of senior family members, children, cattle, managing energy and grins for food, managing safe drinking water, etc. As learned from</td></tr>
</table>

		the discussion pregnant women and • Fever, diarrhoea, scabies, serious loss of stored grains required for day to day consumption.
12.	Experience of flood	• Community in all sections experience flood each year. • The flood becomes sever only if there is heavy rain in the upstream area bringing the result of; (i) riverbank and land cutting, (ii) deposition of silt in cultivated land, (iii) occasional impact on residential houses also swiping away depending upon its extremity. • However, due to lack of outlet for the tributary water and canal water the people are also facing water logging problems in addition to flood.
13.	Average land loss due to the flood	• Maximum 1000 Bigha to Minimum 10 Bigha) * 1 Bigha = 6772.41 sqm.
14	Methods being adopted to combat flood's effect	• Local support for immediate management • Red Cross support for rescuing and distributing assistance (e.g. instant foods, biscuits, blankets etc).
15	Provision/system of notifying about flood	• No flood notification found
16.	Type of diseases that use to be spread during flood	• Diarrhoea, fever, skin diseases, eye infection, etc
17	Knowledge about upcoming embankment construction.	• Generally, people were aware about embankment construction project
18	Information about the upcoming embankment construction program	• Through DWRI district office and local leaders they were found aware
19	People's expectation after the embankment construction	• People expect to get relieved permanently from the flood • People also expect for the proper management for the water coming from tributary rivers and other flash streams, • People also expect to get back the land in the river while constricting embankment as far as possible
20	Peoples willingness to get involved in embankment protection and small-scale community development program.	• Interested
21	People's felt need for rehabilitation centers	• Expect rehabilitation centre also to combat several local difficulties (fire, flood, earthquake, etc.
22	Availability of land for community rehabilitation centers.	• Availability of land will not be an issue for constructing community as there is adequate government land in all construction site in Mawa Ratuwa basin.

West Rapti - Key Findings of Social Consultations

S.N.	Variables:	Findings
1	Estimated number of Immediately beneficiary HHs	1939 HHs
2	Caste and ethnic composition	IP: 1579 (81.93) Brahmin/ Chhetries /Other: 278 (14.34) Dalit: 53 (2.73) Others: 29 (1.50) Total: 1939 (100)
3	Major sources of livelihood	• Agriculture • Wage Labour • Remittance
4	Type of land owned	• Both private and • Government land (Ailani)
5	Use of land	• Cultivation and residential settlements
6	Dominant Cast and ethnic group	• Chaudhari, • Brahmin/Chhetries, • Dalits, Madhesi and Muslims
7	Settlement composition	• Mostly mixed group
8	Major sources of HH income	• Agriculture • wage labor, • seasonal migration and • overseas migration • small business.
9	Major existing infrastructures in the area	• Ward office, • Public structures like; temple and shrines, community building, health facility building, and the local club, • The cooperative group in some communities.
10	Flood related experiences	• Generally, the community in all location have experience flood
11	Gender role in managing flood	• Both male and female of the household facing flood and use to get involved in rescuing life, • Women were found feeling more difficulties due to several roles they have to play in the family-like: taking care of senior family members, children, cattle, managing energy and grins for food, managing safe drinking water, etc. As learned from the discussion pregnant women and • Fever, diarrhea, scabies, serious loss of stored grains required for day to day consumption.
12.	Experience of flood	• The community in all sections, they experience flood each year. • The flood becomes sever only if there is heavy rain in the upstream area bringing the result of; (i) riverbank and land cutting, (ii) deposition of silt in cultivated land, (iii) occasional impact on residential houses also swiping away depending upon its extremity. • However, due to lack of outlets for the tributary water and canal water the people are also facing water logging problems in addition to floods.

S.N.	Variables:	Findings
13.	Average land loss due to the flood	• 74.37 Bigha (3.81 ha) [1 bigha=19.5 ha]
14	Methods being adopted to combat flood's effect	• Local support for immediate management • Red Cross support for rescuing and distributing assistance (e.g. instant foods, biscuits, blankets, etc).
15	Provision/system of notifying about flood	• No flood notification found
16.	Type of diseases that use to be spread during flood	• Diarrhoea, fever, skin diseases, eye infection, etc
17	Knowledge about upcoming embankment construction.	• Generally, people were aware of embankment construction project
18	Information about the upcoming embankment construction program	• Through DWRI district office and local leaders, they were found aware
19	People's expectation after the embankment construction	• People expect to get relieved permanently from the flood • People also expect the proper management for the water coming from the tributaries of Rapti river and other flash streams
20	People's willingness to get involved in embankment protection and small-scale community development program.	• Interested
21	People's felt need for rehabilitation centers	• Expect rehabilitation center also to combat several local difficulties (fire, flood, earthquake, etc.
22	Availability of land for community rehabilitation centers.	• Availability of land will not be an issue for constructing the community as there is adequate government land in all construction sites in West Rapti basin.

Key Findings of Community Consultation in Bakraha Basin

Following are some of the key findings derived from the consultation carried out will local community in the construction locations are summarized in Table below:

Summary of Key Findings of the Social Consultation

S.N.	Variables:	Findings
1	Estimated number of Immediately beneficiary HHs	1939 HHs
2	Caste and ethnic composition	IP: 68 (26.26%) Brahmin/ Chhetries/ Other: 86 (45.49%) Dalit Others: 33 (18.54%) Total: 187 (100)
4	Type of land owned	• Both private and Government land (*Ailani*)
5	Use of land	• Cultivation and • Settlement
6	Dominant Cast and ethnic group	• Chaudhari, • Rajbansi • Dhimal • Rai, • Limbu, • Magar, Tamang • Brahmin/Chhetries, • Dalits, and other disadvantaged groups like Madhesi and Muslims
7	Settlement composition	• Mostly mixed group. In some construction sites proportion of IP has been notices higher
8	Major sources of HH income	• Agriculture • wage labor, • seasonal migration and • overseas migration (in some places it is higher after agriculture) • small business.
9	Major existing infrastructures in the area	• Ward office, • Public structures like; temple and shrines, community building, health facility building, and the local club, • Cooperative group in some community.
10	Flood related experiences	• Generally, the community in all location have experience flood directly or indirectly
11	Gender role in managing flood	• Both male and female of the household facing flood and use to get involved in rescuing life, • Women were found feeling more difficulties due to several roles they have to play in the family-like; taking care of senior family members, children, cattle, managing energy and grins for food, managing safe drinking water, etc. As learned from the discussion pregnant women and • Fever, diarrhoea, scabies, serious loss of stored grains required for day to day consumption.
12.	Experience of flood	• Community in all sections experience flood each year.

S.N.	Variables:	Findings
		• The flood becomes sever only if there is heavy rain in the upstream area bringing the result of; (i) riverbank and land cutting, (ii) deposition of silt in cultivated land, (iii) occasional impact on residential houses also swiping away depending upon its extremity. • However, due to lack of outlet for the tributary water and canal water the people are also facing water logging problems in addition to flood.
13.	Average land loss due to the flood within five years	• Maximum 200 Bigha to Minimum 20 Bigha) i different locations * 1 Bigha = 6772.41 sqm.
14	Methods being adopted to combat flood's effect	• Local support for immediate management • Red Cross support for rescuing and distributing assistance (e.g. instant foods, biscuits, blankets etc).
15	Provision/system of notifying about flood	• No flood notification found
16.	Type of diseases that use to be spread during flood	• Diarrhoea, fever, skin diseases, eye infection, etc
17	Knowledge about upcoming embankment construction.	• Generally people were aware about embankment construction project
18	Information about the upcoming embankment construction program	• Through DWRI district office and local leaders they were found aware
19	People's expectation after the embankment construction	• People expect to get relieved permanently from the flood • People also expect for the proper management for the water coming from tributary rivers and other flash streams, • People also expect to get back the land in the river while constricting embankment as far as possible
20	Peoples willingness to get involved in embankment protection and small-scale community development program.	• Interested
21	People's felt need for rehabilitation centers	• Expect rehabilitation centre also to combat several local difficulties (fire, flood, earthquake, etc.
22	Availability of land for community rehabilitation centers.	• Availability of land will not be an issue for constructing community as there is adequate government land in all construction site in Bakraha basin.

Key Findings of Community Consultation in Lakhandei

S.N.	Variables:	Findings
1	Estimated number of Immediately beneficiary HHs	110
2	Caste and ethnic composition	IP: 79.09%; Brahmin/ Chhetries /Other: 10.90%; Dalit: 10%; Total: 100%
3	Use of land	Cultivation and settlement
4	Major sources of livelihood	• Cultivation, agriculture labour, small business

S.N.	Variables:	Findings
5	Type of land owned	• Both private and • Government land (*Ailani*)
6	Use of land	• Cultivation and • Settlement
7	Dominant Cast and ethnic group	• Kachhadiya, • Brahmin/Chhetries, • Dalits
5	Settlement composition	• Mostly mixed group
6	Major sources of HH income	• Agriculture • wage labour, • seasonal migration to India and • overseas migration • small business.
7	Major existing infrastructures in the area	• The location is near to high way • Ward office, • Public structures like; temple and shrines, community building, health facility building, and the local club, • Women's cooperative group in some communities. • Local market in the accessible area
8	Flood related experiences	• The community in all location have experience flood
9	Gender role in managing flood	• Both male and female of the household facing flood use to get involved in rescuing life, • Women were found feeling more difficulties due to several roles they have to play in the family-like; taking care of senior family members, children, cattle, managing energy and grins for food, managing safe drinking water, etc. As learned from the discussion pregnant women and • Fever, diarrhoea, scabies, serious loss of stored grains required for day to day consumption.
10.	Experience of flood	• The community in all sections, they experience flood each year. • The flood becomes sever only if there is heavy rain in the upstream area bringing the result of; (i) riverbank and land cutting, (ii) deposition of silt in cultivated land, (iii) occasional impact on residential houses also swiping away depending upon its extremity.
11.	Average land loss due to the flood	• On and average within five years the flood had affected hundreds of bigha of cultivated land..
12	Methods being adopted to combat flood's effect	• Local people for immediate support, • Red Cross support the task of rescuing the people and distributing the materials of immediate needs • Health post for in case of an epidemic
13	Provision/system of notifying about flood	• No flood notification found
14.	Type of diseases that use to be spread during flood	• Diarrhoea, fever, skin diseases, eye infection, etc
15	Knowledge about upcoming embankment construction.	• Most of the people were aware of the program as they have also submitted their request to DWRI through local government.
16	Information about the upcoming	• All people were found familiar about the project.

S.N.	Variables:	Findings
	embankment construction program	
17	People's expectation after the embankment construction	• People expect to get relieved permanently from the flood
18	People's willingness to get involved in embankment protection and small scale community development program.	• People has shown their interest and willingness on embankment protection and other small-scale community development program
19	People's felt need for rehabilitation centres	• People expect rehabilitation centres in all sites as they don't have any such centre which may be useful in several difficult situations (fire, flood, earthquake, gathering for social works, etc.
20	Availability of land for community rehabilitation centres.	• The availability of land will not be an issue for constructing the community as there is adequate government land in all construction sites in Lakhandehi basin.

Appendix 4: Questionnaire for Socioeconomic Survey
Government of Nepal
Department of Water Resources and Irrigation
Flood Protection Project in the Selected River Basin of the Country
Socio-economic Information of Affected HHs

Date of Interview:__/____/2076 V.S.
DD /MM / YY

Section A: General Information		
S.N	River Basin's Name:	
1	Province:	
2	District:	
3	Municipality/VDC:	
4	Ward No.	
5	Name of City or Village:	
6	Construction site chain- age	
7	Contact No. of respondent	
8	Interviewers Name	
9	Interviewers contact No	
10.	Name of Affected Landowner	

Section- B: Respondent's Background

1. Respondent's Name : ----------
2. Respondent's Contact Number:
3. Relation with HH Head : ----------
4. Completed Age (in years):……
5. Gender :

(a)	Male	(b)	Female	(c)	Others

6. Caste/Ethnic Group : ----------
7. Do you belong to any of the following group; (IP) (Dalit)
8. Religion : (a) Hindu (ii) Muslim (iii) Buddhist (iv) Christian (v) Others
9. How long you have been staying here?.....

   (i) Was born here, (ii) since 10 years, (iii) since 10-20 years, (iv) before 20 years
   (v) Even before 20 years (v) Others……..

Section-C: Demographic Information of the HHs

C-1. Total family members in the HHs (Pls write in the column):

S.N.	Family Members' Name	Relation with HH Head [1]	Sex [2]	Completed Age [3]	Marital Status [4]	Education (> 5 years) [5]	Current Main Occupation [6]	Disability Y/N[7]
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

(Can be added table back side to this page for more family members in the HHs as applicable)

Coding instructions:

[1] Relation: (a) grandfather/ grandmother (c) Father/mother (d) Son/ daughter in laws (e) grandson/granddaughter (f) Relatives (g) Spouse, (h) others……

[2] Gender/Sex: (a) Female (b) Male (c) Others

[3] Age: (1) < 1 year, (2) below 5 years, (3) 5- 16 Years, (4) 16-65 years (5) Above 65 years

[4] Marital Status: (1) Married (2) Unmarried (3) Others …….

[5] Education: (1) Can't read and write (2) Can sign only (3) Just can read and write (4) Primary, (5) Lower Secondary (up to 7) (6) Secondary or high school (8,9,10), (7) higher secondary, (8) Intermediate (9) Bachelor (Masters) (10) Above master and PHD

[6] Occupation (1) agriculture (2) wage laborer (3) Overseas employment, (4) business, (5) skill works (6) Business, (7) service (8) Others

C.2: Major Household Amenities

Please mentions Major Household Amenities in your HHs

S.N	Description	If Yes, Please Tick -√_	Number
1	Residential House		
2	Bicycle		
3	Motorbike		
4	Motorcar		
5	Jeep/van/truck/Tracktor		
6	Tempo		
7	TV		
8	Invertors		
9	Solar		
10	Drinking-Water Tank		
11	Fan/ Cooler		
12	Cell mobile		
13	House on Rent		
14	Other assets given in rent		
15	Have land in another place		

Section-D: Land Holdings

D-1 Land Holding Size of HHs by Type and Estimated Area to be Affected by Project

S. N.	Type of Land Owned	Total Area Owned (Bigha-Katha-Dhur)	Sqm	Affected Area for Project work		Percent of Loss	
				Big-Kath-Dhr	sqm	Area (sqm)	Percent of total owned Land
1.	Private Land in project location with						
2.	Government Land						
Total							

Section E: Information on Likely Affected Structures

E-1: Information on affected Structures:

S.N	Description	Tick (√)	No	Construction Type	Current Market Value Approx. (NRs)
1.	No loss of structures				
2.	Residential				
3.	Business shed				
4.	Animal or poultry shed				
5.	Other structures in any				
	Total				

F: Impact on Trees

F-1: Information on likely affected Trees

S.N	Description	Tick (√)	Major Species	Nos.	Per Year Productive Value (estimated NRs)
1.	Fruit Trees				
2.	Fodder/firewood tree				
3.	Community plantation for flood protection				
4.	Others……				
	Total				

G: Information on Community and Cultural Structures

G-1: Is there any of the following public places/structure near the riverbank in this area?

S.N	Description	Tick (√)	Associated Impacts
1.	School		
2.	Religious/Cultural Place		
3.	Playground		
4.	Grazing land		
5	Ongoing construction works (e.g. or existing bridges or canals etc)		
6.	Other Specify		

H: Impact of Flood and Water Induced Disasters

H-1: Name of River causing a flood in this area : .....

H-2 How frequent rivers cause a flood in your area?

S.N	Frequency	Tick (√)	Major Consequences					
			Embankment cutting	Land Cutting	Damage of Cultivated Crops	Flood in Settlement	Loss of animals	Loss of Human life
1.	Occasionally							
2.	Annually							
3.	Only during heavy rain							
4.	Other Specify							

H-3 Flood Impact during Last Time

S.N.	Type of Loosed Assets in Last Flood	Quantity/Area/Unit
1.	Damage/loss of crops	
2.	Loss of residential/cattle shed and other structure	
3.	Land Cutting	
4.	Loss of cattle/chickens/birds	
5.	Death of birds (chicken, duck, etc)	
6.	Loss of family members…….No	
7.	Trees plan and vegetable	
8.	Other specify…….	
9.	In which year the last flood was occurred	

H-4 Do you have any further to share about flood?
……
……
.....
.....

I. Household Economy

I-1 What is the average expenditure (Based on last years income)

S.N.	Major Sources of HHs Expenditures	Average Annual Expenditure
1	Food	
2	Education	
3	Medicine/treatment	
4	House repair	
5	Clothing	
6	Festival	
7	Wedding, and other ritual and cultural festivals	
8	For going to overseas employment	
9	Purchasing house, vehicle etc	
10.	Prepayment of loan or payment of interests	
11.	Other specify	

I-2 Source and amount of gross income in last year

I-2-1: Estimated annual household expenditure

S.N.	Major expenditure Items	Expenditure Amount in NRs
1	Food	
2	Education	
3	Medical Care	
4	Housing(maintenance/rent)	
5	Clothing, shoes and other personal effect	
6	Festivals	
7	Marriage/ birth or death of family	
8	Sending family member abroad for job	
9	Purchase of new land / house/ vehicle etc	
10.	Repayment of Loan	
11	Others (Specify)	

I-2-2 Source and amount of gross income in last year

S.N.	Major Sources of Income	Average Income Amount in NRs
1	Farming	
2	Service	
3	Business/small business	
4	Wage	
5	Remittances	
6	Interest	
7	Rental of house, land, vehicle etc	
8	Sell of animal	
9	Others (rental of properties, forest product sale/ gift	
Total Average Annual Income		

J Right to utilize the Land

J-1 Have you kept your land on mortgage? If yes for how long? .....

J-2 Name of Bank……

J-3 When is the maturation day…….

K Do you want to say something about flood protection?
.....
.....
.....

L What are the major problems here related to flood protection?
……
……
……

M. On behalf of my family and myself, I hereby would like to express my confirmation willingness to use my land for embankment construction to protect mime as well as other's land in the area.

(i) Land Owners Name:……
(ii) Relationship in the HHs:…….
(iii) Signature:……..
(iv) Date:……

Thank You So Much and Namaste

Appendix 5 -Details of landowners and land parcels owned
Mohana Khutiya -Details of landowners and land parcels owned

HHs having Land in Construction Sites (Private+Ailani) Mohana Khutiya							
S.N	PRTW No	Survey data	Land in Katha	District	GP_NP	Ward_ No	Village
	1	2	3	4	5	6	7
1	PRTW 2	Jaggu Dagaura	2.0	Kanchanpur	Krishnapur	8	Majghai
2		Kabir Bhagat	4.2	Kanchanpur	Krishnapur	8	Majghai
3		Bhangiram Dagaura	7.0	Kanchanpur	Krishnapur	8	Majghai
4		Harguhi Dagaura	8.0	Kanchanpur	Krishnapur	8	Majghai
5		Phakuram Dagaura	16.6	Kanchanpur	Krishnapur	8	Majghai
6		Dhaniram Chaudhari	18.0	Kanchanpur	Krishnapur	8	Majghai
7		Nanda Lal Rana	15.4	Kanchanpur	Krishnapur	8	Majghai
8		Buddhi Ram Chaudhari	42.0	Kanchanpur	Krishnapur	8	Majghai
9		Bhakta Ram Chaudhari	44.0	Kanchanpur	Krishnapur	8	Majghai
10		Banda Chaudhari	64.0	Kanchanpur	Krishnapur	8	Majghai
11		Phulpati Dagaura	143.0	Kanchanpur	Krishnapur	8	Majghai
12	PRTW 3	Lautan Chaudhari	0.60	Kailali	Dhangadi	13	SriLanka
13		Aashish Rana	0.60	Kailali	Dhangadi	13	SriLanka
14		Sante Kami	1.00	Kailali	Dhangadi	13	SriLanka
15		Man Bdr. Gurung	1.00	Kailali	Dhangadi	13	SriLanka
16		Rabi Lal Chaudhari	1.60	Kailali	Dhangadi	13	SriLanka
17		Lal Bdr. Saud	1.60	Kailali	Dhangadi	13	SriLanka
18		Raj Bdr. Chaudhari	4.00	Kailali	Godawari	9	Murkati
19		Sampat Lal Chaudhari	4.00	Kanchanpur	Krishnapur	9	Jorayal Tole
20		Jagat Ram Rana	4.00	Kailali	Godawari	9	Arjun Tole
21		Bandhu Ram Chaudhari	5.00	Kanchanpur	Krishnapur	9	SriLanka
22		Man Bdr. Dagaura	8.00	Kailali	Dhangadi	13	SriLanka
23		Chhotelal Chaudhari	9.00	Kailali	Dhangadi	13	SriLanka
24		Sunita Chaudhari	5.20	Kailali	Dhangadi	13	SriLanka
25		Bandhu Ram Chaudhari	5.60	Kailali	Godawari	9	Arjun Tole
26		Ram Kumar Chaudhari	4.20	Kailali	Godawari	9	Arjun Tole
27		Bir Bdr. Chaudhari	7.60	Kailali	Godawari	9	Arjun Tole
28		Ram Bdr. Chaudhari	5.60	Kailali	Dhangadi	13	SriLanka
29		Autoriya Chaudhari	5.60	Kailali	Godawari	9	Arjun Tole
30		Phul Chandra Rana	11.00	Kailali	Godawari	9	Arjun Tole
	PRTW 4		Govt. Land				
31	PRTW 6	Debendra Saud	2.60	Kailali	Godawari	9	Murkati
32		Bahali Rana	4.00	Kailali	Godawari	9	Dhanchauri
33		Jaumati Thapa	4.00	Kailali	Dhangadi	13	SriLanka
34		Chhabilal Saud	4.00	Kailali	Godawari	9	Arjun Tole

HHs having Land in Construction Sites (Private+Ailani) Mohana Khutiya							
S.N	PRTW No	Survey data	Land in Katha	District	GP_NP	Ward_ No	Village
	1	2	3	4	5	6	7
35		Dhana Singh Bohora	5.00	Kailali	Godawari	9	Arjun Tole
36		Rasi Rana	5.00	Kailali	Dhangadi	13	SriLanka
37		Dal Bdr. Shah	5.00	Kailali	Godawari	9	Arjun Tole
38		Dirgha Air	6.60	Kailali	Godawari	9	Arjun Tole
39		Ishwor Datta Joshi	8.00	Kailali	Godawari	9	Murkati
40		Shahali Rana	8.00	Kailali	Godawari	9	Dhanchauri
41		Harka Bdr. Saud	9.00	Kailali	Godawari	9	Dhanchauri
42		Khadga Bdr. Mahara	10.00	Kailali	Godawari	9	Murkati
43		Dararu Chaudhari	74.00	Kailali	Godawari	9	Murkati
44		Shree Prasad Chaudhari	20.00	Kailali	Godawari	9	Dhanchauri
45		Phulchandra Rana	30.00	Kailali	Dhangadi	13	SriLanka
46	PRTW 7	Hukum Bdr. Shahu	1.60	Kailali	Godawari	9	Murkati
47		Manu Devi Bohara	5.20	Kanchanpur	Krishnapur	9	Jorayal Tole
48		Bhoj Raj Chaudhari	6.00	Kailali	Godawari	9	Dhanchauri
49		Lal Bdr. Bohara	7.00	Kailali	Dhangadi	13	SriLanka
50		Bal Bdr. Jethara	10.00	Kailali	Dhangadi	13	SriLanka
51		Sinha Raj Chaudhari	15.00	Kailali	Godawari	9	Arjun Tole
52		Sanu Ram Rana	15.00	Kailali	Dhangadi	13	SriLanka
53		Sheru Bohara	10.60	Kailali	Dhangadi	13	SriLanka
54		Lal Bdr. Chaudhari	10.80	Kailali	Godawari	9	Murkati
55		Chamaru Rana	13.00	Kailali	Godawari	9	Murkati
56		Chaudhari Rana	15.00	Kailali	Godawari	9	Dhanchauri
57		Hem Raj Rana	14.00	Kailali	Godawari	9	Murkati
58		Santa Ram Rana	14.00	Kailali	Godawari	9	Murkati
59		Gopal Rana	14.00	Kailali	Godawari	9	Dhanchauri
60		Gopi Ram Rana	43.00	Kailali	Godawari	9	Murkati
61	PRTW 10	Deumani Dagaura	57.4	Kanchanpur	Krishnapur	9	Majhgaun
62	PRTW 11 a	Sheer Dagaura	3.00	Kanchanpur	Godawari	9	Srilanka
63	PRTW 11 b	Bharat Thapa	2.00	Kanchanpur	Krishnapur	9	Jorayal
64		Purnaram Chaudhari	11.00	Kanchanpur	Krishnapur	9	Jorayal
65		Ganesh Bdr. Singh	86.00	Kanchanpur	Krishnapur	9	Jorayal
66		Harka Bdr. Shaud	39.00	Arjuntole	Godawari	9	Kailali
67	PRTW 13	Asharam Chaudhari	7.00	Kailali	Godawari	9	Dhanchauri
68		Tika Ram Chaudhari	10.00	Kailali	Godawari	9	Dhanchauri
69		Ram Bdr. Chaudhari	10.00	Kailali	Godawari	9	Dhanchauri
70		Bujhauna Dagaura	40.00	Kailali	Godawari	9	Dhanchauri
71		Sujhauna Dagaura	26.00	Kailali	Godawari	9	Dhanchauri

HHs having Land in Construction Sites (Private+Ailani) Mohana Khutiya							
S.N	PRTW No	Survey data	Land in Katha	District	GP_NP	Ward_ No	Village
	1	2	3	4	5	6	7
72		Man Bdr. Chaudhari	17.00	Kailali	Dhangadhui	13	Srilanka
73		Kadhera Rana	29.00	Kailali	Godawari	9	Dhanchauri

Mawa Ratuwa - List of landowners having land at construction site

A) Households with Private Land

S.N.	PRTW	Name of Landowner	Private Area (in Kattha)
1	012 L	Apsara Devi Nemwang	29.4
2	012 L	Harka Maya Bhandari	75
3	012 L	Man Bdr. Bhujel	39
4	08	Murari Mishra	80
5	07	Chandra Bdr. Rai	4.9
6	07	Krishna Bdr. Badaiwa	100
7	04	Sanchita Lamsal	9
8	02	Tulasa Devi Adhikari	72
9	02	Dev Kumari Karki	46.55
10	02	Sudan Limbu	20
11	02	Chandra Kumari Limbu	38
12	02	Bishnu Maya Thapa	40
13	02	Khem Raj Khadka	10
14	02	Bhim Bdr. Khadka	9.85
15	02	Rudra Bdr. Katuwal	21.6
16	02	Sammi Dhami	5
17	01	Taranath Rajbansi	80
18	01	Dukho Devi Rajbansi	15
19	01	Harish Chandra Rajbansi	61.6
20	01	Bajra Bdr. Basnet	60
21	01	Balaram Basnet	20
22	10	Rana Maya Neupane	58
23	08	Raj Singh	10
24	07	Nanu Baba Shakya	80
25	07	Tek Bdr. Dahal	43
26	05 A - 05B	Jit Maya Angdembu	15.5
27	04	Yogendra Bdr Karki	54
28	04	Sher Bdr. Baniya	55
29	04	Mahendra Karki	44
30	04	Kalpana Devi Lamsal	7
31	02	Bhakta Bdr. Basnet	52
32	02	Man Bdr. Katuwal	15

B) Households with Private and Ailani Land

S.N.	PRTW	Name of Landowners	Ailani	Private	Total (in Kattha)
1	12 L	Nara Kumari Shahi	3	25.5	28.5
2	12 L	Tulasa Devi Mishra	2	2	4
3	09 A - 09 B	Tika Ram Poudel	15	6	21
4	09 A - 09 B	Maniraj Iwa Limbu	40	8	48

S.N.	PRTW	Name of Landowners	Ailani	Private	Total (in Kattha)
5	09 A - 09 B	Deepak Tamang	7	4	11
6	09 A - 09 B	Harka Bdr. Limbu	30	1	31
7	09 A - 09 B	Rana Bdr. Adhikari	20	40	60
8	09 A - 09 B	Chudamani Regmi	2	40	42
9	09 A - 09 B	Deshu Sauden	5	40	45
10	07	Chhali Maya Rai	22	7.5	29.5
11	07	Bhakta Kumar Tamang	88.55	8	96.55
12	05 A - 05 B	Prem Limbu	6	0.5	6.5
13	05 A - 05 B	Mangal Kumari Darnal	10	0.5	10.5
14	05 A - 05 B	Sukmaya Chaudhari	1.5	3	4.5
15	03	Sabidra Bhandari	10	30	40
16	03	Dil Kumari Lawati	6.5	10	16.5
17	03	Prem Lawati	17	46	63
18	03	Tek Bdr. Limbu	10	6	16
19	03	Birendra Bohora	6	20	26
20	03	Gauri Pd. Bohora	15	18	33
21	01	Dambar Bdr. Basnet	10	1.5	11.5
22	012 L	Rupa Devi Gautam	25	83	108
23	07	Chakra Bdr. Shrestha	30	26	56
24	07	Bhim Bdr. Rai	40	23	63
25	02	Dil Bdr. Katuwal	55	70	125
26	02	Lila Devi Gautam	15	30	45
27	02	Deva Kumar Katuwal	15	15	30
28	02	Manama Adhikari	2.5	25	27.5
29	01	Bhagwan Pd. Rajbansi	50	90	140
30	01	Nara Bdr. Basnet	50	31.75	81.75
31	01	Min Pd. Dulal	30	70	100
32	01	Bandor Badai Sharma	1.5	18.25	19.75

C) Households with *Ailani* Land only

S.N.	PRTW	Name of Landowner	Ailani Land in Kattha
1	09 D	Ambar Bdr. Magar	0.35
2	09 C	Saraswoti Lamichhane	0.3
3	09 C	Mohan Limbu	5
4	09 C	Madan Darjee	0.25
5	09 C	Nir Bdr. Darjee	0.2
6	09 A - 09 B	Padam Bdr. Shrestha	6
7	09 A - 09 B	Nirajan Nepali	1
8	09 A - 09 B	Ganesh Bdr. Poudel	50
9	09 A - 09 B	Sharan Kumar Darjee	3
10	05 A - 05 B	Dil Bdr. Mahat	0.5
11	05 A - 05 B	Sukamaya B.K.	20
12	05 A - 05 B	Bhupal Mahat	0.5
13	05 A - 05 B	Prakash Mahat	0.5

S.N.	PRTW	Name of Landowner	Ailani Land in Kattha
14	05 A - 05 B	Ramesh Karki	0.55
15	03	Kiran Devi Rai	7
16	03	Rajkumar Shrestha	8
17	03	Dudhraj Basnet	12
18	03	Bhim Pd. Lawati	20
19	03	Anita Tamang	7
20	03	Dhirendra Kumar Shrestha	5
21	03	Bhim Bdr. Khadka	10

West Rapti - Details of landowners and land parcels owned

A) Private Landowners

S.N.	PRTW No	Landowners	Total Land in Kattha	District	GP/NP	Ward No.	Village/ Location
1	01	Dukhiram Chaudhari	20	Dang	Gadhawa	2	Mahadeva
2	01	Gyan Prasad Chaudhari	54	Dang	Gadhawa	2	Mahadeva
3	01	Jagani Chaudhari	15.6	Dang	Gadhawa	2	Kothari
4	01	Sagani Chaudhari	6	Dang	Gadhawa	2	Kothari
5	01	Chhoteram Chaudhari	8	Dang	Gadhawa	2	Pachaha
6	01	Theman Prasad Chaudhari	9	Dang	Gadhawa	2	Pachaha
7	01	Shyam Raj Chaudhari	60	Dang	Gadhawa	2	Pachaha
8	01	Brij Nanda Chaudhari	9	Dang	Gadhawa	2	Pachaha
9	01	Rukmaniya Chaudhari	7	Dang	Gadhawa	2	Kothari
10	01	Sarpal Chaudhari	22	Dang	Gadhawa	2	Kothari
11	07-08	Pujaram Chaudhari	40	Dang	Rapti Sonari	2	Kachanapur
12	07-08	Bhagilal, Kulram, Kali Prasad Tharu	19	Dang	Rapti Sonari	2	Kachanapur
13	01	Bhoj Raj Chaudhari	28.2	Dang	Gadhawa	2	Pachaha
14	01	Narendra Kumar Chaudhari	200	Dang	Gadhawa	2	Pachaha
15	01	Dev Prasad Chaudhari	17	Dang	Gadhawa	2	Kothari
16	01	Asaram Chaudhari	18	Dang	Gadhawa	2	Kothari
17	01	Khusiram Chaudhari	21	Dang	Gadhawa	2	Kothari
18	01	Jayarkhan Chaudhari	24	Dang	Gadhawa	2	Mahadeva
19	01	Guru Prasad Chaudhari	17	Dang	Gadhawa	2	Mahadeva
20	01	Kaliram Chaudhari	1.4	Dang	Gadhawa	2	Mahadeva
21	02	Kanhaiya Lal Chaudhari	22	Dang	Gadhawa	4	Khadagpur
22	02	Bodhi Lal Chaudhari	35	Dang	Gadhawa	4	Khadagpur
23	02	Rajaram Chaudhari	36.4	Dang	Gadhawa	4	Khadagpur
24	02	Ram Gopal Chaudhari	52.6	Dang	Lamahi	2	Chhigatpur
25	03	Hiramani Chaudhari	16.4	Dang	Gadhawa	5	Prasiya
26	02	Rajendra Pd. Chaudhari	292	Dang	Gadhawa	4	Khadagpur
27	06	Sukadevi Chaudhari	20	Dang	Gadhawa	7	Kanchhi Gaun
28	06	Basanta Dangi	17.6	Dang	Gadhawa	7	Jharbaira
29	01	Laxmi Prasad Chaudhari	9	Dang	Gadhawa	2	Pachaha
30	01	Paradeshi Chaudhari	11	Dang	Gadhawa	2	Pachaha
31	01	Shree Ram Chaudhari	15	Dang	Gadhawa	2	Pachaha
32	01	Mahesh Kumar Chaudhari	80	Dang	Gadhawa	2	Pachaha
33	01	Phiriya Chaudhari	5	Dang	Gadhawa	2	Kothari
34	01	Prithvi Raj Chaudhari	10	Dang	Gadhawa	2	Kothari

S.N.	PRTW No	Landowners	Total Land in Kattha	District	GP/NP	Ward No.	Village/ Location
35	01	Ram Prasad Chaudhari	19	Dang	Gadhawa	2	Kothari
36	01	Ram Nath Chaudhari	14	Dang	Gadhawa	2	Mahadeva
37	01	Thagilal Chaudhari	2	Dang	Gadhawa	2	Mahadeva
38	02	Tilak Chaudhari	303	Dang	Gadhawa	4	Khadagpur
39	02	Kali Prasad Chaudhari	35	Dang	Gadhawa	4	Khadagpur
40	02	Shiva Narayan Chaudhari	19	Dang	Gadhawa	4	Khadagpur
41	02	Khusal Ram Chaudhari	40	Dang	Lamahi	2	Chhigatpur
42	03	Dash Chaudhari	130	Dang	Gadhawa	5	Lokharpur
43	06	Tularam Chaudhari	32.6	Dang	Gadhawa	7	Kanchhi Gaun
44	01	Bir Prasad Chaudhari	7	Dang	Gadhawa	2	Pachaha
45	01	Shiva Devi Chaudhari	34	Dang	Gadhawa	2	Pachaha
46	02	Prameshwori Devi Chaudhari	20	Dang	Gadhawa	4	Khadagpur
47	03	Thagu Chaudhari	18	Dang	Gadhawa	5	Prasiya
48	06	Shovaram Chaudhari	30	Dang	Gadhawa	7	Kanchhi Gaun
49	06	Laxman Chaudhari	56	Dang	Gadhawa	7	Kanchhi Gaun
50	07-08	Khushiram Tharu	40	Dang	Rapti Sonari	2	Kachanapur
51	07-08	Shanti Tharuni	15	Dang	Rapti Sonari	2	Kachanapur
52	07-08	Sundar Lal Tharu	18	Dang	Rapti Sonari	2	Kachanapur
53	01	Ramsworup Chaudhari	30	Dang	Gadhawa	2	Mahadeva
54	01	Hari Lal Chaudhari	30	Dang	Gadhawa	2	Kothari
55	01	Rajaram Chaudhari	20.2	Dang	Gadhawa	2	Kothari
56	01	Bidesh Chaudhari	45	Dang	Gadhawa	2	Pachaha
57	01	Dosh Haran Chaudhari	50	Dang	Gadhawa	2	Pachaha
58	01	Gokul Prasad Chaudhari	75	Dang	Gadhawa	2	Pachaha
59	01	Shyam Kishor Chaudhari	31.6	Dang	Gadhawa	2	Pachaha
60	01	Pradeshi Chaudhari	21.6	Dang	Gadhawa	2	Kothari
61	01	Kram Bdr. Chaudhari	7	Dang	Gadhawa	2	Kothari
62	01	Shiva Kumari Chaudhari	12	Dang	Gadhawa	2	Mahadeva
63	02	Hari Narayan Chaudhari	40	Dang	Gadhawa	2	Chhigatpur
64	02	Baikuntha Prasad Chaudhari	30	Dang	Gadhawa	4	Khadagpur
65	02	Lahanu Chaudhari	3.2	Dang	Gadhawa	4	Khadagpur
66	03	Jel Prasad Chaudhari	50	Dang	Gadhawa	5	Lokharpur
67	06	Girdhari Chaudhari	32	Dang	Gadhawa	7	Kanchhi Gaun
68	07-08	Prem Lal Chaudhari	12	Dang	Rapti Sonari	2	Kachanapur
69	01	Ganesh Chaudhari	3.4	Dang	Gadhawa	2	Kothari
70	01	Shuka Dev Chaudhari	4.4	Dang	Gadhawa	2	Kothari
71	01	Lalata Chaudhari	5.8	Dang	Gadhawa	2	Pachaha
72	01	Labaru Chaudhari	0.4	Dang	Gadhawa	2	Kothari
73	01	Ram Karan Chaudhari	2.4	Dang	Gadhawa	2	Kothari
74	01	Shiva Kumar Chaudhari	1	Dang	Gadhawa	2	Kothari
75	01	Dubaru Chaudhari	3.2	Dang	Gadhawa	2	Mahadeva
76	01	Paltu Chaudhari	3	Dang	Gadhawa	2	Mahadeva
77	01	Ram Lakhan Chaudhari	9.8	Dang	Gadhawa	2	Mahadeva
78	01	Dukhiram Chaudhari	12.4	Dang	Gadhawa	2	Pachaha
79	01	Prem Kumar Chaudhari	14	Dang	Gadhawa	2	Pachaha
80	01	Prem Lal Chaudhari	2	Dang	Gadhawa	2	Pachaha
81	02	Dukhiram Chaudhari	85.2	Dang	Gadhawa	4	Khadagpur

S.N.	PRTW No	Landowners	Total Land in Kattha	District	GP/NP	Ward No.	Village/ Location
82	02	Shivahari Chaudhari	29.6	Dang	Gadhawa	4	Khadagpur
83	02	Bishnumati Chaudhari	20	Dang	Gadhawa	4	Khadagpur
84	03	Krishna Kumar Chaudhari	18	Dang	Gadhawa	5	Lokharpur
85	06	Sujita Chaudhari	83.2	Dang	Gadhawa	7	Kanchhi Gaun
86	06	Kesh Kumar Chaudhari	80	Dang	Gadhawa	7	Kanchhi Gaun
87	06	Ram Pati Chaudhari	320	Dang	Gadhawa	7	Kanchhi Gaun
88	07-08	Prem, Sushil, Sudhir and Surendra Bhandari	440	Dang	Rapti Sonari	2	Kachanapur
89	07-08	Keshab Raj Poudel	500	Dang	Rapti Sonari	2	Kachanapur

B) Households having Ailani Land in Construction Sites

S.N	PRTW No.	Name of Land Owner	Total Land Owned in Kattha	District	GP/NP	Ward No	Village /Place
1	03	Dhana Bdr. Chaudhari	17	Dang	Gadhawa	5	Prasiya
2	03	Phaguram Chaudhari	15	Dang	Gadhawa	5	Prasiya
3	03	Ramesh Chaudhari	18	Dang	Gadhawa	5	Prasiya
4	03	Bhojram Chaudhari	17	Dang	Gadhawa	5	Prasiya
5	03	Kalu Chaudhari	15	Dang	Gadhawa	5	Prasiya
6	03	Dhotiram Chaudhari	15	Dang	Gadhawa	5	Prasiya
7	03	Guruji Chaudhari	15	Dang	Gadhawa	5	Prasiya
8	03	Deumayi Chaudhari	15	Dang	Gadhawa	5	Prasiya
9	07-08	Sahayab Din Tharu	26	Dang	Gadhawa	5	Prasiya
10	07-08	Lal Bdr. Tharu	8	Dang	Gadhawa	5	Prasiya
11	03	Chandra Pd. Chaudhari	12	Dang	Gadhawa	5	Prasiya
12	03	Krishna Chaudhari	10	Dang	Gadhawa	5	Prasiya
13	03	Dukhiram Chaudhari	3	Dang	Gadhawa	5	Prasiya
14	03	Deu Kumari Chaudhari	15	Dang	Gadhawa	7	Kanchhi Gaun
15	03	Hema Chaudhari	15.4	Dang	Gadhawa	7	Kanchhi Gaun
16	03	Puran Lal Chaudhari	16	Dang	Rapti Sonari	2	Kachanapur
17	03	Ram Lal Chaudhari	36	Dang	Rapti Sonari	2	Kachanapur
18	03	Tularam Chaudhari	25	Dang	Rapti Sonari	2	Kachanapur
19	03	Shir Bdr. Chaudhari	7	Dang	Gadhawa	2	Mahadeva
20	03	Lahiya Chaudhari	16	Dang	Gadhawa	2	Kothari
21	03	Ramu Chaudhari	17	Dang	Gadhawa	2	Kothari
22	03	Indra Prasad Chaudhari	15.6	Dang	Gadhawa	2	Pachaha
23	03	Ganga Prasad Chaudhari	10	Dang	Gadhawa	2	Pachaha
24	03	Aasha Chaudhari	11	Dang	Gadhawa	2	Pachaha
25	03	Arjun Chaudhari	7	Dang	Gadhawa	2	Pachaha
26	03	Rajman Chaudhari	8	Dang	Gadhawa	2	Kothari
27	03	Ram Shankar Chaudhari	27	Dang	Gadhawa	2	Kothari
28	03	Santosh Chaudhari	31	Dang	Gadhawa	2	Mahadeva
29	03	Sitaram Chaudhari	26	Dang	Gadhawa	2	Chhigatpur
30	03	Om Prakash Chaudhari	23	Dang	Gadhawa	4	Khadagpur
31	03	Hari Prasad Chaudhari	16	Dang	Gadhawa	4	Khadagpur
32	03	Hari Charan Chaudhari	17	Dang	Gadhawa	5	Prasiya
33	03	Kali Ram Chaudhari	22	Dang	Gadhawa	5	Prasiya

S.N	PRTW No.	Name of Land Owner	Total Land Owned in Kattha	District	GP/NP	Ward No	Village /Place
34	03	Purna Bdr. Chaudhari	16	Dang	Gadhawa	5	Prasiya
35	03	Kallu Chaudhari	26	Dang	Gadhawa	5	Prasiya
36	03	Aasha Ram Chaudhari	18	Dang	Gadhawa	5	Prasiya
37	03	Laiparan Chaudhari	25	Dang	Gadhawa	5	Prasiya
38	03	Buddhi Ram Chaudhari	34	Dang	Gadhawa	5	Prasiya
39	03	Bharat Mani Chaudhari	16	Dang	Gadhawa	5	Prasiya
40	03	Laxman Chaudhari	5	Dang	Gadhawa	5	Prasiya
41	03	Shree Ram Chaudhari	20	Dang	Gadhawa	5	Prasiya
42	03	Prasadu Chaudhari	10.8	Dang	Gadhawa	5	Prasiya
43	03	Lal Bdr. Chaudhari	12.6	Dang	Gadhawa	5	Lokharpur
44	03	Bal Bdr. Chaudhari	13	Dang	Gadhawa	5	Prasiya
45	03	Hari Lal Chaudhari	18	Dang	Gadhawa	5	Prasiya
46	03	Dukhiram Chaudhari	13	Dang	Gadhawa	5	Prasiya
47	03	Bhojlal Chaudhari	14	Dang	Gadhawa	7	Kanchhi Gaun
48	03	Gyan Bdr. Chaudhari	10	Dang	Rapti Sonari	2	Kachanapur
49	03	Asaram Chaudhari	22	Dang	Gadhawa	2	Kothari
50	03	Manirami Chaudhari	20	Dang	Gadhawa	2	Kothari
51	03	Pateshwori Chaudhari	35	Dang	Gadhawa	2	Pachaha
52	03	Ishru Chaudhari	13	Dang	Gadhawa	2	Kothari
53	03	Madhu Chaudhari	18	Dang	Gadhawa	2	Kothari
54	03	Jallu Chaudhari	16.8	Dang	Gadhawa	2	Kothari
55	03	Hariram Chaudhari	18	Dang	Gadhawa	2	Mahadeva
56	03	Bhagmani Chaudhari	21	Dang	Gadhawa	2	Mahadeva
57	03	Lalawa Chaudhari	20.2	Dang	Gadhawa	2	Mahadeva
58	03	Shyam Bdr. Chaudhari	16	Dang	Gadhawa	2	Pachaha
59	03	Bhagmani Chaudhari	11.2	Dang	Gadhawa	2	Pachaha
60	03	Mangal Prasad Chaudhari	15	Dang	Gadhawa	2	Pachaha
61	03	Balak Ram Chaudhari	17	Dang	Gadhawa	4	Khadagpur
62	03	Chetram Chaudhari	13	Dang	Gadhawa	4	Khadagpur
63	03	Hirman Chaudhari	18	Dang	Gadhawa	4	Khadagpur
64	03	Kalluram Chaudhari	10	Dang	Gadhawa	5	Prasiya
65	03	Phahari Chaudhari	9	Dang	Gadhawa	5	Prasiya
66	03	Min Bdr. BC	40	Dang	Gadhawa	5	Prasiya
67	03	Dhruba Bdr. BC	15	Dang	Gadhawa	5	Lokharpur
68	03	Parema Chaudhari	15	Dang	Gadhawa	5	Prasiya
69	03	Shukku Chaudhari	15	Dang	Gadhawa	5	Prasiya
70	03	Sukhiram Chaudhari	15	Dang	Gadhawa	5	Prasiya
71	03	Satguru Chaudhari	15	Dang	Gadhawa	5	Prasiya
72	03	Chitamani Chaudhari	15	Dang	Gadhawa	5	Prasiya
73	03	Madhu Chaudhari	15	Dang	Gadhawa	5	Prasiya
74	03	Tara BC	40	Dang	Gadhawa	5	Prasiya
75	03	Yam Bdr. Chaudhari	12	Dang	Gadhawa	5	Prasiya
76	03	Saniram Chaudhari	10	Dang	Gadhawa	5	Prasiya
77	03	Bhagmani Chaudhari	11	Dang	Gadhawa	5	Prasiya
78	03	Devabhumi Chaudhari	12	Dang	Gadhawa	5	Prasiya
79	03	Mahabir Chaudhari	12	Dang	Gadhawa	5	Prasiya
80	03	Tulasi Ram Chaudhari	10	Dang	Gadhawa	5	Prasiya
81	07-08	Dhanabir Thapa	25	Dang	Gadhawa	5	Lokharpur

Bakraha - Details of landowners and land parcels owned

S.N.	Affect Type	Parcel No	Name of Respondent	Ailani in Kattha	Private Kattha	Total Kattha	sq.m	Area Required Sq m	% of Land Loss
1	Private	430,426,298,397, 301, 296,40	Sanjaya Kumar Yadav	0	40	40	13520	426.22	3.15
2	Private	17,19,21,24,26,77,4, 28,75	Bagalal Amat	0	40	40	13520	1717.58	12.70
3	Private	304,306,309,285,10 0,185,84,86223	Manmohan Singh Ganagai	0	110	110	37180	1585.26	4.26
4	Private		Kishan Prasad Amat	0	14	14		NA	
5	Private	343443483,51,410	Sanoth Kumar Yadav	0	40	40	13520	1060.11	7.84
6	Private	355	Binod Kumar Yadav	0	88.9	88.9	30048.2	NA	
7	Private/Ailani	446,441,38, 300, 411	Sachida Nanda Yadav	10.5	60	70.5		NA	
8	Private/Ailani	3832,08,369	Om Prakash Yadav	5	53.35	58.35	19722	141.16	0.72
9	Private		Singeshwor Singh	0	110	110	37180	699.66	1.88
10	Private/Ailani	1,46,231	Lalit Prasad Yadav	31	131.85	162.85	55060	149.95	0.27
11	Private/Ailani	1831953,46,347	Sanjeev Kumar Yadav	15	60	75		NA	
12	Private/Ailani	27,127	Surendra Lingden	5	80	85	28730	871.25	3.03
13	Private	2,19,221	Ganesh Bdr. Basnet+Dal Bdr	0	38	38	12844	75.58	0.59
14	Private	19,103	Saulen Lingden	0	24	24	8112	380.24	4.69
15	Private	32	Krishna Kumar Lama	0	102.65	102.65	34712.6	306.16	0.88
16	Private		Ganesh Bdr. Basnet	0	45.4	45.4		NA	
17	Private/Ailani	1411,42,146	Sharmila Sewa	50	34	84	28392	830.79	2.93
18	Private	1,40,144	Sharmila Sewa	0	7.5	7.5	2535	451.01	17.79
19	Private/Ailani	108,96	Sharmila Rimal	20	21.05	41.05	13874.9	926.01	6.67
20	Private	80	Pushpa Bdr Thapa	0	31.25	31.25	10562.5	254.88	2.41
21	Private	7	Jagannath Kuikel	0	27	27	2366	1428.98	60.40
22	Private	501	Tej Bdr. Dhimal	0	4.5	4.5	1521	604.68	39.76
23	Private	336	Lok Prasad Bhattarai	0	14	14	4732	275.11	5.81
24	Private/Ailani		Dal Bdr. Rana Magar	23	0	23			

S.N.	Affect Type	Parcel No	Name of Respondent	Ailani in Kattha	Private Kattha	Total Kattha	sq.m	Area Required Sq m	% of Land Loss
25	Private/Ailani		Dhana Kumari B.K.	10	38	48			
26	Private/Ailani		Ram Bdr. Rana Magar	23	5	28			
27	Ailani		Tara Kumar Kurungbang	7	0	7			
28	Private/Ailani		Lila Bdr. Shrestha	10	1	11			
29	Ailani		Singha Bdr. Rai	18	0	18			
30	Ailani		Man Bdr. Limbu	25	0	25			
31	Ailani		Dal Bdr. Lawati	20	0	20			
32	Ailani		Bishnu Kumar Pyangu	15	0	15			
33	Private/Ailani		Rita Pariyar	27	40	67			
34	Ailani		Dambar Payangu	15	0	15			
35	Ailani		Tika Bdr. Jogi	4	0	4			
36	Ailani		Manju Dhimal	15	0	15			
37	Ailani		Kamal Maya Limbu	8	0	8			
38	Ailani		Jamuna Kurumbang	10	0	10			
39	Ailani		Tek Bdr. Limbu	5	0	5			
40	Private/Ailani		Gyanendra Lawati	20	3	23			
41	Private/Ailani		Dil Kumar Chemjong	22	2	24			
42	Private/Ailani		Ganesh Kumar Shrestha	20	5	25			
43	Private/Ailani		Ram Prasad Dhimal	16	4	20			
44	Private/Ailani		Dal Bdr. Limbu	20	2	22			
45	Ailani		Chandra Bdr. Limbu	20	0	20			
46	Private/Ailani		Lek Bdr. Shrestha	40	30	70			
47	Ailani		Devananda Limbu	20	0	20			
48	Ailani		Tara Devi Katuwal	30	0	30			
49	Private/Ailani		Kushmamaya Shrestha	8	1	9			
50	Ailani		Mani Kumar Kerung	22	0	22			

S.N.	Affect Type	Parcel No	Name of Respondent	Ailani in Kattha	Private Kattha	Total Kattha	sq.m	Area Required Sq m	% of Land Loss
51	Private/Ailani		Tika Dhwoj Chemjung	30	5	35			
52	Private/Ailani		Surya Bdr. Lawati	20	0.5	20.5			
53	Private/Ailani		Lok Bdr. Thapa	15	10	25			

Lakhandehi Households having Land at embankment Sites

S.N.	PRTW	Name of Landowner	Name of Location	Land Owned (in Kattha)
1	08	Chhatiya Devi Kumar	Kachhadiya	31.00
2	01	Bhumika Shrestha	Pattharkot	3.00
3	08	Uga Kumar	Kachhadiya	9.00
4	01	Chandra Bdr. Shrestha	Pattharkot	13.45
5	01	Surendra Kr. Shrestha	Pattharkot	7.00
6	01	Hem Bdr. Shrestha	Pattharkot	12.00
7	08	Ram Prasad Shrestha	Kachhadiya	28.50
8	01	Shiva Prasad Timalsina	Jiyajor	1.00
9	08	Raj Narayan Kumar	Kacchariya	23.00
10	01	Balaram Shrestha	Pattharkot	0.35
11	08	Dukhiya Devi Kumar	Kachhadiya	200.00
12	01	Bishnu Maya Timalsina	Jiyajor	25.00
13	01	Gokarna Bdr. Shrestha	Pattharkot	18.00
14	01	Shankar Timalsina	Pattharkot	4.25
15	08	Jugni Devi Kumar	Kachhadiya	2.50
16	01	Sheer Bdr. Majhi	Jiyajor	10.00
17	01	Talim Bdr. Guramchhan	Syangwa Danda	75.00
18	01	Krishna Das Shrestha	Pattharkot	20.00
19	01	Lal Bdr. Moktan	Pattharkot	10.00
20	01	Manbir Majhi	Pattharkot	24.00
21	01	Gyan Bdr. Majhi	Jiyajor	25.50
22	01	Jit Narayan Shrestha	Pattharkot	15.00
23	01	Bishnu Maya Yonjan	Pattharkot	0.40
24	01	Chakra Bdr. Shrestha	Pattharkot	7.00
25	01	Buddhi Bdr. Pariyar	Pattharkot	12.50
26	01	Narayan Das Shrestha	Pattharkot	10.00
27	01	Bhim Bdr. Majhi	Pattharkot	40.00
28	01	Rup Bdr. Thing	Pattharkot	70.00
29	01	Babu Lal Majhi	Jiyajor	4.40
30	01	Bishnu Majhi	Jiyajor	7.00
31	01	Man Bdr. Katuwal	Pattharkot	15
32	01	Chandra Dev Shrestha	Pattharkot	12.00
33	01	Tek Bdr. Majhi	Jiyajor	3.50
34	01	Hari Bdr. Timalsina	Jiyajor	3.00
35	01	Keshab Prasad Timalsina	Bahuni Danda	20.00
36	01	Khadag Man Lama	Jiyajor	0.75
37	01	Santabir Majhi	Jiyajor	17.00
38	01	Chanamaya Majhi	Jiyajor	1.60
39	01	Ram Bdr. Moktan	Jiyajor	9.00
40	01	Man Bdr. Shrestha	Jiyajor	8.00

S.N.	PRTW	Name of Landowner	Name of Location	Land Owned (in Kattha)
41	01	Dayawati Majhi	Lalbandi	3.50
42	01	Raju Bardewa	Lalbandi	3.00
43	01	Lal Bdr. Ghising	Lalbandi	13.00
44	01	Dhogbir Majhi	Lalbandi	7.00
45	01	Purna Majhi	Lalbandi	2.00
46	01	Shree Lal Majhi	Lalbandi	11.00
47	01	Rajman Majhi	Lalbandi	2.00
48	01	Dil Bdr. Majhi	Lalbandi	12.00
49	01	Man Bdr. Majhi	Lalbandi	40.00
50	01	Chandra Bdr. Majhi	Lalbandi	16.00
51	01	Bishnu Majhi	Lalbandi	36.00

Appendix-6. Estimation of Loss of Income by Affected HHs

Mohana Khutiya -Estimation of Loss of Income by Affected HHs

PRTW	Name of Landowner	Total Land Owned (Kattha)	Avg. Annual Income	Income from Farming	Income Loss due to Project	% loss of Total Income
02	Jaggu Dagaura	2	130000	10000	776	0.60
02	Kabir Bhagat	4.2	213000	0	0	0.00
02	Bhangiram Dagaura	7	185000	50000	3879	2.10
02	Harguhi Dagaura	8	270000	50000	3879	1.44
02	Phakuram Dagaura	16.6	170000	75000	5819	3.42
02	Dhaniram Chaudhari	18	340000	100000	7759	2.28
02	Nanda Lal Rana	15.4	295000	100000	7759	2.63
02	Buddhi Ram Chaudhari	42	265000	110000	8534	3.22
02	Bhakta Ram Chaudhari	44	301000	80000	6207	2.06
02	Banda Chaudhari	64	310000	90000	6983	2.25
02	Phulpati Dagaura	143	225000	225000	17457	7.76
03	Lautan Chaudhari	0.6	130000	10000	776	0.60
03	Aashish Rana	0.6	90000	0	0	0.00
03	Sante Kami	1	120000	0	0	0.00
03	Man Bdr. Gurung	1	180000	0	0	0.00
03	Rabi Lal Chaudhari	1.6	302000	2000	663	0.22
03	Lal Bdr. Saud	1.6	158000	8000	2653	1.68
03	Raj Bdr. Chaudhari	4	195000	15000	4975	2.55
03	Sampat Lal Chaudhari	4	190000	35000	11608	6.11
03	Jagat Ram Rana	4	270000	20000	6633	2.46
03	Bandhu Ram Chaudhari	5	160000	10000	3317	2.07
03	Man Bdr. Dagaura	8	195000	20000	6633	3.40
03	Chhotelal Chaudhari	9	340000	60000	19899	5.85
03	Sunita Chaudhari	5.2	190000	30000	9950	5.24
03	Bandhu Ram Chaudhari	5.6	185000	35000	11608	6.27
03	Ram Kumar Chaudhari	4.2	250000	0	0	0.00
03	Bir Bdr. Chaudhari	7.6	217000	22000	7296	3.36
03	Ram Bdr. Chaudhari	5.6	160000	35000	11608	7.25
03	Autoriya Chaudhari	5.6	210000	10000	3317	1.58
03	Phul Chandra Rana	11	150000	0	0	0.00
06	Debendra Saud	2.6	140000	15000	2171	1.55
06	Bahali Rana	4	67000	32000	4632	6.91
06	Jaumati Thapa	4	43000	19000	2750	6.40
06	Chhabilal Saud	4	134000	10000	1448	1.08
06	Dhana Singh Bohora	5	240000	20000	2895	1.21

PRTW	Name of Landowner	Total Land Owned (Kattha)	Avg. Annual Income	Income from Farming	Income Loss due to Project	% loss of Total Income
06	Rasi Rana	5	102000	22000	3185	3.12
06	Dal Bdr. Shah	5	190000	20000	2895	1.52
06	Dirgha Air	6.6	280000	30000	4343	1.55
06	Ishwor Datta Joshi	8	167000	32000	4632	2.77
06	Shahali Rana	8	210000	50000	7238	3.45
06	Harka Bdr. Saud	9	240000	40000	5790	2.41
06	Khadga Bdr. Mahara	10	165000	45000	6514	3.95
06	Dararu Chaudhari	74	480000	200000	28952	6.03
06	Shree Prasad Chaudhari	20	210000	100000	14476	6.89
06	Phulchandra Rana	30	325000	80000	11581	3.56
07	Hukum Bdr. Shahu	1.6	160000	15000	2183	1.36
07	Manu Devi Bohara	5.2	225000	40000	5820	2.59
07	Bhoj Raj Chaudhari	6	365000	80000	11640	3.19
07	Lal Bdr. Bohara	7	172000	32000	4656	2.71
07	Bal Bdr. Jethara	10	250000	50000	7275	2.91
07	Sinha Raj Chaudhari	15	400000	80000	11640	2.91
07	Sanu Ram Rana	15	250000	60000	8730	3.49
07	Sheru Bohara	10.6	260000	40000	5820	2.24
07	Lal Bdr. Chaudhari	10.8	225000	75000	10913	4.85
07	Chamaru Rana	13	180000	55000	8003	4.45
07	Chaudhari Rana	15	153000	53000	7712	5.04
07	Hem Raj Rana	14	335000	60000	8730	2.61
07	Santa Ram Rana	14	130000	50000	7275	5.60
07	Gopal Rana	14	325000	40000	5820	1.79
07	Gopi Ram Rana	43	155000	120000	17460	11.26[30]
10	Deumani Dagaura	57.4	254000	150000	18763	7.39
11A	Sheer Dagaura	3	150000	10000	3335	2.22
11B	Bharat Thapa	2	214000	10000	3159	1.48
11B	Purnaram Chaudhari	11	405000	45000	14217	3.51
11B	Ganesh Bdr. Singh	86	260000	40000	12638	4.86
11B	Harka Bdr. Shaud	39	385000	85000	26855	6.98
13	Asharam Chaudhari	7	220000	40000	4342	1.97

[30]Gopi Ram Rana was identified as losing 11.26% of annual income as a result of donating lands to the project on the embankment. Gopi Ram Rana estimates that this would be the annual crop loss associated with the embankment construction on a portion of his land. Consultation with Gopi confirms that he is nonetheless very interested to donate the strip of land because he will be able to use the remaining land portion all year round instead of on a seasonal basis and therefore expects to increase his annual income. The social Safeguardss due diligence team are satisfied that Gobi will not be impoverished as a result of the donation and will instead improve his livelihood outcomes as a result of the project.

PRTW	Name of Landowner	Total Land Owned (Kattha)	Avg. Annual Income	Income from Farming	Income Loss due to Project	% loss of Total Income
13	Tika Ram Chaudhari	10	286000	46000	4994	1.75
13	Ram Bdr. Chaudhari	10	290000	140000	15199	5.24
13	Bujhauna Dagaura	40	270000	50000	5428	2.01
13	Sujhauna Dagaura	26	295000	35000	3800	1.29
13	Man Bdr. Chaudhari	17	110000	35000	3800	3.45
13	Kadhera Rana	29	250000	60000	6514	2.61

Mawa Ratuwa - Estimated Loss of Income by Affected Households

PRTW No	Respondent Name	Land owned in Katha	Avg. Annual Income	Avg. Annual Income from Farming	Income Loss due to Project	% loss of Total Income
1	Taranath Rajbansi	80	510000	60000	4109	0.81
1	Dukho Devi Rajbansi	15	295000	50000	3424	1.16
1	Harish Chandra Rajbansi	61.6	472000	32000	2192	0.46
1	Bajra Bdr. Basnet	60	459000	75000	5137	1.12
1	Balaram Basnet	20	420000	0	0	0.00
1	Dambar Bdr. Basnet	11.5	424000	124000	8492	2.00
1	Bhagwan Pd. Rajbansi	140	500000	100000	6849	1.37
1	Nara Bdr. Basnet	81.75	474000	70000	4794	1.01
1	Min Pd. Dulal	100	375000	45000	3082	0.82
1	Bandor Badai Sharma	19.75	275000	20000	1370	0.50
2	Tulasa Devi Adhikari	72	330000	90000	5904	1.79
2	Dev Kumari Karki	46.55	420000	90000	5904	1.41
2	Sudan Limbu	20	340000	15000	984	0.29
2	Chandra Kumari Limbu	38	337000	25000	1640	0.49
2	Bishnu Maya Thapa	40	204000	120000	7872	3.86
2	Khem Raj Khadka	10	225000	25000	1640	0.73
2	Bhim Bdr. Khadka	9.85	145000	55000	3608	2.49
2	Rudra Bdr. Katuwal	21.6	270000	70000	4592	1.70
2	Sammi Dhami	5	375000	25000	1640	0.44
2	Bhakta Bdr. Basnet	52	370000	110000	7216	1.95
2	Man Bdr. Katuwal	15	275000	25000	1640	0.60
2	Dil Bdr. Katuwal	125	410000	50000	3280	0.80
2	Lila Devi Gautam	45	305000	35000	2296	0.75
2	Deva Kumar Katuwal	30	472000	40000	2624	0.56
2	Manama Adhikari	27.5	330000	30000	1968	0.60
3	Sabidra Bhandari	40	335000	50000	2896	0.86
3	Dil Kumari Lawati	16.5	280000	20000	1158	0.41

PRTW No	Respondent Name	Land owned in Katha	Avg. Annual Income	Avg. Annual Income from Farming	Income Loss due to Project	% loss of Total Income
3	Prem Lawati	63	155000	35000	2027	1.31
3	Tek Bdr. Limbu	16	330000	30000	1737	0.53
3	Birendra Bohora	26	125000	80000	4633	3.71
3	Gauri Pd. Bohora	33	265000	100000	5791	2.19
3	Kiran Devi Rai	7	370000	35000	2027	0.55
3	Rajkumar Shrestha	8	305000	15000	869	0.28
3	Dudhraj Basnet	12	324000	65000	3764	1.16
3	Bhim Pd. Lawati	20	190000	80000	4633	2.44
3	Anita Tamang	7	340000	20000	1158	0.34
3	Dhirendra Kumar Shrestha	5	150000	50000	2896	1.93
3	Bhim Bdr. Khadka	10	286000	40000	2316	0.81
4	Sanchita Lamsal	9	444000	100000	23409	5.27
4	Yogendra Bdr Karki	54	378000	84000	19664	5.20
4	Sher Bdr. Baniya	55	621000	50000	11705	1.88
4	Mahendra Karki	44	640000	20000	4682	0.73
4	Kalpana Devi Lamsal	7	390000	25000	5852	1.50
05 A - 05B	Jit Maya Angdembu	15.5	260000	50000	9426	3.63
05 A - 05 B	Prem Limbu	6.5	207000	18000	3393	1.64
05 A - 05 B	Mangal Kumari Darnal	10.5	298000	18000	3393	1.14
05 A - 05 B	Sukmaya Chaudhari	4.5	125000	15000	2828	2.26
05 A - 05 B	Dil Bdr. Mahat	0.5	250000	0	0	0.00
05 A - 05 B	Sukamaya B.K.	20	225000	35000	6598	2.93
05 A - 05 B	Bhupal Mahat	0.5	145000	0	0	0.00
05 A - 05 B	Prakash Mahat	0.5	240000	0	0	0.00
05 A - 05 B	Ramesh Karki	0.55	210000	0	0	0.00
07	Chandra Bdr. Rai	4.9	415000	70000	2004	0.48
07	Krishna Bdr. Badaiwa	100	470000	70000	2004	0.43
07	Nanu Baba Shakya	80	354000	10000	286	0.08
07	Tek Bdr. Dahal	43	195000	30000	859	0.44
07	Chhali Maya Rai	29.5	230000	50000	1432	0.62
07	Bhakta Kumar Tamang	96.55	270000	60000	1718	0.64
07	Chakra Bdr. Shrestha	56	158000	40000	1145	0.72
07	Bhim Bdr. Rai	63	430000	80000	2291	0.53
8	Murari Mishra	80	325000	80000	26006	8.00
8	Raj Singh	10	195000	50000	16254	8.34
09 A - 09 B	Tika Ram Poudel	21	189000	65000	8387	4.44
09 A - 09 B	Maniraj Iwa Limbu	48	345000	100000	12903	3.74
09 A - 09 B	Deepak Tamang	11	290000	20000	2581	0.89

PRTW No	Respondent Name	Land owned in Katha	Avg. Annual Income	Avg. Annual Income from Farming	Income Loss due to Project	% loss of Total Income
09 A - 09 B	Harka Bdr. Limbu	31	274000	60000	7742	2.83
09 A - 09 B	Rana Bdr. Adhikari	60	420000	100000	12903	3.07
09 A - 09 B	Chudamani Regmi	42	405000	50000	6452	1.59
09 A - 09 B	Deshu Sauden	45	325000	80000	10323	3.18
09 D	Ambar Bdr. Magar	0.35	235000	10000	1290	0.55
09 C	Saraswoti Lamichhane	0.3	224000	0	0	0.00
09 C	Mohan Limbu	5	240000	15000	1935	0.81
09 C	Madan Darjee	0.25	200000	0	0	0.00
09 C	Nir Bdr. Darjee	0.2	230000	0	0	0.00
09 A - 09 B	Padam Bdr. Shrestha	6	195000	30000	3871	1.99
09 A - 09 B	Nirajan Nepali	1	314000	0	0	0.00
09 A - 09 B	Ganesh Bdr. Poudel	50	470000	80000	10323	2.20
09 A - 09 B	Sharan Kumar Darjee	3	210000	10000	1290	0.61
10	Rana Maya Neupane	58	289000	100000	14347	4.96
012 L	Apsara Devi Nemwang	29.4	178000	130000	3565	2.00
012 L	Harka Maya Bhandari	75	520000	100000	2742	0.53
012 L	Man Bdr. Bhujel	39	145000	100000	2742	1.89
12 L	Nara Kumari Shahi	28.5	380000	30000	823	0.22
12 L	Tulasa Devi Mishra	4	360000	60000	1645	0.46
012 L	Rupa Devi Gautam	108	500000	100000	2742	0.55

West Rapti Estimated Loss of Income by Affected Households

PRTW	Name of Landowner	Total Land Owned (Kattha)	Avg. Annual Income	Income from Farming	Income Loss due to Project	% loss of Total Income
1	Dukhiram Chaudhari	20	305000	75000	5527	1.81
1	Gyan Prasad Chaudhari	54	195000	50000	3685	1.89
1	Jagani Chaudhari	15.6	156000	36000	2653	1.70
1	Sagani Chaudhari	6	170000	20000	1474	0.87
1	Chhoteram Chaudhari	8	325000	40000	2948	0.91
1	Theman Prasad Chaudhari	9	125000	30000	2211	1.77
1	Shyam Raj Chaudhari	60	280000	240000	17686	6.32
1	Brij Nanda Chaudhari	9	175000	25000	1842	1.05
1	Rukmaniya Chaudhari	7	355000	15000	1105	0.31
1	Sarpal Chaudhari	22	220000	40000	2948	1.34
1	Bhoj Raj Chaudhari	28.2	280000	70000	5158	1.84
1	Narendra Kumar Chaudhari	200	400000	200000	14738	3.68
1	Dev Prasad Chaudhari	17	380000	80000	5895	1.55
1	Asaram Chaudhari	18	275000	35000	2579	0.94
1	Khusiram Chaudhari	21	395000	55000	4053	1.03
1	Jayarkhan Chaudhari	24	300000	120000	8843	2.95
1	Guru Prasad Chaudhari	17	268000	112000	8253	3.08
1	Kaliram Chaudhari	1.4	133000	13000	958	0.72
1	Laxmi Prasad Chaudhari	9	425000	20000	1474	0.35

PRTW	Name of Landowner	Total Land Owned (Kattha)	Avg. Annual Income	Income from Farming	Income Loss due to Project	% loss of Total Income
1	Paradeshi Chaudhari	11	280000	60000	4422	1.58
1	Shree Ram Chaudhari	15	140000	35000	2579	1.84
1	Mahesh Kumar Chaudhari	80	320000	80000	5895	1.84
1	Phiriya Chaudhari	5	280000	15000	1105	0.39
1	Prithvi Raj Chaudhari	10	180000	10000	737	0.41
1	Ram Prasad Chaudhari	19	155000	20000	1474	0.95
1	Ram Nath Chaudhari	14	195000	30000	2211	1.13
1	Thagilal Chaudhari	2	186000	6000	442	0.24
1	Bir Prasad Chaudhari	7	89000	54000	3979	4.47
1	Shiva Devi Chaudhari	34	135000	55000	4053	3.00
1	Ramsworup Chaudhari	30	245000	45000	3316	1.35
1	Hari Lal Chaudhari	30	145000	15000	1105	0.76
1	Rajaram Chaudhari	20.2	280000	40000	2948	1.05
1	Bidesh Chaudhari	45	195000	45000	3316	1.70
1	Dosh Haran Chaudhari	50	355000	55000	4053	1.14
1	Gokul Prasad Chaudhari	75	155000	100000	7369	4.75
1	Shyam Kishor Chaudhari	31.6	135000	50000	3685	2.73
1	Pradeshi Chaudhari	21.6	260000	40000	2948	1.13
1	Kram Bdr. Chaudhari	7	205000	25000	1842	0.90
1	Shiva Kumari Chaudhari	12	250000	15000	1105	0.44
1	Ganesh Chaudhari	3.4	366000	42000	3095	0.85
1	Shuka Dev Chaudhari	4.4	265000	45000	3316	1.25
1	Lalata Chaudhari	5.8	205000	35000	2579	1.26
1	Labaru Chaudhari	0.4	400000		0	0.00
1	Ram Karan Chaudhari	2.4	365000	65000	4790	1.31
1	Shiva Kumar Chaudhari	1	275000	15000	1105	0.40
1	Dubaru Chaudhari	3.2	210000		0	0.00
1	Paltu Chaudhari	3	275000		0	0.00
1	Ram Lakhan Chaudhari	9.8	267000	25000	1842	0.69
1	Dukhiram Chaudhari	12.4	280000	35000	2579	0.92
1	Prem Kumar Chaudhari	14	365000	30000	2211	0.61
1	Prem Lal Chaudhari	2	251000	35000	2579	1.03
2	Kanhaiya Lal Chaudhari	22	222000	60000	1351	0.61
2	Bodhi Lal Chaudhari	35	225000	65000	1463	0.65
2	Rajaram Chaudhari	36.4	204000	70000	1576	0.77
2	Ram Gopal Chaudhari	52.6	357000	112000	2521	0.71
2	Rajendra Pd. Chaudhari	292	500000	100000	2251	0.45
2	Tilak Chaudhari	303	350000	50000	1126	0.32
2	Kali Prasad Chaudhari	35	230000	80000	1801	0.78
2	Shiva Narayan Chaudhari	19	180000	50000	1126	0.63
2	Khusal Ram Chaudhari	40	360000	60000	1351	0.38
2	Prameshwori Devi Chaudhari	20	149000	65000	1463	0.98
2	Hari Narayan Chaudhari	40	225000	60000	1351	0.60
2	Baikuntha Prasad Chaudhari	30	255000	45000	1013	0.40
2	Lahanu Chaudhari	3.2	30500	20000	450	1.48
2	Dukhiram Chaudhari	85.2	345000	45000	1013	0.29
2	Shivahari Chaudhari	29.6	280000	55000	1238	0.44
2	Bishnumati Chaudhari	20	230000	45000	1013	0.44
3	Hiramani Chaudhari	16.4	155000	70000	8357	5.39
3	Dash Chaudhari	130	365000	15000	1791	0.49
3	Thagu Chaudhari	18	173000	36000	4298	2.48

PRTW	Name of Landowner	Total Land Owned (Kattha)	Avg. Annual Income	Income from Farming	Income Loss due to Project	% loss of Total Income
3	Jel Prasad Chaudhari	50	385000	65000	7760	2.02
3	Krishna Kumar Chaudhari	18	304000	82000	9789	3.22
3	Dhana Bdr. Chaudhari	17	201000	66000	7879	3.92
3	Phaguram Chaudhari	15	185000	60000	7163	3.87
3	Ramesh Chaudhari	18	185000	55000	6566	3.55
3	Bhojram Chaudhari	17	197000	72000	8596	4.36
3	Kalu Chaudhari	15	176000	61000	7282	4.14
3	Dhotiram Chaudhari	15	220000	55000	6566	2.98
3	Guruji Chaudhari	15	105000	60000	7163	6.82
3	Deumayi Chaudhari	15	132000	42000	5014	3.80
3	Chandra Pd. Chaudhari	12	110000	50000	5969	5.43
3	Krishna Chaudhari	10	184000	20000	2388	1.30
3	Dukhiram Chaudhari	3	187000	10000	1194	0.64
3	Deu Kumari Chaudhari	15	152000	50000	5969	3.93
3	Hema Chaudhari	15.4	180000	30000	3582	1.99
3	Puran Lal Chaudhari	16	210000	50000	5969	2.84
3	Ram Lal Chaudhari	36	145000	30000	3582	2.47
3	Tularam Chaudhari	25	254000	80000	9551	3.76
3	Shir Bdr. Chaudhari	7	190000	20000	2388	1.26
3	Lahiya Chaudhari	16	220000		0	0.00
3	Ramu Chaudhari	17	160000	20000	2388	1.49
3	Indra Prasad Chaudhari	15.6	175000	40000	4775	2.73
3	Ganga Prasad Chaudhari	10	269000	60000	7163	2.66
3	Aasha Chaudhari	11	145000	20000	2388	1.65
3	Arjun Chaudhari	7	130000	20000	2388	1.84
3	Rajman Chaudhari	8	165000	70000	8357	5.06
3	Ram Shankar Chaudhari	27	340000	48000	5730	1.69
3	Santosh Chaudhari	31	200000	40000	4775	2.39
3	Sitaram Chaudhari	26	110000	45000	5372	4.88
3	Om Prakash Chaudhari	23	197000	42000	5014	2.55
3	Hari Prasad Chaudhari	16	154000	55000	6566	4.26
3	Hari Charan Chaudhari	17	175000	70000	8357	4.78
3	Kali Ram Chaudhari	22	242000	42000	5014	2.07
3	Purna Bdr. Chaudhari	16	234000	50000	5969	2.55
3	Kallu Chaudhari	26	290000	90000	10745	3.71
3	Aasha Ram Chaudhari	18	205000	80000	9551	4.66
3	Laiparan Chaudhari	25	260000	60000	7163	2.76
3	Buddhi Ram Chaudhari	34	165000	45000	5372	3.26
3	Bharat Mani Chaudhari	16	202000	42000	5014	2.48
3	Laxman Chaudhari	5	280000	15000	1105	0.39
3	Shree Ram Chaudhari	20	200000	45000	5372	2.69
3	Prasadu Chaudhari	10.8	294000	80000	9551	3.25
3	Lal Bdr. Chaudhari	12.6	215000	60000	7163	3.33
3	Bal Bdr. Chaudhari	13	240000	60000	7163	2.98
3	Hari Lal Chaudhari	18	294000	64000	7641	2.60
3	Dukhiram Chaudhari	13	185000	20000	2388	1.29
3	Bhojlal Chaudhari	14	225000	60000	7163	3.18
3	Gyan Bdr. Chaudhari	10	182000	25000	2985	1.64
3	Asaram Chaudhari	22	220000	60000	7163	3.26
3	Manirami Chaudhari	20	148000	40000	4775	3.23
3	Pateshwori Chaudhari	35	205000	55000	6566	3.20

PRTW	Name of Landowner	Total Land Owned (Kattha)	Avg. Annual Income	Income from Farming	Income Loss due to Project	% loss of Total Income
3	Ishru Chaudhari	13	134000	30000	3582	2.67
3	Madhu Chaudhari	18	266000	30000	3582	1.35
3	Jallu Chaudhari	16.8	115000	25000	2985	2.60
3	Hariram Chaudhari	18	160000	40000	4775	2.98
3	Bhagmani Chaudhari	21	175000	40000	4775	2.73
3	Lalawa Chaudhari	20.2	215000	95000	11341	5.28
3	Shyam Bdr. Chaudhari	16	187000	45000	5372	2.87
3	Bhagmani Chaudhari	11.2	140000	35000	4178	2.98
3	Mangal Prasad Chaudhari	15	173000	25000	2985	1.73
3	Balak Ram Chaudhari	17	130000	25000	2985	2.30
3	Chetram Chaudhari	13	75000	30000	3582	4.78
3	Hirman Chaudhari	18	120000	30000	3582	2.98
3	Kalluram Chaudhari	10	375000	45000	5372	1.43
3	Phahari Chaudhari	9	305000	90000	10745	3.52
3	Min Bdr. BC	40	411000	150000	17908	4.36
3	Dhruba Bdr. BC	15	295000	25000	2985	1.01
3	Parema Chaudhari	15	175000	45000	5372	3.07
3	Shukku Chaudhari	15	200000	45000	5372	2.69
3	Sukhiram Chaudhari	15	160000	35000	4178	2.61
3	Satguru Chaudhari	15	260000	35000	4178	1.61
3	Chitamani Chaudhari	15	265000	45000	5372	2.03
3	Madhu Chaudhari	15	228000	35000	4178	1.83
3	Tara BC	40	260000	120000	14326	5.51
3	Yam Bdr. Chaudhari	12	125000	75000	8954	7.16
3	Saniram Chaudhari	10	260000	45000	5372	2.07
3	Bhagmani Chaudhari	11	285000	65000	7760	2.72
3	Devabhumi Chaudhari	12	370000	70000	8357	2.26
3	Mahabir Chaudhari	12	185000	50000	5969	3.23
3	Tulasi Ram Chaudhari	10	380000	55000	6566	1.73
6	Sukadevi Chaudhari	20	245000	45000	1578	0.64
6	Basanta Dangi	17.6	170000	70000	2455	1.44
6	Tularam Chaudhari	32.6	240000	20000	701	0.29
6	Shovaram Chaudhari	30	220000	80000	2806	1.28
6	Laxman Chaudhari	56	455000	80000	2806	0.62
6	Girdhari Chaudhari	32	205000	55000	1929	0.94
6	Sujita Chaudhari	83.2	286000	45000	1578	0.55
6	Kesh Kumar Chaudhari	80	310000	80000	2806	0.91
6	Ram Pati Chaudhari	320	210000	80000	2806	1.34
07-08	Pujaram Chaudhari	40	195000	175000	14796	7.59
07-08	Bhagilal, Kulram, Kali Prasad Tharu	19	155000	120000	10146	6.55
07-08	Khushiram Tharu	40	270000	100000	8455	3.13
07-08	Shanti Tharuni	15	242000	60000	5073	2.10
07-08	Sundar Lal Tharu	18	422000	60000	5073	1.20
07-08	Prem Lal Chaudhari	12	134000	10000	846	0.63
07-08	Prem, Sushil, Sudhir and Surendra Bhandari	440	250000	250000	21138	8.46
07-08	Keshab Raj Poudel	500	250000	250000	21138	8.46
07-08	Sahayab Din Tharu	26	345000	45000	3805	1.10
07-08	Lal Bdr. Tharu	8	132000	22000	1860	1.41
07-08	Dhanabir Thapa	25	287000	95000	8032	2.80

Bakraha -Estimated Loss of Income by Affected Households

PRTW	Name of Landowner	Total Land Owned (Kattha)	Avg. Annual Income	Income from Farming	Income Loss due to Project	% loss of Total Income
1	Lok Bdr. Thapa	25	210000	40000	2400	1.14
2	Ram Bdr. Rana Magar	28	280000	60000	454	0.16
2	Tara Kumar Kurungbang	7	263000	40000	302	0.11
2	Lila Bdr. Shrestha	11	249000	45000	340	0.14
2	Singha Bdr. Rai	18	204000		0	0.00
2	Man Bdr. Limbu	25	382000	52000	393	0.10
2	Puna Raj Lawati	20	149000	35000	265	0.18
2	Bishnu Kumar Pyangu	15	241000	21000	159	0.07
2	Dhana Bdr. Pariyar	67	299000	65000	491	0.16
2	Dambar Payangu	15	204000	60000	454	0.22
2	Tika Bdr. Jogi	4	170000	25000	189	0.11
2	Kaluram Dhimal	15	289000	50000	378	0.13
2	Kamal Maya Limbu	8	157000	20000	151	0.10
2	Singha Bdr. Kurumbang	10	280000	20000	151	0.05
2	Tek Bdr. Limbu	5	544000	34000	257	0.05
2	Gyanendra Lawati	23	323000	70000	529	0.16
2	Dil Kumar Chemjong	24	390000	65000	491	0.13
2	Ganesh Kumar Shrestha	25	298000	18000	136	0.05
2	Ram Prasad Dhimal	20	370000	70000	529	0.14
2	Eit Maya Lawati	22	175000	80000	605	0.35
2	Chandra Bdr. Limbu	20	345000	60000	454	0.13
2	Lek Bdr. Shrestha	70	499000	130000	983	0.20
2	Devananda Limbu	20	215000	60000	454	0.21
2	Tara Devi Katuwal	30	210000	90000	680	0.32
2	Kushmamaya Shrestha	9	414000	80000	605	0.15
2	Mani Kumar Kerung	22	300000	45000	340	0.11
2	Tika Dhwoj Chemjung	35	189000	62000	469	0.25
2	Surya Bdr. Lawati	20.5	370000	70000	529	0.14
4	Tej Bdr. Dhimal	4.5	237000	17000	2066	0.87
4	Lok Prasad Bhattarai	14	399000		0	0.00
4	Karna Bdr. B.K.	48	222000	50000	6077	2.74
6	Pushpa Bdr Thapa	31.25	144000	20000	9961	6.92
6	Jagannath Kuikel	27	489000		0	0.00
7	Sharmila Rimal	41.05	260000	20000	4331	1.67
8	Sanjaya Kumar Yadav	40	375000	75000	1402	0.37
8	Bagalal Amat	40	242000	52000	972	0.40
8	Manmohan Singh Ganagai	110	490000	145000	2711	0.55

PRTW	Name of Landowner	Total Land Owned (Kattha)	Avg. Annual Income	Income from Farming	Income Loss due to Project	% loss of Total Income
8	Kishan Prasad Amat	14	200000	80000	1496	0.75
8	Sanoth Kumar Yadav	40	225000	100000	1870	0.83
8	Binod Kumar Yadav	88.9	350000	50000	935	0.27
8	Sachida Nanda Yadav	70.5	580000	100000	1870	0.32
8	Om Prakash Yadav	58.35	300000	150000	2805	0.93
8	Singeshwor Singh	110	460000	100000	1870	0.41
8	Lalit Prasad Yadav	162.9	440000	120000	2244	0.51
8	Sanjeev Kumar Yadav	75	245000	200000	3740	1.53
9	Surendra Lingden	85	500000	80000	11455	2.29
9	Ganesh Bdr. Basnet+Dal Bdr	38	270000	50000	7159	2.65
9	Saulen Lingden	24	390000	70000	10023	2.57
9	Krishna Kumar Lama	102.7	432000	180000	25773	5.97
9	Ganesh Bdr. Basnet	45.4	397000	120000	17182	4.33
9	Sharmila Sewa	84	504000	80000	11455	2.27
9	Sharmila Sewa	7.5	220000	20000	2864	1.30
9	Dal Bdr. Rana Magar	23	214000	80000	11455	5.35

Lakhandehi Estimated Loss of Income by Affected Households

PRTW No	Respondent Name	Land owned in Katha	Avg. Annual Income	Avg. Annual Income from Farming	Income Loss due to Project	% loss of Total Income
1	Bhumika Shrestha	3	215000	50000	218	0.10
1	Chandra Bdr. Shrestha	13.45	325000	75000	327	0.10
1	Surendra Kr. Shrestha	7	268000	65000	283	0.11
1	Hem Bdr. Shrestha	12	244000	54000	235	0.10
1	Shiva Prasad Timalsina	1	353000	10000	44	0.01
1	Balaram Shrestha	0.35	315000	15000	65	0.02
1	Bishnu Maya Timalsina	25	104000	45000	196	0.19
1	Gokarna Bdr. Shrestha	18	299000	120000	523	0.17
1	Shankar Timalsina	4.25	345000	50000	218	0.06
1	Sheer Bdr. Majhi	10	374000	90000	392	0.10
1	Talim Bdr. Guramchhan	75	479000	120000	523	0.11
1	Krishna Das Shrestha	20	320000	100000	436	0.14
1	Lal Bdr. Moktan	10	300000	100000	436	0.15
1	Manbir Majhi	24	214000	60000	261	0.12
1	Gyan Bdr. Majhi	25.5	210000	100000	436	0.21
1	Jit Narayan Shrestha	15	250000	90000	392	0.16
1	Bishnu Maya Yonjan	0.4	282000	30000	131	0.05
1	Chakra Bdr. Shrestha	7	430000	85000	370	0.09
1	Buddhi Bdr. Pariyar	12.5	265000	35000	152	0.06
1	Narayan Das Shrestha	10	245000	65000	283	0.12
1	Bhim Bdr. Majhi	40	266000	35000	152	0.06
1	Rup Bdr. Thing	70	255000	55000	240	0.09
1	Babu Lal Majhi	4.4	385000	50000	218	0.06
1	Bishnu Majhi	7	333000	70000	305	0.09
1	Chandra Dev Shrestha	12	227000	50000	218	0.10
1	Tek Bdr. Majhi	3.5	375000	55000	240	0.06
1	Hari Bdr. Timalsina	3	375000	45000	196	0.05
1	Keshab Prasad Timalsina	20	525000	100000	436	0.08
1	Khadag Man Lama	0.75	270000	100000	436	0.16
1	Santabir Majhi	17	275000	50000	218	0.08
1	Chanamaya Majhi	1.6	310000	50000	218	0.07
1	Ram Bdr. Moktan	9	358000	100000	436	0.12
1	Man Bdr. Shrestha	8	343000	20000	87	0.03
1	Janga Bdr. Majhi	30	205000	45000	196	0.10
1	Dayawati Majhi	3.5	205000	60000	261	0.13
1	Raju Bardewa	3	292000	22000	96	0.03
1	Lal Bdr. Ghising	13	288000	40000	174	0.06
1	Dhogbir Majhi	7	218000	60000	261	0.12
1	Purna Majhi	2	255000	55000	240	0.09
1	Shree Lal Majhi	11	167000	45000	196	0.12

PRTW No	Respondent Name	Land owned in Katha	Avg. Annual Income	Avg. Annual Income from Farming	Income Loss due to Project	% loss of Total Income
1	Rajman Majhi	2	369000	55000	240	0.06
1	Dil Bdr. Majhi	12	139000	60000	261	0.19
1	Man Bdr. Majhi	40	106000	40000	174	0.16
1	Chandra Bdr. Majhi	16	220000	75000	327	0.15
1	Bishnu Majhi	36	389000	20000	87	0.02
8	Chhatiya Devi Kumar	**31**	304000	124000	412	0.14
8	Uga Kumar	**9**	185000	55000	183	0.10
8	Ram Prasad Shrestha	**28.5**	500000	45000	150	0.03
8	Raj Narayan Kumar	**23**	260000	60000	200	0.08
8	Dukhiya Devi Kumar	**200**	305000	15000	50	0.02
8	Jugni Devi Kumar	**2.5**	322000	22000	73	0.02

Appendix-7: Project Screening Checklist for Involuntary Resettlement

Probable Involuntary Resettlement Effects	Yes	No	Not Known	Remarks
Involuntary Acquisition of Land				
1. Will there be land acquisition?		√		The project does not involve any land acquisition. The project's construction works involve embankment construction in different sections to protect the cultivation land and settlements.
2. Is the site for land acquisition known?		√		No land acquisition involved
3. Is the ownership status and current usage of land to be acquired known		√		There are no land acquisition of resettlement impacts
4. Will easement be utilized within an existing Right of Way		√		All the activities will be carried out in construction sites
1. Will there be losses of shelter and residential land due to land acquisition?		√		
2. Will, there be loss of Agriculture and other productive assets due to land acquisition		√		
3. Will, there be losses of crops, trees, and fixed assets due to land acquisition		√		
4. Will the be losses of business or enterprises due to land acquisition?		√		
5. Will there be losses of income sources and means of livelihood due to land acquisition?		√		
Involuntary Restrictions on Land Use or on Access to Legally Designated Parks and Protected Areas				
6. Will people lose access to natural resources, communal facilities, and services?		√		
7. Will land use is changed, will it have an adverse impact on social and economic activities?		√		
8. Will access to land and resources owned community or by the state be restricted		√		
Information on displaced persons:				
Any estimate of the likely number of persons that will be displaced by the project? [ ] No [ ] Yes If yes, approximately how many? Not applicable as no one will be relocated				
Are any of the poor, female heads of house, or vulnerable to poverty risk? [ ] No [ ] Yes				
Are any displaced persons from Indigenous or ethnic community groups? [ ] No [ ] Yes				

Appendix -8: Project Screening Checklist for Indigenous People

Key Concerns (Please provide elaborations on the remarks column)	Yes	No	Not Known	Remarks
B. Indigenous People Identification				
1. Are there socio-cultural groups present in or use the project area who may be considered as "tribes" (hill tribes, schedule tribes, tribal peoples), "minorities (ethnic or national minorities or cultural community?	√			There are ethnic minority groups mainly known as Thru and Chaudhari in the location of construction sites.
2. Are there national or local laws or policies as well as anthropological research/studies that consider these groups present in or using the project area as belonging to "ethnic minorities", scheduled tribes, tribal peoples, national minorities or cultural communities?	√			There is an Act on National Foundation for the upliftment of Aadibasi Janajati 2002 to consider these groups present in the project area as ethnic minority indigenous groups.
3. Do such groups self-identify as being part of a distinct social and cultural group?	√			Yes, however, they almost have also assimilated with the mainstream in every aspect (e.g. cultural, social, economic, political, etc) and they also share their cultural reciprocity with other mainstream groups. Both the mainstream community and the minority group equally interact in both Napali as well as local Tharu and Chaudhari languages.
4. Do such groups maintain collective attachments to distinct habitats or ancestral territories and/or to the natural resources in these habitats and territories?	√			They are maintaining their collective attachments with the culture and place. However, they are not static on ancestral territories and on natural resources; rather they share their culture with other mainstream groups in terms of everything (social, cultural, geographical, educational, economic, political, etc aspects.
5. Do such groups maintain cultural, economic, social, and political institutions distinct from the dominant society or culture?	√			They have also organized under different mainstream organizations as well as an organization focused on their group for their development, welfare, and cultural protection.
6. Have such groups speak a distinct language or dialect?	√			Even the senior citizens can communicate both in their language and national (Nepali) language. The educated persons can also communicate in different other national and even international languages.
7. Has such a group been historically, socially and economically marginalized disempowered, excluded, and/or discriminated against?	√			Earlier, the group had been historically, socially, and economically marginalized and disempowered, excluded. However, their overall social status and role have been changed

Key Concerns (Please provide elaborations on the remarks column)	Yes	No	Not Known	Remarks
				especially the imitative taken by the Government to liberate the poor and deprived community from the traditional bonded labor system, especially during the nineties.
8. Are such groups represented as "Indigenous People" or as "ethnic minorities", or scheduled tribes or "tribal population" in any formal decision making bodies at the national or local levels?	√			The constitution of Nepal and the relevant act has given equal opportunities even to the indigenous population to be part of any type of institution up-to capacity and even for formal decision making. Recently these communities have been participating and making the decision in several facets of society as politicians, ministers, diplomats, bureaucrats, teachers and academician and so on.
B. Identification of Potential Impacts				
9. Will the project directly or indirectly benefit or target Indigenous People	√			The proposed will provide direct benefit to the Indigenous people by protecting them from floods, land cutting, loss of crop production.
10. Will the project directly or indirectly affect Indigenous Peoples' traditional socio-cultural and belief practices? (e.g. child-rearing, health education, arts, and Governance)		√		
11. Will the project affect the livelihood system of indigenous people? (e.g. food production system, rural resource management, crafts and trade employment status)	√			The implementation of the project also ensures increase food protection due to possibilities of cultivation even in abandoned fallow land, protection of land, property, and life from the flood.
12. Will the project be in an area (land or territory) occupied, owned, or used by Indigenous peoples, and /or claimed as the ancestral domain?	√			The government has not specifically allocated any specific place only focusing on the ancestral domain. Rather in some places land has been allocated and even with ownership transfer for the victims of flood in the past and recently for the emancipated bandaged labors which also include other caste and ethnic groups except Tharu and Chaudhari.
C. Identification of Special Requirements: *will the project activities include?*				
. Commercial development of the cultural resources and knowledge of indigenous peoples?			√	The project is also accessing the scope of incorporating such viable activities in close consultation and coordination with the project office at the central level, district level as well as local communities neighboring to the embankment locations for the protection and sustainability of the

Key Concerns (Please provide elaborations on the remarks column)	Yes	No	Not Known	Remarks
				constructed embankments.
14. Physical displacement from traditional or customary lands			√	No physical displacement will occur. The embankment will be constructed along the bank of the river by maximum utilizing the lands along the river bed and government lands. Wherever such land is not available and unavoidable part of construction work, the project will use a portion of such private or another type of occupied land through the approach of voluntary land donation without transferring the ownership. This will ensured by the official Memorandum of Understanding (MoUu) made between the project and the landowners with the representation of government bodies.
15. Commercial development of Natural Resources (such as minerals, hydrocarbon, forest, water, hunting or fishing groups)within customary lands underuse that would impact the livelihood or the cultural ceremonial, spiritual usages that define the identity and the community of Indigenous People?	√			The project envisages to incorporate such components in collaboration with the Project at the central level, district level offices, and local community residing in the neighboring location of the embankments.
16. Establishing legal recognition of rights to land and territories that are traditionally owned or customary used or claimed by indigenous people?		√		Generally, this sort of task is being undertaken time to time by the Government since the beginning through the commission of different types (e.g. commission for providing land and ownership certificate to all sorts of landless people as well as for indigenous peoples in Dang districts.
17. Acquisition of lands that are traditionally owned or customarily used, occupied or claimed by indigenous peoples?		√		There will be no land acquisition at all. The project is just constructing the embankment at the edge of the river and government land. Wherever necessary permission will be granted with the landowners for Voluntary Land Donation through an MOU as described before to ensure relevant landowners' permission to protect their and their neighbors valuable productive land by constructing embankment based on their demand.

D. Anticipated Project Impact on Indigenous People

Project Component/ Activity/Output	Anticipated Positive Effects	Anticipated Negative Effects

Key Concerns (Please provide elaborations on the remarks column)		**Yes**	**No**	**Not Known**	**Remarks**
Construction of embankments, revetments, spurs, and outlets	Flood protection to cultivating land, settlements, and infrastructures such as a house, schools, health facilities, community structures, and income-generating activities				None

GENDER EQUALITY AND SOCIAL INCLUSION ACTION PLAN

Activities	Targets and indicators	Responsibility	Time
Output 1: Flood protection infrastructure improved			
1. Ensure that construction activities abide by core labor standards including OHS, prohibition of child labor and gender related aspects.	(i) Adequate facilities and separate women/men toilets exist in each construction site for labors. (ii) Orientation sessions on labor standards/ equal wages/OHS and awareness on STI (incl. HIV) prevention, human trafficking, sexual harassment, exploitation and abuse targeting 10 sessions from PMU/field office staff/Contractors.[i]	PMU and Contractors. DWRI Field Office Social Development Officers	1–5 years
2. Ensure participation of women and members from indigenous people, excluded and vulnerable households in rehabilitation and construction of flood control infrastructures including nature-based solutions for flood risk (such as bio-engineering and river embankment).	(i) Specific conditions included in contractors' bid document whereby at least 15% employment opportunities be given to women. (ii) At least 10% of those employed on flood infrastructure rehabilitation and construction works are indigenous peoples and Dalits, and 15% are women.	PMU and Contractors DWRI Field Office Social Development Officers	2–5 years
3. Ensure participation of women and members from indigenous peoples, excluded and vulnerable households in safeguards related consultations.	(i) Men and women of affected households of 5 basins participated in safeguards related consultations (land use agreements, involuntary resettlement and indigenous peoples) and informed on process (data disaggregated by sex, caste, ethnicity and vulnerability. (basins baseline to be established during inception.)	PMU, Local Government and community representatives	1 year
Output 3: Flood prevention and preparedness capacity improved			
4. Increase institutional capacity of DWRI staff in flood risk management.	(i) At least 20% of trained DWRI staff and local government staff (at least 15% women) demonstrated skills in flood risk management	PMU DWRI Field Office Social Development Officers	1–5 years

Activities	Targets and indicators	Responsibility	Time
5. Establish CDRMCs.	(i) Each CDRMC consists of 33% women members. Inclusion of at least one person with disability and one from indigenous peoples group, as applicable.	PMU, DWRI, NGO, Local communities DWRI Field Office Social Development Officers	1–5 years
6. Enhance capacity of community including women, vulnerable, indigenous peoples and persons with disability on flood risk management.	(i) At least 50% of women, members from vulnerable groups, indigenous people and persons with disability of CDRMC are trained community-based FFEWS. (ii) Community risk reduction plan identified risks for women, men, children, elderly, indigenous peoples, vulnerable groups, including any special needs of persons with disability for each subproject and the measures to address.	PMU, DWRI, NGO, CBDRMU DWRI Field Office Social Development Officers	1–5 years
7. Prepare CBDRM plans and deliver a training program on CBDRM for local communities in flood prone areas of the subprojects.	(i) Six gender-inclusive CBDRM plans (1 for each river basin area) prepared by the community with at least 33% women participation and inclusion of at least one persons with disability and one from indigenous peoples group (ii) CBDRM training program incorporates identified risks to women, men, children, elderly, indigenous peoples, vulnerable groups, including any special needs of persons with disability. (iii) Ten CBDRM committee members per river basin area reported knowledge and skills on disaster preparedness including at least 33% women and proportionate number of indigenous peoples, excluded and vulnerable groups including persons with disability.	PMU, DWRI, NGO, CBDRMUs DWRI Field Office Social Development Officers	1–2 years
8. GESI budget and training for project implementation, monitoring and reporting	(i) Adequate budget allocated for GESI action plan. (ii) GESI training for PMU staff, incl. all eligible women staff, conducted, with focus on GESI action plan implementation, monitoring and reporting (iii) implementation and quarterly progress reports submitted.	PMU, DWRI	1–5 years

Activities	Targets and indicators	Responsibility	Time
9. Maintain MIS at DWRI for project monitoring, reporting and evaluation.	(i) Maintained MIS includes sex, caste, ethnicity disaggregated data of all project activities (including data of vulnerable households including indigenous and persons with disability).	PMU, DWRI DWRI Field Office Social Development Officers	1–5 years
10. Ensure participation of women and members from indigenous people, excluded and vulnerable households in construction of flood control infrastructures	(i) 48 gender-responsive flood shelters constructed - Design of Flood Shelters include separate toilets and washrooms for women and men, special ramp for persons with disability and elderly persons, separate rooms for men and women.	PMU, DWRI, NGO, CBDRMU	

CBDRM = community-based disaster risk management; CBDRMU = community-based disaster risk management units; CDRMC=Community Disaster Risk Management Committee; DWRI = Department of Water Resources and Irrigation; FFEWS = flood forecasting and early warning system; MIS = Management Information System; GESI = Gender Equality and Social Inclusion; NGO=nongovernment organization; OHS = occupational health and safety; PMU = project management unit…

[i] At least one orientation in PMU and one in each Site office; and minimum 2 times over the project period to verify and ensure that conditions are met. The person in charge of giving the orientations sessions will be the GESI expert or an equivalent from the PIC.

Project Administration Manual

Project Number: 52195-001
Loan and Grant Numbers: {LXXXX; GXXXX, TAXXXX}
September 2020

Nepal: Priority River Basins Flood Risk Management Project

ABBREVIATIONS

ADB	–	Asian Development Bank
APFS	–	audited project financial statement
CBDRM	–	community-based disaster risk management
DHM	–	Department of Hydrology and Meteorology
DMF	–	design and monitoring framework
DWRI	–	Department of Water Resources and Irrigation
e-MIS	–	environmental safeguards management information system
EMP	–	environmental management plan
EMR	–	environmental monitoring report
FFEWS	–	flood forecasting and early warning system
FMA	–	financial management assessment
GESI	–	gender equality and social inclusion
GRC	–	grievance redress committee
GRM	–	grievance redress mechanism
IEE	–	initial environmental examination
MEWRI	–	Ministry of Energy, Water Resources and Irrigation
MOF	–	Ministry of Finance
NGO	–	nongovernment organization
OAG	–	Office of the Auditor General
OCB	–	open competitive bidding
OHS	–	occupational health and safety
PAM	–	project administration manual
PIC	–	project implementation consultants
PIU	–	project implementation unit
PMU	–	project management unit
QPR	–	quarterly progress report
SEC	–	senior environment cum safety consultant
SEMP	–	site-specific environmental management plan
SLO	–	safeguard liaison officer
SMR	–	social safeguard monitoring report
SOE	–	statement of expenditures
SOP	–	standard operating procedure
SPS	–	Safeguard Policy Statement, 2009
SSC	–	senior social consultant

NOTE

In this report, “$” refers to United States dollars.

CONTENTS

ATTACHMENTS

Project Administration Manual Purpose and Process

The project administration manual (PAM) describes the essential administrative and management requirements to implement the project on time, within budget, and in accordance with the policies and procedures of the government and Asian Development Bank (ADB). The PAM should include references to all available templates and instructions either through linkages to relevant URLs or directly incorporated in the PAM.

The Ministry of Energy, Water Resources and Irrigation (MEWRI), the Project Management Unit (PMU), the field offices under the Department of Water Resources and Irrigation (DWRI), and the Project Implementation Unit (PIU) under the Department of Hydrology and Meteorology (DHM) are wholly responsible for the implementation of ADB-financed project, as agreed jointly between the borrower and ADB, and in accordance with the policies and procedures of the government and ADB. ADB staff is responsible for supporting implementation including compliance by MEWRI, DWRI and DHM of their obligations and responsibilities for project implementation in accordance with ADB's policies and procedures.

At loan and grant negotiations, the borrower and ADB shall agree to the PAM and ensure consistency with the loan and grant agreements. Such agreement shall be reflected in the minutes of the loan negotiations. In the event of any discrepancy or contradiction between the PAM and the loan agreement, the provisions of the loan and grant agreement shall prevail.

After ADB Board approval of the project's report and recommendations of the President (RRP), changes in implementation arrangements are subject to agreement and approval pursuant to relevant government and ADB administrative procedures (including the Project Administration Instructions) and upon such approval, they will be subsequently incorporated in the PAM.

I. PROJECT DESCRIPTION

1. The Government of Nepal has requested the Asian Development Bank (ADB) to support the implementation of the Priority River Basins Flood Risk Management Project which focuses on six priority river basins in the Terai region: (i) West Rapti; (ii) Mawa Ratuwa; (iii) Lakhandei; (iv) Mohana Khutiya; (v) East Rapti; and (vi) Bakraha.[1] Collectively, 29,356 hectares (ha) of the priority river basins and 70,428 people are exposed to 1-in-50-year flood. The project areas have minimal reactive embankment interventions that provide limited flood protection.

2. The project will improve the resilience of communities to flooding in the six selected river basins in the Terai. These areas are vulnerable to flooding due to in-migration of people in search of better livelihoods and insufficient flood protection infrastructure or early flood warnings and low community awareness on how to respond to flooding. Flood risk is expected to increase with climate change. The project will support Nepal's National Water Plan to reduce social and economic losses from water induced disasters through blending structural and nonstructural measures.[2] The project will protect agricultural land and households in priority areas from a 1-in-50-year flood by constructing flood embankments, spurs and outlet structures. The local response to flooding will be strengthened through the development of flood forecasting and early warning systems (FFEWS) and community-based disaster risk management (CBDRM). The direct project beneficiaries will be the local communities within the project area. The Department of Water Resources and Irrigation (DWRI) and the Department of Hydrology and Meteorology (DHM) will be the implementing agencies.

3. The project will have the following outputs:

(i) **Output 1. Flood protection infrastructure improved.** The project will reduce direct impacts from flooding through (i) construction of flood control infrastructure (embankments, spurs, and outlet structures); (ii) planning and implementation of bioengineering of river embankments for enhanced flood risk management, using suitable vegetative methods to prevent soil erosion; and (iii) development of maintenance manuals and an asset management system for flood protection infrastructure. The construction works are expected to generate employment for at least 10% of the affected households, including indigenous peoples, Dalits and women.

(ii) **Output 2. Flood forecasting and response systems enhanced**. The project will support the government and communities in flood-prone areas to improve early flood warning systems through (i) installing about 40 rain gauges and 30 hydrometeorological stations, (ii) developing about 5 FFEWS, and (iii) improving maintenance of FFEWS.

(iii) **Output 3. Flood prevention and preparedness capacity improved.** This will be delivered by (i) undertaking an organizational capacity building program on flood risk management and infrastructure planning for the DWRI and local governments (municipalities, village municipalities and provincial governments); (ii) developing the capacity of local communities on disaster preparedness; (iii) constructing about 48 flood shelters with gender-responsive features; and (iv) developing CBDRM

[1] Priority rivers were selected from 25 river basins from ADB. 2016. *Flood Hazard Mapping and Preliminary Preparation of Flood Risk Management Projects: Final Report.* Manila. Factors such as likelihood/ magnitude of flood damage, poverty index, impact on human wellbeing, loss of life, as well as equitable distribution of projects between regions, were taken into consideration.

[2] Government of Nepal, Water and Energy Commission Secretariat. 2002. *National Water Plan, 2002–2027*. Kathmandu.

plans, in consultation with community stakeholders (including women) and in line with local development plans and budgets that integrate disaster risk information.[3]

[3] CBDRM includes developing flood risk maps and supporting implementation of non-structural measures prioritized in community plans, especially measures related to strengthening livelihood resilience.

II. IMPLEMENTATION PLANS

A. Project Readiness Activities

Table 1: Project Readiness Activities

Indicative activities	2020									2021			Agency
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	
Advance contracting actions:													
(i) **PIC Recruitment (CS-01)**													DWRI
a. Issuing RFP					x								DWRI
b. Submission of proposal & evaluation						x	x	x	x	x	x		DWRI
c. Negotiation and award												x	DWRI
d. Mobilize and implementation												x	DWRI
(ii) **Procurement of Works Package (CW-01)**													DWRI
a. Bid advertisement and bid period					x	x	x						DWRI
b. Bid submission and evaluation							x	x	x				DWRI
c. Award and mobilize										x			DWRI
(iii) **Procurement of Works Package (CW-02)**													DWRI
a. Bid advertisement and bid period					x	x	x						DWRI
b. Bid submission and evaluation					x	x	x	x	x				DWRI
c. Award and mobilize										x			DWRI
(iv) Establish project implementation arrangements	x	x	x	x	x	x	x	x					DWRI, DHM
(v) Approval of IEEs	x												DWRI
(vi) ADB Board Approval						x							ADB
(vii) Loan/grant signing							x						MOF, MEWRI, ADB
(viii) Government legal opinion provided								x					MOF
(ix) Government budget inclusion	x												MOF, MEWRI, ADB
(x) Loan/grant effectiveness									x				ADB

ADB = Asian Development Bank, CW = Civil works, DHM = Department of Hydrology and Meteorology, DWRI = Department of Water Resources and Irrigation, FFEWS = flood forecasting and early warning system, IEE = initial environmental examination, MEWRI = Ministry of Energy, Water Resources and Irrigation, MOF = Ministry of Finance, PIC = project implementation consultant, RFP = request for proposal.
Source: Asian Development Bank.

B. Overall Project Implementation Plan

4. The project is expected to be approved in September 2020. After loan effectiveness, which is anticipated in December 2020, the project implementation period is 7 years.[4] The project is expected to be physically completed by March 2027 and financially closed by September 2027. Monitoring of the project performance and outcome will be until October 2028, including preparation of the project completion report. The project's overall implementation plan is in ATTACHMENT B.

III. PROJECT MANAGEMENT ARRANGEMENTS

C. Project Implementation Organizations: Roles and Responsibilities

5. The project implementation organizations including their roles and responsibilities are shown in the table below.

Table 2: Project Implementation Organizations: Roles and Responsibilities

Project Implementation Organizations	Management Roles and Responsibilities
Ministry of Finance	• Ensures timely signing of lending agreements. • Manages the advance accounts each for the ADB loan and grant • Through DWRI and DHM, obtaining account statements of advance accounts, reconciles advance accounts with the project subaccounts, and submits withdrawal applications to ADB. • Ensures timely allocation and release of both project and counterpart funds.
Project Steering Committee	• Chaired by MEWRI and members are shown in ATTACHMENT C. It will meet at least biannually, or more regularly as required. • Provides policy guidance based on performance reviews of the project. • Ensures collaboration among central and district level agencies. • Monitors the progress and addresses relevant issues for smooth implementation of the project.
Executing agency: Ministry of Energy, Water Resources and Irrigation	• Ensures overall oversight of the project and makes timely decisions on all matters relating to project implementation. • Ensures full staffing and timely mobilization of PMU, Field Offices and PIU. • Facilitates inter-ministerial coordination. • Leads interagency coordination. • Ensures adequacy of overall project financing and secures annual budget allocations for implementation. • Overall responsibility for complying with loan and grant covenants, environmental safeguards, and facilitating corrective actions as required.
Implementing agency: Department of Water Resources and Irrigation	• Overall responsibility for ensuring the project is implemented according to time, quality, and budget. • Ensures full staffing and timely mobilization of PMU and Field Offices.

[4] Implementation of output 1 is expected to be completed within 5 years.

Project Implementation Organizations	Management Roles and Responsibilities
	• Ensures minimum staff turnover of PMU and Field Offices. • Monitors compliance with loan and grant covenants, environmental and social safeguards, and facilitates corrective actions as required. • Opens and manages its respective advance and project subaccounts. • Prepares and reviews withdrawal applications, obtains project account statements, and submits them to ADB.
Implementing agency: Department of Hydrology and Meteorology	• Overall responsibility for ensuring that project output 2 on FFEWS is implemented according to time, quality, and budget. • Ensures full staffing and timely mobilization of PIU. • Ensures minimum staff turnover of PIU. • Monitors compliance with loan and grant covenants, environmental and social safeguards, and facilitates corrective actions as required. • Opens and manages its respective advance and project subaccounts. • Prepares and reviews withdrawal applications, obtaining project account statements, and submits the required documents for withdrawal applications to PMU.
Project Management Unit	• The PMU will be established within the DWRI offices in Jawalakhel (See staff schedule in ATTACHMENT D). • The PMU will be led by a Project Director who will be responsible for the overall implementation and management of the project. The Project Director will serve as the focal contact with ADB. • Other key personnel within the PMU are: Deputy Project Directors, Project Accountant, Environmental Specialist, Social Safeguards Focal, Community Based Disaster Risk Management and FFEWS Coordinator. **General Project Administration and Management** • Responsible for overall project management, implementation, and monitoring. • Coordinates with MOF to ensure the provision of adequate counterpart budget for the project. • Coordinates with ADB, stakeholders, and other agencies at central level for smooth project implementation. • Coordinates with government agencies to resolve any departmental issues. • Prepares implementation plans, annual budgets, and disbursement projections. • Approves all planning, design and contract documents associated with the project. • Monitors and ensures compliance with the loan and grant covenants, GESI action plan, environmental and social safeguards. • Maintains project documents, consolidates inputs from PIU and field offices, and submits reports (quarterly and annual progress reports, semi-annual safeguards reports, and project completion report) in a timely manner.

Project Implementation Organizations	Management Roles and Responsibilities
	• Prepares and submits periodic progress reports on each investment activities as required. • Prepares reports, advising the PSC and coordinates PSC meetings. • Establishes and manages separate project advance accounts for ADB loan and grant. • Actively uses the ADB disbursement information systems such as the loan financial information services (LFIS) and Client Portal for Disbursement (CPD) to ensure project accounts are complete. • Manages project account for government funds. • Establishes and maintains a PPMES for each package, output and outcome levels. • Consolidates accounts and prepares withdrawal applications for MOF to submit to ADB. • Submits all audited project accounts and financial statements pertaining to the project within six months of the end of each fiscal year. • Maintains project accounts and comprehensive loan financial records and submits consolidated quarterly reports. • Leads project implementation by (i) procuring and evaluating services, works and goods; and (ii) obtaining all necessary government approvals and right-of-way clearances from state departments and private land-owners. • Recruits and manages the (i) PIC, and (ii) CBDRM NGO, and (iii) procures equipment and vehicles for the project. • Monitors the activities of the field offices and provides advice as necessary. • Monitors physical and non-physical investment activities under the project; obtaining necessary data for establishing baselines, maintaining and updating the PPMES. • Prepares project completion report with the help of project consultants. • Provides support to ADB missions. **Technical Oversight and Support** • Supports, reviews, and submits the detailed engineering designs and estimates to DWRI for approval. • Carries out periodic quality audit of the civil works contracts; and providing guidance, support and monitor field offices in implementing subprojects. • Takes full responsibility for operation and maintenance of civil works during implementation **Safeguards Compliance** • Overall responsibility for safeguards by monitoring and ensuring compliance with ADB's Safeguards Policy Statement, 2009 and government requirements. • Establishes a central safeguard desk comprising of a safeguard liaison Officer supported by a senior environment/safety consultant accredited in OHS and senior social consultant of the PIC. The central safeguard desk will ensure full compliance with the overall environmental and social safeguards.

Project Implementation Organizations	Management Roles and Responsibilities
	• Prepares and submits initial environmental examination reports, with environmental management plan, OHS plan, resettlement plans, and indigenous people development plan, as appropriate. • Coordinates obtaining right-of-way clearances. • Ensures integration of environmental and social safeguards, including voluntary land donation, land acquisition and gender aspects, as required in all documents, particularly in tender documents. • Prepare automated environmental safeguards management information system (e-MIS) and associated monitoring checklist; orient project staff, field safeguards monitors, and contractors on safeguards monitoring, corrective action and reporting in the project using e-MIS. • Updates and monitors satisfactory implementation of the EMPs, and any correction action plans for additional facilities such as access roads and camps, consistent with safeguards requirements and ADB's Safeguards Policy Statement (2009). • Consolidates monthly safeguard monitoring report submitted by field offices and prepares and submits to ADB semi-annual environmental and semi- annual social safeguards monitoring reports following ADB's template for review and disclosure. • Ensures grievance redress mechanisms are established and functioning in all subproject with participation of the concerned municipalities. • Addresses grievances related to the project following the grievance redress mechanism established in the project. • Provides capacity support to field offices on safeguards issues.

Project Implementation Unit	• The PIU will be established within the DHM office in Babar Mahal (See staff schedule in ATTACHMENT D).
	• The PIU will be led by a Project Manager who will be responsible for overall implementation management of Output 2 FFEWS. The Project Manager will serve as the focal contact with ADB.
	• Other key personnel within the PIU are: Senior Accountant, Hydrologist and Meteorologist.
	• Maintains project documents and submits reports (quarterly progress reports and project completion report) in a timely manner.
	• Submits all audited project accounts and financial statements pertaining to the project within six months of the end of each fiscal year.
	• The PIU will be responsible for:
	  • Overseeing the overall implementation of Output 2 FFEWS.
	  • Preparing implementation plans, annual budgets, and disbursement projections.
	  • Coordinating with DWRI.
	  • Liaising and corresponding with ADB on all issues relating to the project.
	  • Coordinating with government agencies to resolve any departmental issues.
	• Approving all planning, design and contract documents associated with Output 2.

Project Implementation Organizations	Management Roles and Responsibilities
	• Leading implementation of the project by (i) procuring and evaluating services, works and goods; (ii) obtaining all necessary government approvals and right-of-way clearances from state departments and private land-owners as needed. • Procuring and overall management of the FFEWS goods package. • Providing inputs for the PPMES under the PMU. • Preparing and submitting reports to the PMU; (i) periodic progress reports on each investment activities; (ii) disbursement projections; (iii) requesting budgetary allocations for counterpart funds; (iv) collecting supporting documents for preparing withdrawal applications; (v) audit reports; and (vi) reports mandated under the loan, grant and project agreements. • Monthly submission to PMU of supporting documents for withdrawal applications to ADB. • Updates and monitors satisfactory implementation of the EMPs, and any correction action plans for additional facilities such as access roads and camps, consistent with safeguards requirements and ADB's Safeguards Policy Statement (2009) and submitting updated safeguards and monitoring reports for review and disclosure.
Implementing agency: Six Field Offices under the Project Management Unit	There are six field offices (Jhapa, Morang, Sarlahi, Makwanpur, Dang and Kailali) established at field level and working under the PMU. Each field office will be headed by a Project Manager and will be responsible for the day-to-day management of the civil works contracts in their respective areas. The main functions of the field offices will include: • Close coordination with PMU on management of civil works contracts, timely disbursements, compliance with loan covenants and any project management issues. • Day-to-day inspection of civil works and quality assurance control. • Establish a Safeguard Desk chaired by safeguard focal person supported by safeguards field monitors under overall guidance of senior environment/safety consultant and senior social consultant. • Approval of SEMP including OHS Plan submitted by contractor. Ensures contractor has timely appointed senior safeguards assurance officer and a safety officer by approving their biodata. Monitors SEMP during implementation using standard checklist, and instruct contractor to take corrective action in cases of non-compliance. Prepare monthly subproject safeguards compliance monitoring report based on contractor's monthly report, and forward information to PMU to consolidate and prepare EMR. • Addresses project related grievances on gender and safeguards. • Signs MOU with community group for establishing nursery and implementing bio-engineering of the embankments. • Prepares progress reports for assigned contracts and MOUs. • Verifies certification and payments contractors' claims and submits required documents to PMU for withdrawal applications • Maintains project financial and other records. The key personnel within the field offices are: Project Manager, Accountant, Public Relations Manager.

Project Implementation Organizations	Management Roles and Responsibilities
Subproject Consultation Committee	• Chaired by Provincial Government Infrastructure and Development Secretary. Members are shown in ATTACHMENT C. It will meet as and when required. • Provides inputs on project design and construction issues. • Ensures collaboration among district level agencies. • Support the Grievance Redressal Mechanism.
Project Implementation Consultant (CS-01)	• Prepares, designs, and finalizes bid documents of remaining civil works, goods and services contract packages to be awarded under the Project. • Survey and design protection of embankments by using bio-engineering (nature-based vegetative method of slope protection), prepares standard MOU for signing with user's committee, and supports field offices to sign MOU and implement bio-engineering work (establishing nursery, orientation to bio-technicians and community, implement bio-engineering and their routine maintenance). • Provides overall project management and administration support on reporting, financial management, and monitoring and evaluation. • Supports the PMU, field offices and PIU with establishing and maintaining the PPMES. • Supports PMU, field offices and PIU to procure, mobilize, manage and supervise all contracts. • Ensures implementation of the project per the approved plans, designs, and cost estimates. • Undertakes any necessary additional surveys and investigations to support designs and implementation. • Prepares detailed terms of reference, and assisting PIU to recruit, mobilize, and manage studies and surveys under provisional sum items. • Provides technical and management advice, as required. • Establish safeguards mechanism in the project, guide contractor in preparation of SEMP and field office approval, prepare environmental and social monitoring checklist, orient project staff and PIC field monitors on safeguards compliance requirements of the project and taking corrective actions, collect monthly monitoring report from field offices and consolidate to prepare safeguards reporting in QPR and EMR. • Monitors the implementation of the GESI action plan. • Supports PMU to manage and administer the project financing. • Prepares routine reporting requirements of ADB. • Knowledge transfer to the PMU, field offices and PIU. • Assists PIU with preparations, logistics and reporting for missions fielded by ADB, as necessary. • Reports directly to PMU for all matters related to implementation of the project. • Reviews and confirms social safeguard due diligence reports. • Supports commissioning and operation of the investments, including preparing management, operation and maintenance manuals.

Project Implementation Organizations	Management Roles and Responsibilities
ADB	ADB will monitor and review overall implementation of the project including compliance with loan and grant agreements, project agreement and ADB guidelines. ADB will be responsible in: • Fielding bi-annual review missions, midterm review missions, and project completion review mission to assess project implementation progress and compliance with loan covenants. • Reviewing PMU's submissions for procurement of goods, civil works, and services. • Ensuring environmental and social safeguards and GESI action plan compliance for ensuring sustainable implementation of project. • Ensuring timely disbursement of funds subject to PMU's submission of withdrawal applications.

ADB = Asian Development Bank, CBDRM = community-based disaster risk management, DHM = Department of Hydrology and Meteorology, DWRI = Department of Water Resources and Irrigation, EMP = environment management plan, EMR = environment monitoring report, FFEWS = flood forecasting and early warning system, GESI = Gender Equality and Social Inclusion, MEWRI = Ministry of Energy, Water Resources and Irrigation, MOF = Ministry of Finance, OHS = occupational health and safety, PIC = project implementation consultant, PIU = project implementation unit, PMU = project management unit, PPMES = project performance monitoring and evaluation system, PSC = project steering committee, SEMP = site-specific environmental management plan.
Source: Asian Development Bank.

D. Key Persons Involved in Implementation

6. The following key persons are involved in implementation:

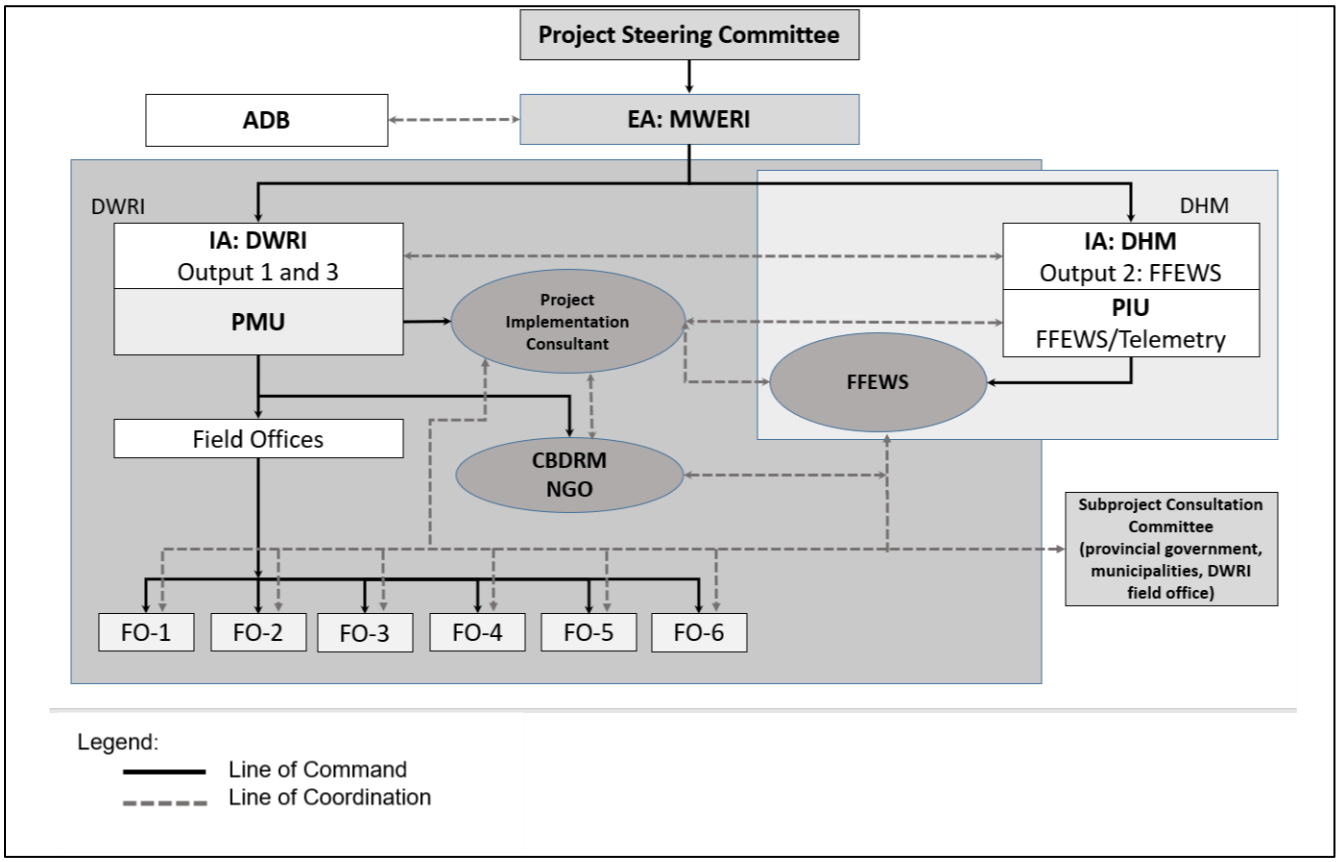
Executing Agency Ministry of Energy, Water Resources and Irrigation through the Steering Committee	Officer's Name: Position: Telephone: Email address: Office Address:	Er. Rabindra Nath Shrestha Secretary +977-1-4211426 gholirabindra@yahoo.com Singha Durbar, Kathmandu, Nepal
Implementing Agency Project Management Unit under the Department of Water Recourses and Irrigation	Officer's Name: Position: Telephone: Email address: Office Address:	Mr. Ajay Adhikari Project Director +977-1-5526213 prbfrmp@dwri.gov.np Jawalakhel, Lalitpur, Nepal
Project Implementation Unit under the Department of Hydrology and Meteorology	Officer's Name: Position: Telephone: Email address: Office Address:	Mr. Bikram Shrestha Zoowa Senior Div. Hydrologist Flood Forecasting Section and Hydrological Data and Network Section +977-1-4428229, +977-9860088578 b_zoowa@hotmail.com POB 406, Babar mahal, Kathmandu
Asian Development Bank South Asia Environment, Natural Resources and Agriculture Division (SAER)	Staff Name: Position: Telephone No. Email address:	Ms. Mio Oka Director +63 2 8632 6834 moka@adb.org

Mission Leader	Staff Name:	Ms. Suzanne Marsh
	Position:	Water Resources Specialist
	Telephone No.	+63 2 8632 4205
	Email address:	smarsh@adb.org

E. Project Organization Structure

7. The following flow chart show the reporting lines essential internal structures of key organizations involved in implementation.

Figure 1: Project Organization Chart



ADB = Asian Development Bank, CBDRM = community-based disaster risk management, DHM = Department of Hydrology and Meteorology, DWRI = Department of Water Resources and Irrigation, EA = executing agency, FFEWS = flood forecasting and early warning system, FO = field office, IA = implementing agency, MEWRI = Ministry of Energy, Water Resources and Irrigation, NGO = nongovernment organization, PIU = project implementation unit, PMU = project management unit.

IV. COSTS AND FINANCING

8. The cost of the project is estimated at $63.00 million, inclusive of taxes and duties, and financing charges during implementation. In addition to financing a proportionate share for the project components, the government will finance all costs related to (i) safeguard implementation, (iii) salaries and operating costs of the project management unit (PMU), field offices and project implementation unit (PIU), and (iv) training.

Table 3: Project Investment Plan

Item		**Amount** ($ million) [a]
A.	Base Cost [b]	
	1. Output 1: Flood Protection Infrastructure Improved	39.15
	2. Output 2: Flood Forecasting and Response Systems Enhanced	8.47
	3. Output 3: Flood Protection and Preparedness Capacity Improved	4.90
B.	Contingencies [c]	8.84
C.	Financing Charged During implementation[d]	1.64
	Total (A+B+C)	**63.00**

[a] Includes taxes and duties of $5.30 million to be financed from government resources.
[b] In February 2020 prices.
[c] Physical contingencies computed at 5% for civil works and FFEWS, 5% for equipment and 4% for consultancy services. Price contingencies computed, on average, at 1.5%–1.6% on foreign exchange costs and 4.6%–6.0% on local currency costs; includes provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate
[d] Includes interest and other charges on all sources of financing. Includes interest of 1% during the grace period and 1.5% during the amortization period.
Source: Asian Development Bank estimates.

9. The government has requested (i) a concessional loan in an amount of $40.00 million from ADB's ordinary capital resources, and (ii) a grant not exceeding $10.00 million from ADB's Special Funds resources (Asian Development Fund), both to help finance part of the project.

10. The summary financing plan is in Table 4. ADB will partly finance the expenditures in relation to civil works, equipment, consulting services, and FFEWS.

Table 4: Financing Plan

Source	**Amount** ($ million)	**Share of Total** (%)
Asian Development Bank	50.00	
Ordinary capital resources (concessional loan)[a]	40.00	63.50
Special Funds resources (ADF grant)[b]	10.00	15.90
Government	13.00	20.60
Total	**63.00**	**100.00**

ADF = Asian Development Fund.
[a] Includes $20.00 million from ADF 12 disaster risk reduction funding.
[b] ADF 12 disaster risk reduction grant funding.
Source: Asian Development Bank estimates.

A. Cost Estimates Preparation and Revisions

11. Cost estimates were prepared by ADB in consultation with DWRI and DHM. Cost estimates for civil works and equipment were based on estimates prepared by DWRI, which were in turn based on the Nepal Schedule of Rates for 2019. During implementation, the PIU will be responsible for updating cost estimates, subject to consultation with PMU. Revisions to planned withdrawal allocations will require prior approval from ADB.

B. Key Assumptions

10. The following key assumptions underpin the cost estimates and financing plan:
    (i) Exchange rate: NRs114.11 = $1.00 (as of 16 Feb 2020).
    (ii) Price contingencies based on expected cumulative inflation over the implementation period are as follows:

Table 5: Escalation Rates for Price Contingency Calculation

Item	2020	2021	2022	2023	2024	2025	2026	2027	Average
Foreign rate of price inflation (%)	1.5%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%
Domestic rate of price inflation (%)	5.1%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	5.9%

Source: Asian Development Bank staff estimates.

C. Detailed Cost Estimates by Expenditure Category

12. The cost estimates of the project amounts to $63.00 million. The detailed cost estimates by expenditure category are given in the Table 6.

Table 6: Detailed Cost Estimates by Expenditure Category

Item		NRs million	$ million	% of Total Base Cost
A.	**Investment Costs**			
	1. FFEWS (turnkey contract)	933.78	7.54	14.36%
	2. Civil Works	4,429.24	35.74	68.05%
	3. Equipment (Vehicles)	29.33	0.25	0.48%
	4. Equipment (CBDRM, Office Supplies)	144.01	1.12	2.13%
	5. Safeguards Implementation	200.08	1.65	3.14%
	6. Consulting Services [a]	386.37	3.11	5.92%
	7. Training	4.09	0.03	0.06%
	Sub Total (A)	**6,126.90**	**49.44**	**94.14%**
B.	**Recurrent Cost**			
	Government Staff Salaries	334.19	2.63	5.01%
	Operation Costs	59.12	0.45	0.86%
	Sub Total (B)	**393.31**	**3.08**	**5.86%**
	Total Base Costs (A+B)	**6,520.21**	**52.52**	**100.00 %**
C.	**Contingencies**			
	Physical	363.21	2.80	5.33%
	Price	782.51	6.04	11.50%
	Sub Total (C)	**1,145.72**	**8.84**	**16.83%**
D.	**Financing Charges During Implementation**			
	Interest during construction	226.88	1.64	3.12%
	Subtotal (D)	**226.88**	**1.64**	**3.12%**
Total Project Cost (A+B+C+D)		**7,892.81**	**63.00**	**119.95%**

FFEWS = flood forecasting and early warning system.
[a] Consulting services amount to 4.9% of ADB funding (loan and grant)
Notes: Numbers may not sum precisely because of rounding.
Source: Asian Development Bank estimates.

D. Allocation and Withdrawal of Loan and Grant Proceeds.

Table 7. Allocation and Withdrawal of ADB Loan Proceeds [a]

No.	Item	Amount Allocated $	Percentage and Basis for Withdrawal from the Loan Account
		Category	
1	Civil works	29,570,000	83% of total expenditure claimed
2	Equipment[b]	550,000	49% of total expenditure claimed
3	Consulting Services[c]	2,470,000	79% of total expenditure claimed
4	Interest	1,640,000	100% of amounts due
5	Unallocated	5,770,000	
	Total	**40,000,000**	

[a] Disaster Risk Reduction Fund will finance $20.00 million equivalent of the ADB concessional OCR loan (COL).
[b] Equipment includes CBDRM Equipment and Office Supplies as listed in the procurement plan
[c] Consulting services amount to 4.9% of total ADB funding (loan and grant amount)

Table 8. Allocation and Withdrawal of ADB Grant Proceeds [a]

No.	Item	Amount Allocated $	Percentage and Basis for Withdrawal from the Grant Account
		Category	
1	Civil works	1,520,000	4% of total expenditure claimed
2	Equipment[b]	420,000	38% of total expenditure claimed
3	Vehicles[c]	217,000	100% of total expenditure claimed[e]
4	FFEWS[d]	6,450,000	86% of total expenditure claimed
5	Training and Workshop	30,000	100% of total expenditure claimed[e]
6	Unallocated	1,363,000	
	Total	**10,000,000**	

FFEWS = flood forecasting and early warning system.
[a] Disaster Risk Reduction Fund will finance $10.00 million equivalent of the ADF Grant.
[b] Equipment includes CBDRM Equipment and Office Supplies as listed in the procurement plan
[c] Vehicles to be used for project site supervision both for DHM and DWRI (9 Motorcycles, two 4WD vehicles).
[d] DHM Category User
[e] Exclusive of taxes and duties imposed in the territory of the recipient

E. Detailed Cost Estimates by Financier

Table 9: Cost Estimate Summary by Expenditure Category and Financier

($ million)

Item	ADB Loan[a]		ADB Grant[b]		Government[c]		Total Cost
	Amount	% of Cost Category	Amount	% of Cost Category	Amount	% of Cost Category	
A. Investment Costs							
1. FFEWS (turnkey contract)	0.00	0 %	6.45	86%	1.09	14%	7.54
2. Civil Works	29.57	83%	1.52	4%	4.65	13%	35.74
3. Vehicles [d]	0.00	0.0%	0.22	87%	0.03	13%	0.25
4. Equipment	0.55	49%	0.42	38%	0.15	13%	1.12
5. Safeguards Implementation	0.00	0%	0.00	0%	1.65	100%	1.65
6. Consulting Services	2.47	79%	0.00	0%	0.64	21%	3.11
7. Training and Workshops	0.00	0%	0.03	100%	0.00	0%	0.03
Subtotal A	**32.59**	**66%**	**8.64**	**17%**	**8.21**	**17%**	**49.44**
B. Recurrent Costs							
1. Government Staff Salaries	0.00	0%	0.00	0%	2.63	100%	2.63
2. Operational costs	0.00	0%	0.00	0%	0.45	100%	0.45
Subtotal B	**0.00**	**0%**	**0.00**	**0%**	**3.08**	**100%**	**3.08**
Total Base Costs	**32.59**	**62%**	**8.64**	**16%**	**11.29**	**22%**	**52.52**
C. Contingencies							
1. Physical	1.61	58%	0.43	15%	0.76	27%	2.80
2. Price	4.16	69%	0.93	15%	0.95	16%	6.04
Subtotal C	**5.77**	**65%**	**1.36**	**15%**	**1.71**	**19%**	**8.84**
D. Financial Charges During Implementation	**1.64**	**100%**	**0.00**	**0%**	**0.00**	**0%**	**1.64**
Total Project Cost (A+B+C+D)	**40.00**	**64%**	**10.00**	**16%**	**13.0**	**21%**	**63.00**
% Total Project Cost		**64%**		**16%**		**21%**	**100.0%**

FFEWS = flood forecasting and early warning system.
Note: Numbers may not sum precisely because of rounding.
[a] Disaster Risk Reduction (DRR) Fund will finance $20.00 million equivalent of the ADB concessional OCR lending (COL).
[b] DRR funds will finance $10.00 million of the ADB grant.
[c] Includes taxes and duties. Audit costs is included as part of the government cost.
[d] Vehicles to be procured under the grant (9 Motorcycles, two 4WD vehicles)
Source: Asian Development Bank estimates.

F. Detailed Cost Estimates by Component

Table 10: Cost Estimate Summary by Expenditure Category and Output

($ million)

	Total cost	Output 1.		Output 2.		Output 3.	
	Amount	**Amount**	**% of Cost**	**Amount**	**% of Cost**	**Amount**	**% of Cost**
A. Investment Costs							
1. FFEWS (turnkey contract)	7.54	0.00	0%	7.54	100%	0.00	0%
2. Civil Works	35.74	33.97	95%	0.00	0%	1.77	5%
3. Vehicles	0.25	0.14	56%	0.11	44%	0.00	0%
4. Equipment	1.12	0.00	0%	0.00	0%	1.12	100%
5. Safeguards Implementation	1.65	1.65	100%	0.00	0%	0.00	0%
6. Consulting Services	3.11	1.58	51%	0.21	7%	1.32	42%
7. Training and Workshops	0.03	0.00	0%	0.00	0%	0.03	100%
Subtotal (A)	**49.44**	**37.34**	**75%**	**7.86**	**16%**	**4.24**	**9%**
B. Recurrent Cost							
1. Government Staff Salaries	2.63	1.54	58%	0.52	20%	0.57	22%
2.Operational Costs	0.45	0.27	60%	0.09	20%	0.09	20%
Subtotal (B)	**3.08**	**1.81**	**59%**	**0.61**	**20%**	**0.66**	**21%**
Total Base Cost	**52.52**	**39.15**	**75%**	**8.47**	**16%**	**4.90**	**9%**
C. Contingencies							
1. Physical	2.80	2.27	81%	0.35	13%	0.18	6%
2. Price	6.04	4.6	76%	0.84	14%	0.60	10%
Subtotal (C)	**8.84**	**6.87**	**78%**	**1.19**	**13%**	**0.78**	**9%**
D. Financing Charges During Implementation							
1. Interest during construction	1.64	1.24	76%	0.25	15%	0.15	9%
Subtotal (D)	**1.64**	**1.24**	**76%**	**0.25**	**15%**	**0.15**	**9%**
Total Project Costs (A+B+C+D)	**63.00**	**47.26**	**75%**	**9.91**	**16%**	**5.83**	**9%**

FFEWS = flood forecasting and early warning system.
Source: Asian Development Bank estimates.

G. Detailed Cost Estimates by Year

Table 11: Detailed Cost Estimates by Year
($ million)

Item	Total Cost	2020	2021	2022	2023	2024	2025	2026	2027
A. Investment Costs									
1. FFEWS (turnkey contract)	7.54	0.00	2.40	2.30	1.47	0.71	0.34	0.16	0.16
2. Civil Works	35.74	4.12	6.15	10.89	6.84	4.92	1.44	1.38	0.00
3. Vehicles	0.25	0.00	0.13	0.12	0.00	0.00	0.00	0.00	0.00
4. Equipment	1.12	0.00	0.06	0.30	0.28	0.27	0.16	0.05	0.00
5. Safeguards Implementation	1.65	0.00	0.68	0.66	0.16	0.08	0.07	0.00	0.00
6. Consulting Services	3.11	0.23	0.77	0.74	0.62	0.38	0.19	0.18	0.00
7. Training and Workshops	0.03	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
Subtotal (A)	**49.44**	**4.35**	**10.2**	**15.02**	**9.38**	**6.36**	**2.22**	**1.77**	**0.16**
B. Recurrent Costs									
1. Government Staff Salaries	2.63	0.06	0.57	0.71	0.37	0.36	0.29	0.16	0.11
2.Operational Costs	0.45	0.00	0.05	0.05	0.09	0.09	0.09	0.06	0.02
Subtotal (B)	**3.08**	**0.06**	**0.62**	**0.76**	**0.46**	**0.45**	**0.38**	**0.22**	**0.13**
Total Base Costs (A+B)	**52.52**	**4.41**	**10.82**	**15.78**	**9.84**	**6.81**	**2.58**	**1.99**	**0.29**
C. Contingencies									
1. Physical	2.80	0.19	0.41	0.63	0.43	0.26	0.09	0.43	0.36
2. Price	6.04	0.00	0.47	1.45	1.39	1.33	0.65	0.64	0.11
Subtotal C	**8.84**	**0.19**	**0.88**	**2.08**	**1.82**	**1.59**	**0.74**	**1.07**	**0.47**
D. Financing Charges During Implementation	**1.64**	0.00	**0.03**	**0.12**	**0.21**	**0.28**	**0.30**	**0.35**	**0.35**
Total Project Costs (A+B+C+D)	**63.00**	**4.60**	**11.73**	**17.98**	**11.87**	**8.68**	**3.62**	**3.41**	**1.11**
% Total Project Cost	100.0%	7.3%	18.6%	28.5%	18.8%	13.8%	5.7%	5.4%	1.8%

FFEWS = flood forecasting and early warning system.
Note: Figures may not sum due to rounding.
Source: ADB estimates.

H. Contract and Disbursement S-Curve

13. The following shows quarterly contract awards and disbursement projections over the life of the project. The S-Curve is only for ADB financing and ADB-administered co-financing, which will be recorded in ADB's systems and reported through e-Ops. Counterpart funds are excluded. The projection for contract awards includes contingencies and unallocated amounts, but excludes front-end fees, service charges, and interest during construction. The total projected disbursements equal to the full loan amount, up to 4 months after loan closing.

Figure 2: Contract Awards and Disbursement S-Curve – Loan

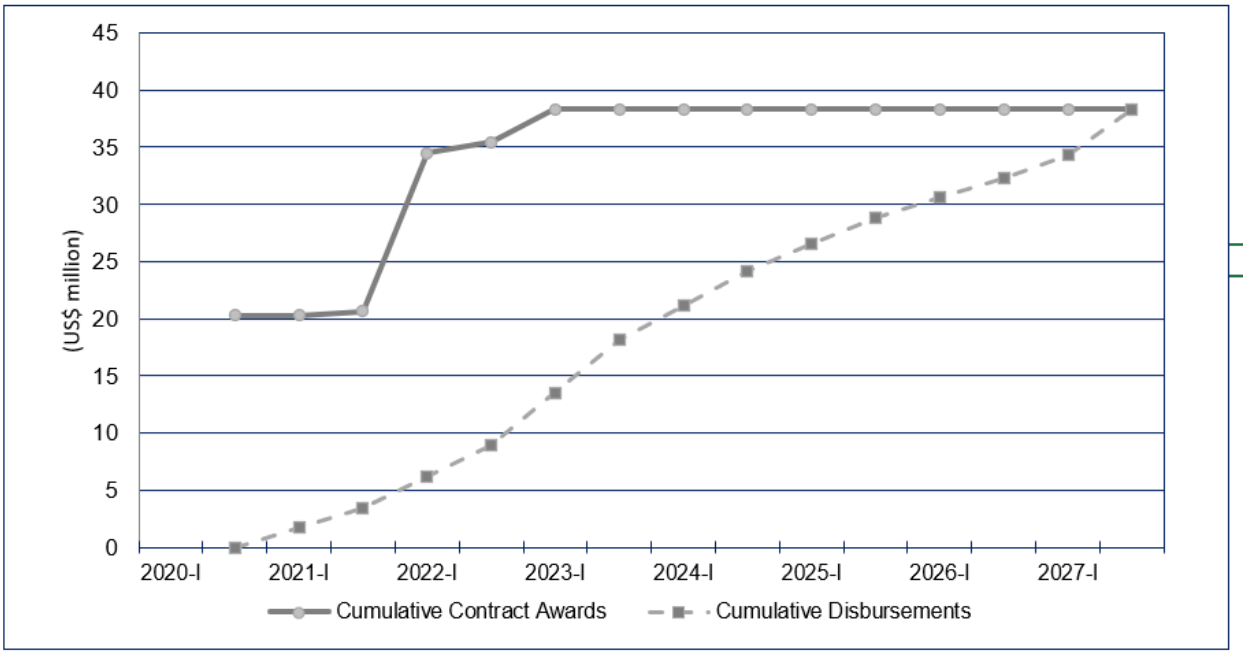


Table 12: Project Loan: Contract Awards and Disbursement ($ million)

	Contract Awards ($ million)					Disbursements ($ million)				
Year	**Q1**	**Q2**	**Q3**	**Q4**	**Total**	**Q1**	**Q2**	**Q3**	**Q4**	**Total**
2020	-	-	-	20.3	20.3	-	-	-	-	-
2021	-	-	0.4	-	0.4	1.6	0.9	0.9	1.4	4.8
2022	13.8	1.0	-	-	14.8	1.4	1.4	1.4	2.2	6.4
2023	2.9	-	-	-	2.9	2.3	2.3	2.3	1.5	8.4
2024	-	-	-	-	-	1.5	1.5	1.5	1.2	5.7
2025	-	-	-	-	-	1.2	1.2	1.2	0.8	4.4
2026	-	-	-	-	-	0.9	0.9	0.9	0.9	3.6
2027	-	-	-	-	-	1.1	2.0	2.0	-	5.1
	Total Contract Awards				**38.4**	**Total Disbursements**				**38.4**

Figure 3: Contract Awards and Disbursement S-Curve – Grant

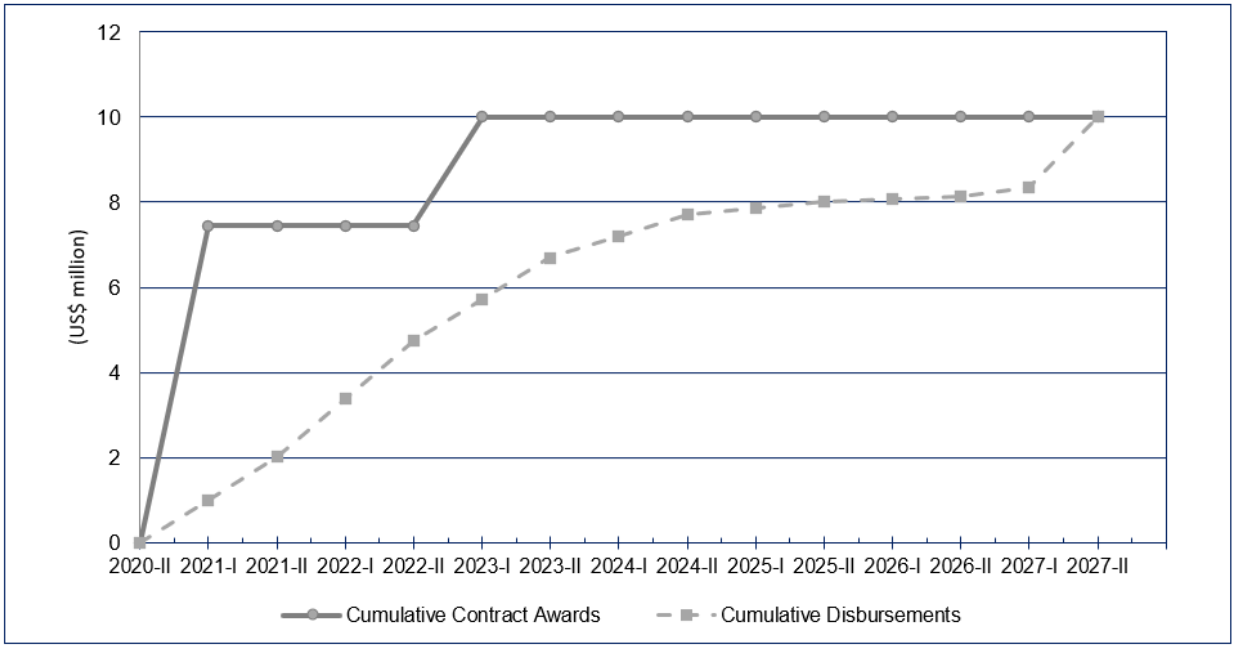
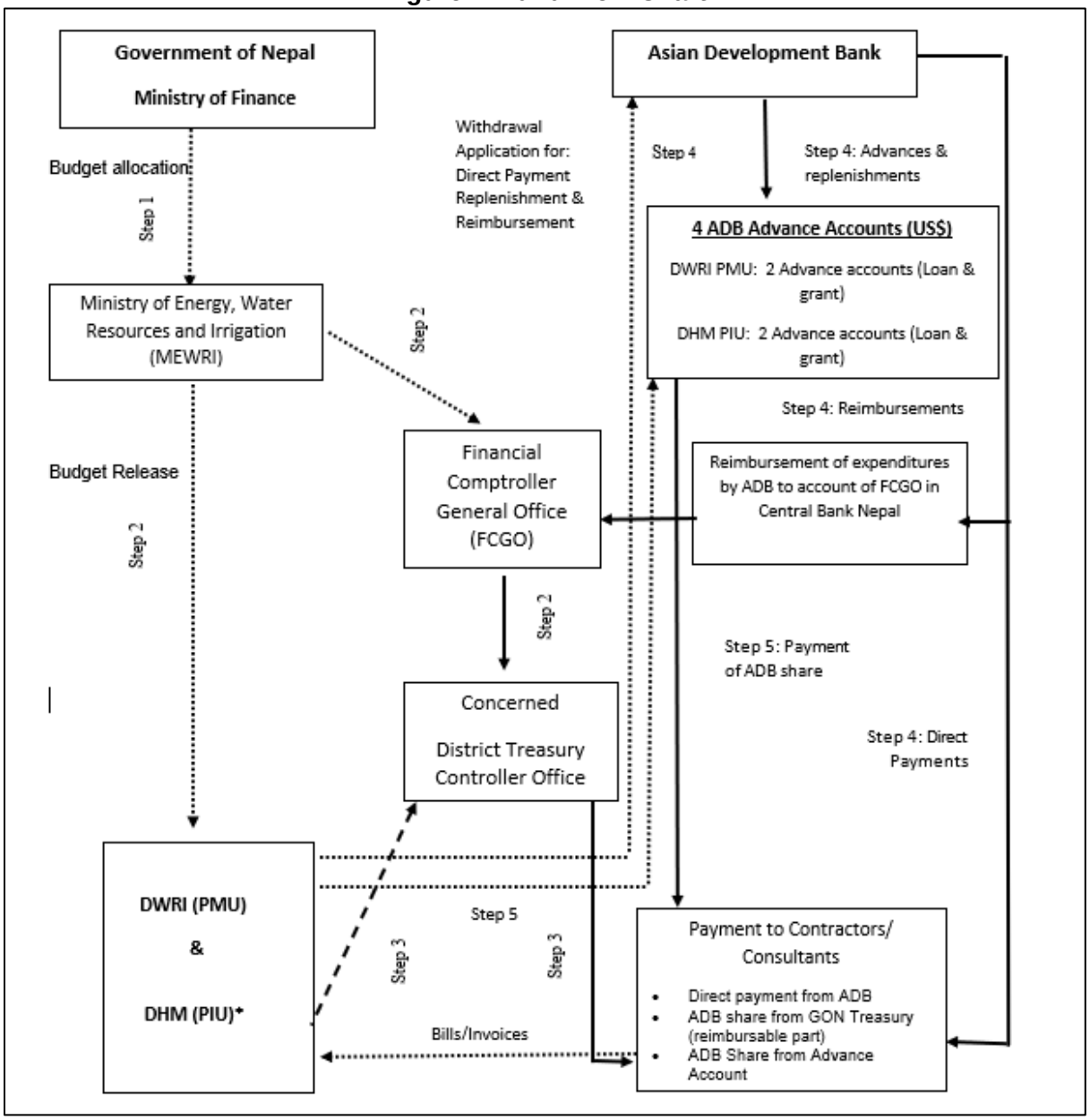


Table 13: Project Grant: Contract Awards and Disbursement ($ million)

	Contract Awards (in USD million)					Disbursements (in USD million)				
Year	**Q1**	**Q2**	**Q3**	**Q4**	**Total**	**Q1**	**Q2**	**Q3**	**Q4**	**Total**
2020	-	-	-	-	-	-	-	-	-	-
2021	7.5	-	-	-	7.5	-	1.7	1.7	0.7	4.1
2022	-	-	-	-	-	0.7	0.5	0.5	0.5	2.2
2023	2.5	-	-	-	2.5	0.5	0.3	0.3	0.3	1.4
2024	-	-	-	-	-	0.3	0.1	0.1	0.1	0.6
2025	-	-	-	-	-	0.1	0.0	0.0	0.0	0.1
2026	-	-	-	-	-	0.0	0.1	0.1	0.7	0.9
2027	-	-	-	-	-	0.7	-	-	-	0.7
	Total Contract Awards				**10.00**	**Total Disbursements**				**10.00**

I. Fund Flow Diagram

Figure 4. Fund Flow Chart



Legend:

- Documents Flow
- Request for payment from counterpart fund (government share)
- Fund Flow

ADB = Asian Development Bank, DHM = Department of Hydrology and Meteorology, DWRI = Department of Water Resources and Irrigation, FCGO = financial comptroller general's office, PIU = project implementation unit, PMU = project management unit.

Step 1: Budget allocation; Step 2: Budget release; Step 3: Counterpart fund payment; Step 4: Withdrawal application for payment from ADB for direct payment, replenishment to Advance Account and reimbursement to Government Account; Step 5: Payment from Advance Account.

*DHM will claim withdrawal applications through the DWRI PMU, by submitting to the PMU the required documentation as outlined in the ABD disbursement handbook and the PMU will prepare the withdrawal application.

V. FINANCIAL MANAGEMENT

A. Financial Management Assessment

14. A financial management assessment (FMA) has been conducted for the two implementing agencies DWRI and DHM, in accordance with ADB's Guidelines for the Financial Management and Analysis of Projects[5] and Financial Due Diligence: A Methodology Note,[6] and Technical Guidance Notes. The FMA focused on fund flows, staffing, accounting policies and procedures, internal controls, financial reporting and monitoring and internal and external audit. The purpose of the FMA is to ensure that adequate financial management arrangements are in place for the proposed project. The PMU in DWRI and PIU in DHM will be responsible for the financial management arrangements under their respective outputs but PMU will have the overall responsibility of consolidating, compiling, and coordinating the financial information.

15. The FMA found that DWRI and DHM have adequate financial management capability to (i) record the required financial transactions, (ii) provide reliable annual financial statements and audit reports in a timely manner, and (iii) safeguard the financial assets. However, the FMA also identified the following main financial management risks: (i) frequent project staff turnover; (ii) DHM lacks knowledge and experience with ADB procedures and systems; and (iii) weak internal audit. Overall, the financial management risk is assessed as Moderate.

16. The main risk mitigation actions include: (i) assigning qualified account staff to the PMU and PIU; (ii) engaging a Financial Management Specialist to support the project; (iii) providing training to the project's financial staff in ADB's procedures and systems; (iv) including comprehensive financial information in the quarterly project progress reports; and (v) active use of ADB disbursement information systems such as the loan financial information services (LFIS) and Client Portal for Disbursement (CPD) to ensure project accounts are complete. The detailed financial management risks and mitigation actions are summarized in the table below.

Table 14: Financial Management and Internal Control Risk Assessment

Risk	Risk Assessment	Risk Description	Mitigation Measures
Inherent Risk			
1. Country-specific	Substantial	Absorption capacity of the government departments for capital expenditure, slow implementation and timeliness of counterpart financing may pose a challenge.	Close monitoring of the activities and timeliness of counterpart funds throughout the project implementation.
2. Entity-specific	Moderate	DWRI has past experience in Implementing ADB projects while DHM has implemented a World Bank project in the past.	A PMU to be set-up in the DWRI and a PIU to be set-up in the DHM.

[5] ADB. 2005. *Financial Management and Analysis of Projects.* Manila. Available: http://www.adb.org/documents/financial-management-and analysis-projects

[6] ADB. 2015. *Financial Due Diligence: A Methodology Note.* Manila. Available: http://www.adb.org/documents/financial-due-diligence-methodology-note

Risk	Risk Assessment	Risk Description	Mitigation Measures
3. Project-specific	Moderate	The project will be implemented in several remote locations and by two different implementing agencies.	Not applicable.
Overall Inherent Risk	**Substantial**		
Control Risk			
1. Implementing entity	Moderate	Complex implementation arrangement with two implementing agencies, which may pose challenges in coordinating and consolidation of financial reporting.	A PMU to be set up in the DWRI and a PIU to be set up in the DHM. The financial management related roles and responsibilities between the PMU and the PIU need to be operationalized as outlined in the sections below.
2. Fund flow	Moderate	Timely release of counterpart fund. Complex flow of funds with two implementing agencies and separate advance accounts.	Assurances to be sought from the Government to provide adequate and timely counterpart funds to DWRI and DHI. Separate advance accounts to be maintained by the PMU and PIU. All withdrawal applications to be prepared by PMU. Expenditures incurred by the PMU and PIU to be claimed through separate withdrawal applications.
3. Staffing	Substantial	Frequent turnover of finance and accounting staff. Lack of knowledge and experience with ADB procedures and systems.	Qualified financial management/ accountants' staff to be assigned to the PMU and the PIU to work full-time for the project. Develop a training plan for project financial management staff. Training in ADB procedures and systems to be ensured on a regular basis to enhance the financial management staffs' understanding in ADB policies and requirements. A qualified financial management consultant to be engaged as part of the Project Implementation Consultant package.
4. Accounting policies and procedures	Moderate	Existing government policies and procedures are followed.	Develop supplementary accounting instructions to enable consistent financial reporting by the PMU and PIU in line with expenditure categories outlined in the PAM.

Risk	Risk Assessment	Risk Description	Mitigation Measures
5. Internal audit	Substantial	Internal audit function generally weak.	FCGO/DTCO shall include the proposed project in their audit scope. The internal audit observations shall be shared with the respective PMU and PIU management for management responses and implementation as applicable.
6. External audit	Moderate	Audit to be conducted by the OAG in accordance with National Audit standards. The DWRI and DHM to be audited separately. Audit report may be submitted to ADB with minor delays.	The PMU and PIU will cause their respective PFS to be audited separately by the OAG in accordance with the statement of audit needs agreed between ADB and OAG. The PMU shall compile both APFS and submit them to ABD within 6 months at the end of the financial year.
7. Reporting and monitoring	Moderate	Financial reports may not meet ADB's minimum requirements.	The PMU and PIU shall prepare quarterly financial reports within 30 days after the end of the reporting period. The PMU shall consolidate the financial information to be included in the quarterly progress reports to be submitted within 45 days after the end of the reporting period. PMU and PIU shall prepare separate PFS according to agreed format within two months after the fiscal year.
8. Information systems	Moderate	Since 2019, DWRI and DHM are using the government software called CGAS e-payment system. However, direct payments and USD payments made from the advance account will have to be manually included in the system. The project financial reports are created manually in excel based on the CGAS information.	Active use of ADB systems (LFIS and CPD) to reconcile project accounts and ADB disbursement records, and keep track of direct payments as well as advances, replenishments and liquidations to the advance account. PMU and to PIU to explore ways to automate financial reporting for the project in the agreed format.
Control Risk	**Moderate**		
Overall Project financial management risk	**Moderate**		

ADB = Asian Development Bank, APFS = audited project financial statement, CGAS = Computerized Government Accounting System, CPD = client portal for disbursement, DHM = Department of Hydrology and Meteorology, DTCO = district treasury controller's office, DWRI = Department of Water Resources and Irrigation, FCGO = financial comptroller general's office, FM = financial management, GON = Government of Nepal, LFIS = loan financial information services, OAG = office of the auditor general, PAM = project administration manual, PFS = project financial statement, PIU = project implementation unit, PMU = project management unit, WB = World Bank.

17. DWRI and DHM have agreed to implement an action plan with key measures to address the identified risks. The financial management action plan presented in the table below summarizes the key risks, activities for mitigation, staff and/or personnel responsible, and agreed completion dates.

Table 15: Financial Management Action Plan

Risk area	Agreed Action	Responsible entity	Agreed Completion Date
Implementing entity	Set up and formalize the financial management arrangements including roles and responsibilities between the PMU and PIU.	PMU and PIU	By loan effectiveness
Staffing	Assign qualified accountant to the PMU and PIU.	PMU and PIU	By loan effectiveness
Staffing	Engage a financial management specialist to support PMU and PIU in training, system set-up, accounting and financial reporting.	PMU	By loan effectiveness
Staffing	Develop and implement a financial management training plan with regards to project financial reporting, ADB disbursement procedures and systems (CPD and LFIS), and FM and audit requirements.	PMU, PIU and ADB	Within 2 months after loan effectiveness
Accounting	Develop supplementary accounting instructions to enable consistent financial reporting by the PMU and PIU in line with financing structure and expenditure categories outlined in the PAM.	PMU and PIU	Within 2 months after loan effectiveness
Internal audit	Monitor FCGO/DTCO audit observations and implement all significant audit recommendations related to the project.	PMU and PIU	Within six months after the receipt of the internal audit report throughout the project implementation
External audit	Ensure the project is included in the audit plan of the OAG. Cause PMU's and the PIU's project financial statements to be audited separately by OAG in accordance with the statement of audit needs agreed between ADB and OAG. Compile the PMU and PIU APFS for further submission to ADB.	PMU and PIU PMU and PIU PMU	Within 2 months after loan effectiveness Annually throughout the project implementation Within 6 months after the end of the fiscal year
Financial reporting	Prepare quarterly financial reports and include comprehensive financial	PMU and PIU	Within 45 days after the end of the reporting period

Risk area	Agreed Action	Responsible entity	Agreed Completion Date
	information in the quarterly progress reports to be submitted to ADB.		
Information systems	Use of ADB systems (LFIS and CPD) to reconcile project accounts and ADB disbursement records, and keep track of direct payments as well as advances, replenishments, and liquidations to the advance account. PMU and PIU to explore ways to automate financial reporting for the project in the agreed format.	PMU and PIU	Monthly from loan first disbursement throughout project implementation Within six months after loan effectiveness

ADB = Asian Development Bank, APFS = audited project financial statement, CPD = client portal for disbursement, DTCO = district treasury controller's office, FCGO = financial comptroller general's office, LFIS = loan financial information services, OAG = office of the auditor general, PAM = project administration manual, PIU = project implementation unit, PMU = project management unit.

18. To ensure effective and timely implementation of the financial management action plan, DWRI and DHM are required to review the progress made against each agreed action on a quarterly basis. In addition, ADB review missions will review and verify the status of the financial management risks and financial management action plan on an annual basis and suggest remedial measures, as appropriate.

B. Disbursement

1. Disbursement Arrangements for ADB Funds

19. The loan proceeds will be disbursed in accordance with ADB's Loan Disbursement Handbook (2017, as amended from time to time), and detailed arrangements agreed upon between the government and ADB.[7] Online training for project staff on disbursement policies and procedures is available.[8] Project staff are encouraged to avail of this training to help ensure efficient disbursement and fiduciary control.

20. The project will make use of the Advance Fund, direct payment, and reimbursement procedure. DWRI and DHM will be responsible for: (i) preparing disbursement projections, and (ii) requesting budgetary allocations for counterpart funds and collecting supporting documents for their respective outputs. DWRI will be responsible for preparing and submitting all withdrawal applications to ADB and collecting the necessary documents from DHM and retaining supporting documents. To facilitate consolidation of ADB disbursement records and DWRI's and DHM's books of accounts, DWRI will claim expenditures incurred by DWRI and DHM in separate withdrawal applications.

21. **Advance fund procedure**. Immediately after loan effectiveness, DWRI and DHM will establish two advance accounts each, one for loan and one for the grant, in the Nepal Rastra Bank. The currency of the advance accounts is the US dollar. The advance account is to be used exclusively for ADB's share of eligible expenditures. The implementing agencies, DWRI and

[7] The handbook is available electronically from the ADB website: https://www.adb.org/documents/loan-disbursement-handbook

[8] Disbursement eLearning: http://wqr4.adb.org/disbursement_elearning

DHM, who administer their respective advance accounts are accountable and responsible for proper use of advances to the advance account including advances to any sub-accounts.

22. The total outstanding advance to each of the advance accounts should not exceed the estimate of ADB's share of expenditures to be paid through the advance account for the forthcoming 6 months. DWRI and DHM may request for initial and additional advances to the advance account based on an estimate of expenditure sheet setting out the estimated expenditures to be financed through the account for the forthcoming 6 months.[9] For every liquidation and replenishment request of the advance account, the borrower will furnish to ADB (i) a statement of account (bank statement ending balance). issued by the bank where the advance account is maintained, and (ii) the advance account reconciliation statement (AARS) reconciling the above-mentioned bank statement against Ministry of Finance's (MOF) records.[10] Supporting documents should be submitted to ADB or retained by DWRI and DHM in accordance with ADB's Loan Disbursement Handbook (2017, as amended from time to time) when liquidating or replenishing the advance accounts.

23. **Statement of expenditure (SOE) procedure.**[11] The SOE procedure may be used for reimbursement of eligible expenditures and liquidation of the advance account. The ceiling of the SOE procedure is the equivalent of $100,000 per individual payment. Supporting documents and records for the expenditures claimed under the SOE should be maintained and made readily available for review by ADB's disbursement and review missions, upon ADB's request for submission of supporting documents on a sampling basis, and for independent audit. DWRI and DHM (through DWRI) will be responsible for preparing liquidation and replenishment of the advance fund. Procedures for establishing and operating the advance account and SOE procedures are detailed in the ADB's Loan Disbursement Handbook (2017, as amended from time to time).

24. Before the submission of the first withdrawal application, the borrower should submit to ADB sufficient evidence of the authority of the person(s) who will sign the withdrawal applications on behalf of the government, together with the authenticated specimen signatures of each authorized person. The minimum value per withdrawal application is stipulated in the ADB's Loan Disbursement Handbook (2017, as amended from time to time). The borrower should ensure sufficient category and contract balances before requesting disbursements. Use of ADB's Client Portal for Disbursements (CPD) system is encouraged for submission of withdrawal applications to ADB.[12]

2. Disbursement Arrangements for Counterpart Funds

25. All disbursements under government financing will be carried out in accordance with the regulations of the Government of Nepal and accounting principles acceptable to ADB.

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[9] Estimate of expenditure sheet is available in Appendix 8A of ADB's *Loan Disbursement Handbook* (2017, as amended from time to time).

[10] Follow the format provided in Appendix 8B of ADB's *Loan Disbursement Handbook* (2017, as amended from time to time).

[11] Statement of expenditure forms are available in Appendix 7B and 7D of ADB's *Loan Disbursement Handbook* (2017, as amended from time to time).

[12] The Client Portal for Disbursement facilitates online submission of withdrawal application to ADB, resulting in faster disbursement. The forms to be completed by the Borrower are available online.

C. Accounting

26. DWRI and DHM will maintain, or cause to be maintained, separate books and records covering all cash receipts from all funding sources and payments occurred under their respective project outputs. DWRI and DHM will prepare separate project financial statements, in accordance with Nepal Public Sector Accounting Standards cash basis of accounting and Government of Nepal's accounting policies which are consistent with international accounting principles.

27. **Financial Reporting.** The project financial statements shall follow the guidance included in the statements of audit needs agreed between ADB and the Office of the Auditor General (OAG) and will include at a minimum, the following:

(i) Statement of sources and consolidated uses of funds showing the funds received and expenditures incurred from ADB, the government and other project financiers (if applicable) for the current year, prior year and cumulative from inception to date;
(ii) Statement of budget versus actual showing expenditures for the current year. Any significant variances must be adequately explained in the notes;
(iii) Statement of expenditures (SOE);
(iv) Statement of imprest/advance account including advance account reconciliation and advance account ledger and photocopy of imprest/advance account bank statement as well as bank balance certificate for the unspent balance;
(v) Statement of compliance with financial covenants;
(vi) Detailed notes to the financial statements including accounting policies and explanatory notes, break-down of expenditures by financiers, and a detailed list of Withdrawal applications submitted to—and the amounts paid by ADB as follows: (a) withdrawal application number; (b) the amount claimed and currency; (c) date submitted; and (d) disbursement method and the amount disbursed by ADB as well as the applicable exchange rate.

28. In order to provide timely information on the project's financial progress and the status of financial management, to the project management, DWRI and DHM as well as ADB, the DWRI and DHM will produce quarterly financial reports within 30 days after the end of the reporting period. The DWRI will consolidate the financial information in the quarterly progress reports (QPRs) to be submitted to ADB within 45 days after the end of the quarter.

29. The consolidated financial information in the QPRs will include at least the following:

(i) Overall financial progress by financing source for the reporting period, year to date and cumulative;
(ii) Timeliness and adequacy of Government counterpart funding;
(iii) Disbursement information for the reporting period, year to date and cumulative, including comparison with the disbursement curves outlined in the PAM;
(iv) Reconciliations of the Advance Accounts. Any reconciliation items are to be disclosed and explained in the text;
(v) Reconciliation of project records with ADB disbursement data. Any discrepancies are to be disclosed and explained in the text;
(vi) Variance analysis including budget vs actual expenditures and physical vs financial progress, with significant deviations are analyzed and explained;
(vii) Signed contracts and payments made under each contract in the reporting period and cumulative, including comparison with the contract award curve outlined in the PAM; and

(viii) Status of financial management under the project including follow-up status on the (a) FM action plan, (b) compliance with financial loan covenants, (c) past external and internal audit (if any) observations related to the project as well as (d) agreed actions from review missions.

30. **Reconciliations and Variance analysis.** Detailed financial reports may be included as an annex to the progress report as agreed with ADB. To ensure the correctness and completeness of the project's disbursement records, DWRI and DHM shall conduct:

(i) Monthly reconciliations of the two advance accounts and the respective subaccounts; and
(ii) Quarterly reconciliation of the project accounts, and ADB's disbursement data available in the Loan/Grant Financial Information System.

31. Any discrepancies and/or reconciliation items will be promptly followed up on to ensure these are resolved in a prompt manner. Furthermore, any differences between amounts claimed and the amounts disbursed will be disclosed and explained in the WA register, in the quarterly progress reports and in the notes of the project financial statements.

32. Moreover, DWRI and DHM will conduct variance analysis of at least on a quarterly basis, examining the differences between budgeted vs. actual expenditures as well as financial vs. physical progress. The variance analysis will pay particular attention to:

(i) Significant deviations from the budgeted engineer's estimate;
(ii) Significant deviations between financial and physical progress;
(iii) Significant delays on (planned vs. reported) physical and/or financial progress; and
(iv) Inconsistent and/or delayed progress reporting.

33. Any significant variances, delays or deviations etc. shall be promptly followed-up on and explained in the QPRs.

34. **Capacity building of financial management staff.** To ensure an effective operation of FM staff assigned to the project, the PMU/DWRI and PIU DHM will ensure that each financial/accounts staff assigned to the project undertake the following actions within the first 3 months working with the project:

(i) Become aware of the ADB's and national anticorruption policy and whistleblowing mechanisms;
(ii) Complete the ADB Disbursement eLearning course;
(iii) Master loan/grant agreement including the loan covenants and the relevant sections of the Project Administration Manual, ADB disbursement handbook as well as The Statement of Audit needs agreed between ADB and the OAG;
(iv) Obtain user/reader rights (as required) to ADB's systems including: CPD and Loan/Grant Financial Information System; and
(v) Familiarize themselves with the agreed statement of audit needs between OAG and ADB as well as ADB's financial reporting requirements.

35. In addition, the project should on a yearly basis liaise with ADB to take advantage of other financial management resources and training events organized by ADB, especially in the first years of project implementation.[13]

36. **Fixed Asset Management**. All project assets created, and equipment purchased as part of the project will be recorded in the DWRI/DHM's fixed asset register. The project assets will be subject to annual physical inventory exercises/verification counts where the location and condition of the assets/equipment is confirmed.

D. External Auditing and Public Disclosure

37. DWRI and DHM will cause their respective project financial statements to be audited separately on an annual basis and in accordance with the International Organization of Supreme Audit Institutions Fundamental Auditing Principles by the OAG. The Statement of Audit Needs agreed between ADB and the OAG will be used as a guide.

38. The respective audit reports will include a separate audit opinions, which will cover (i) whether the project financial statements present a true and fair view or are presented fairly, in all material respects, in accordance with the applicable financial reporting framework; (ii) whether the loan proceeds were used only for the purposes of the project; and (iii) the level of compliance for each financial covenant contained in the legal agreements for the project. As part of the audit report a management letter shall also be provided. From the second audit onwards, the management letters will include a follow-up on the implementation status of previous audit recommendations (where applicable).

39. The PIU will submit its audited project financial statement (APFS) to the PMU in a timely manner to allow the PMU to compile the APFS, audit opinions and management letters for both entities and submit the complete package to ADB in a timely manner.[14] As part of the compilation, the PMU will ensure the financial information presented in each of the APFS reconcile with ADB's disbursement records. In this regard, a separate unaudited reconciliation statement, in a format acceptable to ADB, will be attached to the complied APFS submitted to ADB. Any discrepancies will be promptly followed-up by the PMU, so the matter can be solved in a timely manner.

40. The APFS, together with the auditor's opinion, and the management letter will be presented in the English language and submitted to ADB within 6 months from the end of the fiscal year. Compliance with financial reporting and auditing requirements will be monitored by review missions and during normal program supervision, and followed-up regularly with all concerned, including the external auditor.

41. The government, DWRI, and DHM have been made aware of ADB's approach to delayed submission, and the requirements for satisfactory and acceptable quality of the audited project financial statements.[15] ADB reserves the right to require a change in the auditor (in a manner

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[13] ADB offers an eLearning course: Cash Basis IPSAS for ADB Project Financial Reporting.

[14] No later than 6 months after the end of the fiscal year.

[15] Following is ADB's policy on delayed submission of audited project financial statements:

(i) When audited project financial statements are *not received by the due date*, ADB will write to the executing agency advising that (i) the audit documents are overdue; and (ii) if they are not received within the next 6 months, requests for new contract awards and disbursement such as new replenishment of advance accounts, processing of new reimbursement, and issuance of new commitment letters will not be processed.

(ii) When audited project financial statements *have not been received within 6 months after the due date*, ADB will withhold processing of requests for new contract awards and disbursement such as new replenishment of

consistent with the constitution of the borrower), or for additional support to be provided to the auditor, if the audits required are not conducted in a manner satisfactory to ADB, or if the audits are substantially delayed.

42. ADB reserves the right to verify the project's financial accounts to confirm that the share of ADB's financing is used in accordance with ADB's policies and procedures. Public disclosure of the APFS, including the auditor's opinion on the project financial statements, will be guided by ADB's Access to Information Policy.[16] After the review, ADB will disclose the APFS and the opinion of the auditors on the project financial statements no later than 14 days of ADB's confirmation of their acceptability by posting them on ADB's website. The management letter and additional auditor's opinions will not be disclosed.[17]

43. **Winding up and loan closure.** In order to close the project account in a timely manner and to comply with ADB's requirements, DWRI and DHM will ensure that the following measures are undertaken:

(i) All ADB-financed expenditures are incurred before or by the loan/grant closing date;
(ii) All withdrawal applications including liquidations of the advance account are submitted to ADB preferably by the loan/grant closing date but in no case later than the end of the winding-up period; that is, within four months after the end of the loan closing date;
(iii) Any unutilized advances are refunded to ADB within 2 months after the end of the winding-up period;
(iv) The final project financial statements are audited by independent auditors (OAG) as agreed with ADB and the APFS and the management letter are submitted to ADB as soon as possible after the loan closing date;
(v) The final APFS must include all eligible expenditures incurred up to the loan closing date as well as up to the final withdrawal application submitted to ADB;
(vi) All past audit observations are resolved in a timely manner;
(vii) A final inventory of the project's assets is conducted and duly documented to facilitate the transfer of assets to the relevant authorities, as applicable; and
(viii) All project financial records are filed in an orderly manner and stored in a secure location for a for at least 1 year following receipt by ADB of the final audited project financial statements or 2 years after the loan closing date, whichever is later.

advance accounts, processing of new reimbursement, and issuance of new commitment letters. ADB will (i) inform the executing agency of ADB's actions; and (ii) advise that the loan may be suspended if the audit documents are not received within the next 6 months.

(iii) When audited project financial statements *have not been received within 12 months after the due date*, ADB may suspend the loan.

[16] Available at https://www.adb.org/sites/default/files/institutional-document/450636/access-information-policy.pdf

[17] ADB. 2018. *Access to Information Policy*. Paragraph 17(iv) and (v). This type of information would generally fall under public communications policy exceptions to disclosure.

VI. PROCUREMENT AND CONSULTING SERVICES

A. Advance Contracting and Retroactive Financing

44. All advance contracting and retroactive financing will be undertaken in accordance with ADB Procurement Policy (2017, as amended from time to time) and Procurement Regulations for ADB Borrowers (2017, as amended from time to time). The issuance of invitations to bid under advance contracting and retroactive financing will be subject to ADB approval. The borrower, Executing Agency MEWRI, and Implementing Agencies, DWRI and DHM have been advised that approval of advance contracting and retroactive financing does not commit ADB to finance project.

45. **Advance contracting.** The works and services packages to be financed by the project through advance contracting are: (i) Civil works CW-01 (Mohana Khutiya subproject); (ii) Civil works CW-02 (Mawa Ratuwa subproject); and (ii) Consulting services CS-01 (Project Implementation Consultant) and (iii) FFEWS FF-01. Eligible PMU and PIU setting-up expenses (office equipment, vehicles, and personnel) may also be part of advance contracting and retroactive financing. Table 16 below indicates the schedule for advance contracting, for CS-01, CW-01, CW-02, and FF-01 including status for each activity.

46. **Retroactive financing.** The maximum amount of expenditures eligible under the retroactive financing shall not exceed 20% of the total ADB loan amount which shall have been incurred before loan effectiveness, but not more than 12 months before the signing of the loan agreement.

Table 16: Advanced Actions

Activity	Responsible	Due date	Comment
CS-01: Project Implementation Consultant			
CSRN posting	DWRI	31-Oct-19	Completed
EOI submission deadline		29-Nov-19	Completed
Shortlisting and submission of S-1	DWRI	30-May-20	Completed
RFP submission deadline		28-Sep-20	
Technical proposal evaluation, preparation and submission of S-2	DWRI	27-Dec-20	
Financial proposal evaluation, preparation and submission of S-3	DWRI	09-Feb- 20	
Contract negotiation and signing	DWRI	23-Feb-21	
Consultant mobilization	DWRI	24-Mar-21	

Activity	Responsible	Due date	Comment
CW-01: Flood Control Works at Mohana Khutiya River Basin			
Submission of bid document to ADB	DWRI	20-Jun-20	Submitted 24-Jun-20
Advertise Bid Notice	DWRI	29-Aug-20	
Receipt of bids	DWRI	10-Oct-20	
Technical bid evaluation report preparation and submission to ADB	DWRI	09-Nov-20	
Price bid evaluation report preparation and submission to ADB	DWRI	19-Dec-20	
Contract signing	DWRI	26-Jan-21	
Submission of signed contract agreement to ADB	DWRI	27-Jan-21	
Contractor mobilization	DWRI	27-Jan-21	

Activity	Responsible	Due date	Comment

CW-02: Flood Control Works at Mawa Ratuwa River Basin			
Submission bid document to ADB	DWRI	20-Jun-20	Submitted 24-Jun-20
Advertise Bid Notice	DWRI	29-Aug-20	
Receipt of bids	DWRI	10-Oct-20	
Technical bid evaluation report preparation and submission to ADB	DWRI	09-Nov-20	
Price bid evaluation report preparation and submission to ADB	DWRI	19-Dec-20	
Contract signing	DWRI	26-Jan-21	
Submission of signed contract agreement to ADB	DWRI	27-Jan-21	
Contractor mobilization	DWRI	27-Jan-21	

Activity	Responsible	Due date	Comment
FF-01: FFEWS			
Submission bid document to ADB	DHM	31-Aug-20	
Advertise Bid Notice	DHM	01-Oct-20	
Receipt of bids	DHM	12-Nov-20	
Technical bid evaluation report preparation and submission to ADB	DHM	12-Dec-20	
Price bid evaluation report preparation and submission to ADB	DHM	21-Jan-21	
Contract signing	DHM	28-Feb-21	
Submission of signed contract agreement to ADB	DHM	01-Mar-21	
Contractor mobilization	DHM	01-Mar-21	

ADB = Asian Development Bank, CS = consulting services, CSRN = consulting services recruitment notice, CW = civil works, DWRI = Department of Water Resources and Irrigation, EOI = expression of interest, RFP = request for proposals, S = submission.

B. Procurement of Goods, Works, and Consulting Services

47. All procurement (including consulting services and non-government organizations) of goods and works will follow ADB Procurement Policy (2017, as amended from time to time) and Procurement Regulations for ADB Borrowers (2017, as amended from time to time).[18]

48. Open competitive bidding (OCB) (international advertisement) procedures will be used for any works contract estimated to cost $5.00 million or higher, and any goods contract valued at $2.00 million or higher. Domestic preference may apply to civil works and goods packages. For any works contract estimated to cost less than $5.00 million and any goods contract estimated to cost less than $2.00 million OCB (national advertisement) procedures will be used. Request for quotations will be used for procurement of works and goods worth less than $100,000. The government shall use hard copies or through electronic means for OCB (national advertisement). For OCB (international advertisement), only manual bidding will be used.

49. All OCB (national advertisement) contracts and first package each of shopping for works and goods under the project will be subject to prior review by ADB. Procurement capacity assessment of the DWRI and DHM indicates that it has adequate human and physical resources for carrying out procurement.

50. All procurement activities, including the FFEWS, will be the responsibility of the Project Director of the PMU, who will be supported by his or her staff and consultants. ADB will closely monitor all major project implementation activities. Civil works will comprise (i) five OCB packages

[18] In the event of any unclarity regarding procedures to be undertaken for procurement under the Project, ADB will provide clarifications at the government's request. Procurement under the project will be undertaken through use of the applicable standard bidding documents published by ADB.

for the river training works and (ii) OCB packages for flood shelters. FFEWS would be procured through a turnkey contract (using Goods and related services single stage two envelope procedure of ADB).

51. The terms of reference for the project implementation consultants (PIC) are provided in ATTACHMENT F. An estimated 57 person-months of consulting services (25 international, 26 national and 6 national non-key) are required to (i) facilitate design, supervision, and management of subprojects; (ii) support project management and quality assurance; (iii) strengthen institutional capacity; and (iv) facilitate gender development and poverty alleviation. A team of consultants (PIC) will be recruited through a firm using the quality and cost-based method of selection with a quality-cost ratio of 90:10 to ensure engagement of highly qualified and experienced team of consultants.

52. The project also envisages the recruitment of an NGO for design and implementation of CBDRM activities. They will be recruited using the quality and cost-based method of selection with a quality-cost ratio of 90:10. The services of CBDRM consultant are required to facilitate design, management and implementation of CBDRM activities. The project though the field offices will procure works through community procurement in compliance with the threshold limit indicated in procurement plan. The field offices have adequate capacity and experience in procuring community contracts for civil works. The community procurement for implementing bio-engineering work (establishing nursery, implementing bio-engineering of embankments, and their maintenance shall not exceed the threshold of NRs6 million).

C. Procurement Plan

53. The procurement plan (ATTACHMENT E) is prepared in accordance with ADB's country-specific template. The procurement plan indicates threshold and review procedures, goods, works, and consulting service contract packages and national competitive bidding guidelines. The procurement plan provides: (i) a list of goods, works, and consulting services contract packages that will be processed over the next 18 months with milestone dates for activities; (ii) the proposed methods for procurement of such contracts that are permitted under the loan agreement; and (iii) the related ADB review procedures. The procurement plan will be updated by the PMU for approval by ADB, at least annually, and more frequently if necessary, and should cover the next 18 months of procurement activity. A delay in loan effectiveness, other start-up delays, and delays during implementation will require an unscheduled procurement plan update. ADB will review each updated procurement plan prior to its publication.

54. ADB will review documents and submissions related to procurement at all major milestones prior to proceeding with the procurement process. PMU and DHM PIU will be supported by procurement specialist in the PIC and with regular trainings on procurement.

VII. SAFEGUARDS

55. In compliance with ADB's Safeguard Policy Statement, 2009 (SPS), the project's safeguard categories are as follows.

A. Environmental Safeguards

56. **Environment (category B).** Initial environmental examination (IEEs) were prepared for the six river basins from feasibility studies, although the East Rapti subproject involves only construction of flood shelters and development of FFEWSs. The IEEs were prepared following the national environmental provisions and ADB's SPS. The IEEs include the environmental management plan (EMP), which identifies the potential environmental impacts and proposes mitigation measures, a monitoring plan, and overall safeguards implementation institutional arrangements. The EMP also requires occupational health and safety measures for project staff and nearby communities, including managing the spread of coronavirus disease (COVID-19). The IEEs will be disclosed on ADB's website based on the requirements of the SPS and ADB's Access to Information Policy.

57. The project will not encroach upon national parks and buffer zones, protected or sensitive ecosystems, and ancient heritage sites. The project's key activities that attract environmental concerns are construction of embankments, flood shelters, FFEWSs, and quarry operation. The environmental impacts predicted during implementation are mainly restricted to the construction stage and will be site specific, short in duration, reversible, and of low significance, such as temporary dust in the air, sediments in water, and noise pollution.

58. An environmental liaison officer will be appointed at PMU for overall safeguards coordination in the project. The officer will be supported by the PIC environmental specialist. The consultant will be responsible to establish overall safeguards monitoring and reporting mechanism in the project, develop an environmental safeguards management information system (MIS) prepare monitoring checklist and reporting formats, and support in capacity development of executing agency, implementing agency and contractors in operation of e-MIS and reporting by using standard checklist. The Chief of the Field Offices will be designated as safeguard focal point, who will be supported by safeguards field monitors of the PIC (one in each subproject). The field monitors will support the field offices safeguard focal in compliance monitoring and reporting field level safeguards performance. The contractor will appoint a full-time senior safeguards assurance officer and a senior safety officer accredited in occupational health and safety in each contract package. Safeguards performance of the project will be reported through QPR and semi-annual environmental monitoring report (EMR) during construction and annual monitoring report during operation and maintenance phases. Consultation with stakeholders and affected people were carried out during project preparation and will be continued during implementation following ADB's Access to Information Policy. The executing agency will establish a grievance redress mechanism (GRM) at central and local levels to receive, assess and resolve complaints from affected persons or community during implementation. Transparency will be maintained in handling the complaints at all times.

59. **Environmental Management Plan**. The EMP will be attached with the respective bidding and contract agreement documents. The bidders shall propose sufficient budget in their bids for implementing EMP requirements following suggested specifications as suggested in the bill of quantities. The contract agreement will have safeguards clause along with action for noncompliance's. Sufficiency of budget and commitment of bidder in this regard will be verified by the Employer. The site-specific environmental management plan (SEMP) will take into account

the prevailing pandemic situation and the guidance issued by Government of Nepal, the successful contractor will prepare and submit a SEMP that includes the occupational health and safety (OHS) plan and a standard operational procedure (SOP) to manage COVID-19 risks. The SEMP and OHS Plan will comply with the EMP measures and the government instruction/ guidelines for implementing construction work during the pandemic. The SOP will also follow the guidance issued by agencies like WHO, ILO and IFC. The EA will guide the contractor in preparing site-specific EMP and OHS plans with SOP giving a priority to the measures for responding to the COVID-19 risks during construction. The contractor will seek the Employer's endorsement after award of contract and before site mobilization.

B. Social Safeguards

60. **Involuntary resettlement.** The project is classified as category *C* for involuntary resettlement in accordance with ADB's SPS. The social safeguards due diligence confirms that there is no physical or economic displacement due to involuntary land acquisition or involuntary restriction on land use under the project.[19] Project infrastructure is estimated to require (i) about 50 hectares (ha) of land for construction of embankments (9 m–12 m width) across five river basins, (ii) 1.6 ha of land for construction of 48 community flood shelters (approximately 340 m^2 per flood shelter) across six river basins, and (iii) 0.02 ha of land for the 30 rain gauge stations (approximately 5 m^2). The project will satisfy land use requirements through a combination of government land, negotiated settlement and voluntary land contributions from direct project beneficiaries. Government land is free from occupants (including street vendors) and there are no common property resources on such lands. The following paragraphs outline the project's procedures for undertaking negotiated land settlements and or voluntary land or land use donations in a transparent, consistent, and equitable manner so that people entering into agreements maintain the same or better income and livelihood status. The institutional roles, responsibilities, and implementation arrangements for social safeguards is outlined below in Section D.

61. **Procedure for voluntary land or land use donation.** Land for embankment construction will be contributed on a voluntarily basis by *eligible* project beneficiaries. Landowners and users are deemed eligible to contribute land or land use to the project when: (i) the donation is verified as voluntary and not resulting from coercion or force,[20] (ii) the donation is verified to not negatively impact or impoverished the land owner or user,[21] (iii) the project benefit will realistically offset the affected party's land or land use donation, and (iv) the donation is verified in verbal and written records as confirmed and witnessed by an independent third party.[22] Recognizing that landowners and users living in flood affected areas are majority poor and marginalized, the project will provide livelihoods enhancement training for all landowners and users that contributed to the project.[23] Private land owners will choose to transfer the contributed land title deed to the government or maintain the land title deed in their own name; whichever option is deemed preferable in the

[19] Social Safeguards Due Diligence Reports (accessible from the list of linked documents in Appendix 2 of the report and recommendation of the President).

[20] Including from other community members, government authorities or any other party.

[21] Donations resulting in a loss of more than 10% of the household annual income *OR* a loss of more than 10% of the household total land holding cannot be contributed on a voluntary basis to the project, irrespective of the affected party's willingness to do so. Furthermore, no structures including residential, business, animal or food storage can be donated to the project on a voluntary basis.

[22] An independent third party is a designated nongovernmental organization, government or legal authority who does not serve to benefit from the Project and is impartial to the donation outcome.

[23] The Social Safeguard Focal will be responsible for overseeing the design, preparation, and implementation of the livelihood's enhancement for eligible households. A budget has been assigned to the activities; a time-bound work plan will be submitted to ADB following the verification of land use arrangements.

landowner interest.[24] All land and land user contributions must be verified by the field office Social Development Officers in collaboration with local representatives (ward members) before land is provided by PMU to the contractors. The PMU will ensure that all voluntary land and land use donations are documented, overseen by an independent third party and reported within the project's semi-annual Social Safeguards Monitoring Reports (SMR. see para. 91).

62. **Procedure for negotiated settlement.** Where landowners or users are ineligible or do not wish to donate land, the project has the option to enter into a negotiated settlement. Compensation for the negotiated settlement will be provided in the form of replacement of assets (land for land) or cash compensation. Embankment user associations will be formed with the ward representative to identify cases and appropriate compensation provisions. As per ADB SPS, negotiated settlement is achieved by providing fair and appropriate compensation and other incentives to the willing seller, negotiated through meaningful and well documented consultations. To the extent negotiation is based on the concept of willing buyer and willing seller, negotiated settlement is voluntary (footnote 22). If negotiations fail, the project must avoid the affected asset by changing the project design. The PMU will ensure that negotiated settlements are documented, overseen by an independent third party and reported within the project's SMR.

63. **Indigenous peoples:** The project is classified as category *B* for indigenous peoples in accordance with ADB's SPS. Social safeguards due diligence confirmed that the targeted beneficiary population are majority indigenous as per the ADB definition; ethically distinct and vulnerable. Over 50 community consultations and 400 household surveys were conducted during the project preparation for the purpose of indigenous people identification and impact assessment. Multiple indigenous people groups were identified, including the Madheshi, Tamang, Bote, Chepang, Gurung, Rai, Magar, Newar, and Tharus ethnic groups.[25] Consultations confirm that project activities will not adversely affect the dignity, human rights, livelihood systems, culture, territory, natural, or cultural resources of indigenous peoples.. The indigenous people population expects to benefit from flood protection and enhanced disaster readiness.

64. ADB's SPS indigenous people safeguard seeks to ensure that indigenous peoples (i) receive culturally appropriate social and economic benefits, (ii) do not suffer adverse impacts as a result of projects, and (iii) can participate actively in projects that affect them. As per Appendix 3, para. 17 of ADB's SPS, a separate indigenous peoples plan is not required, as indigenous peoples are the majority of direct project beneficiaries, and only positive impacts are identified. The project design has mainstreamed a culturally sensitive approach to information sharing, meaningful consultation, and benefit sharing.[26] The following paragraphs describe how the project has ensuring meaningful and ongoing consultations with indigenous people and culturally appropriate benefit sharing mechanisms.

65. Indigenous people information sharing and consultation in project design and implementation. During project preparation, indigenous peoples actively participated in project

[24] Landowners will not be obliged to transfer their land title deeds to the government as the river course will change in time and the landowner may be able to reclaim their land. As per the Memorandum of Understanding, landowners will only be able to access the donated land once the embankment is no longer functional. The expected life of the embankment is 25 years.

[25] The Brahmin, Chhetri and the Dalit castes are common to all the sub project areas whereas diverse indigenous ethnic groups are present across in the six sub project areas. Indigenous peoples are found to maintain their own distinct ethnic cultural systems and nature-based livelihood practices. For example, the Rajbansis, Majhi, Bote, Danwar and Tharu maintain a river-based lifestyle and fish consumption as a staple in the diet. Each indigenous ethnic group has their own way of deriving their livelihood from available natural resources in the sub-projects.

[26] ADB. 2009. *Safeguard Policy Statement*. Manila. See Appendix 3, Safeguard Requirements 3: Indigenous Peoples, para. 17.

screening activities including community level focus group discussions and household surveys. Indigenous people participants, both male and female, were invited to share views about the location and use of project infrastructure (embankments, rain gauges and community flood shelters). Indigenous peoples were also invited to share distinct cultural norms and practices associated with flood protection management, including preparation, response, early warning, and post-disaster relief. Community consultations highlighted that indigenous peoples in the project area possess extensive knowledge about the trend of rivers, including indigenous ways of knowing about flood indications as well as various local methods to complement the river embankment related construction activities. The main concern of indigenous peoples related however to ensuring a gender responsive project design. Specifically, indigenous people women and girls have requested that community flood shelters provide separate bathrooms and private spaces for menstruating and elderly women, as well as women with small children. Indigenous people women also requested the project to ensure their participation in decision making and training opportunities. Indigenous people groups did not perceive any issue with the mixing of indigenous people groups during a flood response scenario. To the contrary, rural communities in the region are often ethnically diverse. Furthermore, indigenous people groups do not reportedly have any culturally distinct flood mitigation or response practices that they deem relevant for the project. Notwithstanding this, indigenous peoples will again be consulted during the implementation period when the community-based flood forecasting and early warning system is designed.

66. **Gender.** The project's Gender Equality and Social Inclusion (GESI) Action Plan was designed in response to indigenous people feedback. The GESI action plan outlines a series of activities and targets aimed at ensuring ongoing and meaningful consultation with indigenous people groups about impacts and culturally appropriate benefit sharing. For example, the GESI action plan contains targets for indigenous people (and indigenous people women's) inclusion in the rehabilitation and construction of flood control infrastructures. Participation of indigenous peoples (and indigenous people women) in all safeguards related consultations. Targeted indigenous people inclusion in flood risk management training. Indigenous people participation and input into the design of culturally responsive community risk reduction plan for each subproject. The GESI action plan activities and targets are budgeted and will be monitored within the project's quarterly progress report. The project's Social Safeguards Focal will further report on adherence to ADB's indigenous people safeguard principles within the project's semi-annual SMR. The GRM is designed to culturally sensitive to the needs and interests of indigenous peoples.

67. **Prohibited investment activities.** Pursuant to ADB's SPS, ADB funds may not be applied to the activities described on the ADB Prohibited Investment Activities List set forth at Appendix 5 of the ADB's SPS.

C. Grievance Redress Mechanism

68. Under safeguards implementation, a project specific GRM will be established to receive and facilitate the resolution of affected people's concerns, complaints, and grievances if any about the social and environmental performance at the project level. The GRM will aim to provide a time bound and transparent mechanism to voice and resolve social and environmental concerns linked with the project. A GRM shall be established to ensure:

(i) The basic rights and interests of every person affected by poor environmental or social performance of the project are protected; and

(ii) Concerns arising from the poor environmental or social performance of the project during the conduct of pre-construction, construction and operation activities are effectively and timely addressed.

69. GRM is proposed to be simple, transparent, and responsive. GRM will address only the concerns arising due to the project implementation activities, mainly during construction stage. It will be a four-tier mechanism with scope for availing Nepal's legal system which can be availed at any time irrespective of lodging any concerns in the first and second tier of GRM.

70. The Environmental Liaison Officer in PMU will distribute the project booklets designed to inform general public about their rights as per the EMP by following the provision of GRM, and also complaints forms to the chiefs of all local bodies. The affected person or community desiring to register complain about the impact of construction works on their property, production system, economic well-being, and any other environmental impacts such as quality of surface and ground water, quality of air and noise, health, safety, welfare, or any other assets of their lives shall make their complaint using these complaints forms and register in the grievance redress committee.

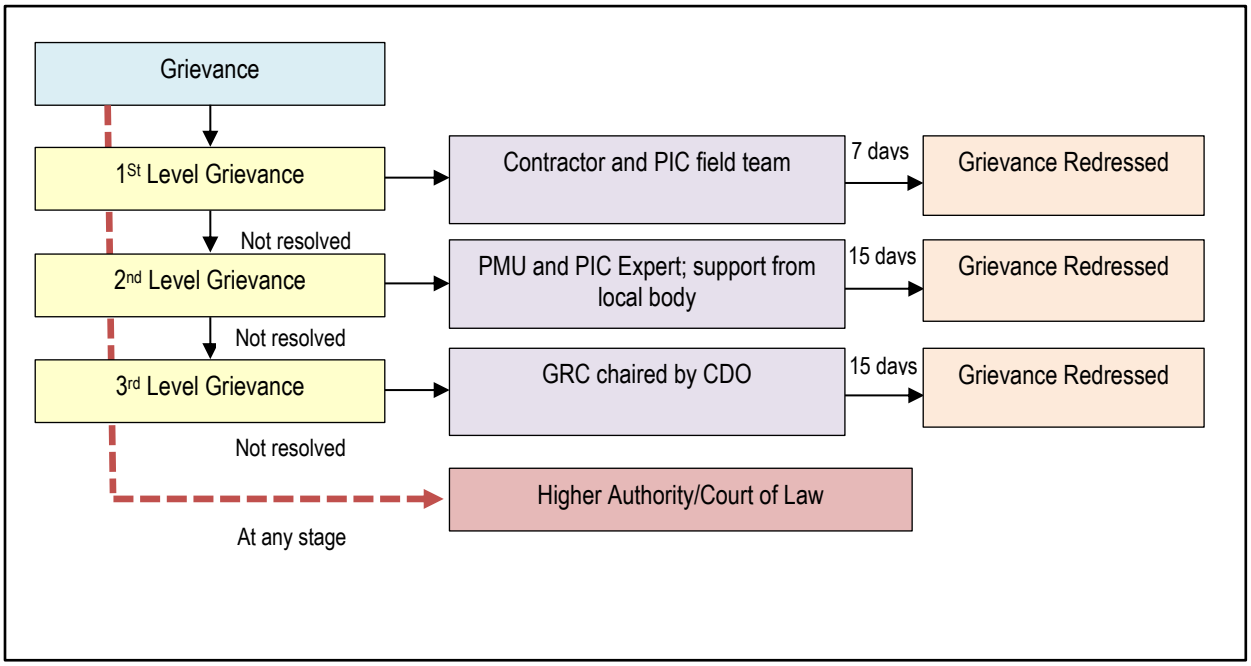
71. DWRI through its field offices will coordinate with local bodies at the project influence area to resolve grievances related with the project activities. A grievance redress committee (GRC) will be established at district administration office chaired by the chief district officer and representatives from ward and municipality, district revenue office, and district survey office as members. The field office chief will be the member secretary. The GRM will provide applicants with a culturally sensitive and inclusive mechanism. Submitted grievance will be addressed in timely and amicable resolution of the grievances, preferably at the project level (1st level of grievance handling). For any grievance filed by a marginalized or vulnerable person, such as an indigenous or poor person, extra attention will be paid to ensuring the following: (i) complainant will be aided in recording their grievance (field offices to write up verbal complaint verbatim), (ii) complainant can be represented and supported by a local leader (such as an indigenous leader), (iii) the GRC will use locally established grievance redress system if relevant (in the case of indigenous people) and (iv) the outcome of the grievance will be delivered in writing and in person by the field office person responsible, to ensure comprehension of the outcome and any follow up actions. All grievances shall be recorded in grievance register (including in Nepali or local language), and entire process shall be tracked and reported through quarterly and annual progress report and semi-annual social and environmental safeguards monitoring reports. Legal redress can be accessed at any stage in the GRM. The grievance redress process shall include the following stages:

72. **Level 1:** Aggrieved person/household shall file the complaint at subproject level. The receiving agent will be obliged to provide immediate written confirmation of receiving the complaint, and document that in GRM register. The grievance will be discussed with the affected person(s) and Safeguard Desk in the field office supported by the environment monitors to reach an agreement to settle the issue locally (within 15 days). If after 7 days the aggrieved person does not agree with grievance redressal proposal by the PIU, the complaint may be forwarded to PMU/PIU DHM seeking appropriate resolution.

73. **Level 2:** PMU/PIU DHM in consultation with aggrieved person and support from Local Body will try to solve the problem within 15 days of receipt of the complaint received in their office. If no amicable solution is reached at PMU/PIU DHM level within 15 days, the grievance shall be forwarded to GRC chaired by Chief District Officer.

74. **Level 3:** Project will form a GRC at district level chaired by the Chief District Officer, and representatives from the field office/PIU, concerned municipality, and the ward chair will be the member, and the field office chief will be the member secretary. The PIU chief supported by safeguard monitors will function the role of member secretary. The GRC will consult with the complainant and propose to resolve the issue. The GRC may invite concerned line agencies, and community group for discussion to find an amicable solution.

Figure 5. Grievance Redress Mechanism



CDO = Chief District Officer, GRC = Grievance Redress Committee, PIC = Project Implementation Consultant, PMU = Project Management Unit.

75. **Other dispute redress mechanisms.** The complainant, if not satisfied with the resolution through the GRM, can always have legal recourse to judicial processes at any stage of grievance redressal. In the ADB Accountability Mechanism, people adversely affected by ADB-financed projects can express their grievances; seek solutions; and report alleged violations of ADB's operational policies and procedures, including safeguards. This is a separate resolution mechanism from the GRM described above.

76. The Accountability Mechanism has two separate but related phases. First is problem solving, led by ADB's special project facilitator, to assist complainant in finding solutions to their problems. The second is the compliance review led by a three-member panel that investigates alleged violations of ADB's operational policies and procedures, including safeguard policies, that have already resulted in, or are likely to result in, direct adverse and material harm to Project-affected people. It recommends how to ensure Project compliance with these policies and procedures.

D. Safeguard Implementation Arrangement

77. **Project Management Unit**. The PMU will establish a "Central Safeguard Desk" (CSD) and comprise Safeguard Liaison Officer (SLO) supported by a senior environment cum safety consultant (SEC) accredited in OHS and senior social consultant (SSC) of PIC. The SLO will ensure full compliance with the overall environmental and social safeguards. The SLO will work

closely with environment and social development focal points and safeguards field monitors located in the field offices . The field offices shall work under the guidance of CSD and report to them. The safeguard focal person(s) will co-chair SLO meetings. They will be supported by a senior environment/OHS specialist mobilized through the project implementation consultant (PIC).

78. The SEC will support the PMU and the PIU to (i) ensure EMP/OHS requirements are included in BOQ and the specifications in the bidding document; (ii) support the PMU to work jointly with the field offices to ensure all required environmental safeguards clauses are included in the contract agreement; (iii) establish safeguards mechanism, develop an environmental safeguards management information system (e-MIS); prepare associated standard environmental and OHS monitoring checklist, and provide orientation to PMU/field offices/PIU staff, environment monitors and contractors in using them; (iii) prepare structure of environmental compliance reporting in quarterly and semi-annual monitoring reports covering PMU, field offices and PIU activities; (iv) facilitate PIUs in complying with all government rules regarding environmental clearances; (v) periodic field monitoring and provide guidance to the field offices/PIU in properly carrying out the environmental and OHS activities; (vi) review, monitor and recommend field offices to take timely corrective actions; (vii) consolidate monthly environmental monitoring reports received from field offices and prepare semi-annual monitoring reports, and share with PMU and PIU/DHM prior to forwarding to ADB; (viii) assist in meaningful consultation and setting up of GRM in each field office; (ix) regular review of compliance with safeguards covenants; and (x) organize periodic capacity building training to all project related stakeholders.

79. **Field Office and Project Implementation Unit (PIU)**. Each field office will establish a Safeguard Desk, which will be chaired by safeguard focal person (Field Office Chief), who will be supported by safeguards field monitors under overall guidance of SEC and SSC. The Safeguard Desks will ensure the following: (i) the bidding document and contract agreement documents includes specific safeguard provisions, and ensure that EMP/OHS costs are sufficiently costed; (ii) ensure contractor submits site-specific EMP and OHS plan (integrated SEMP) before field mobilization; (iii) implement SEMP and document using standard checklists; (iv) involuntary resettlement and indigenous peoples screening and preparation of due diligence reports, as needed, to verify land use arrangements (including land donations and/or negotiated settlement), avoidance of involuntary resettlement impacts and meaningful consultation and information sharing with indigenous people; (v) comply with prohibition of child labor; (vi) ensure equal wage rate for similar work irrespective of gender; (vii) implement activities for prevention of sexually transmitted diseases and HIV/AIDS for workers and community; (viii) implement agreed rehabilitation and construction targets for indigenous people, women and other vulnerable groups; (ix) take timely corrective actions to ensure full compliance with social and environmental safeguards and OHS; (x) submit monthly environmental monitoring report to the senior environmental/OHS specialist at PMU and monthly social monitoring reports on the indigenous people and involuntary resettlement implementation progress to the Social Safeguard Focal in the CSD; (xi) assist field offices and PIU field team to conduct meaningful, culturally and gender sensitive consultation in the field; and (xii) establish a culturally sensitive GRM at field offices and address grievances in a timely manner for both field office and PIU work.

80. **Project Implementation Consultant**. The PIC SEC will support SLO in PMU and PIU/DHM. The SEC will have intermittent inputs of 9 months. The specialist will provide support to the PMU/field offices and PIU offices in maintaining overall environmental safeguards and OHS requirements in the project. The SEC will prepare an e-MIS and support the safeguard field monitors at field offices in monitoring environmental and OHS activities. The PIC will mobilize safeguard field monitors intermittently in each field office. They will work under the guidance of

SEC and SSC PMU. The monitors will also coordinate with the PIU/DHM field team implementing FFEWS and ensure safeguards in their work. They will support field offices and PIU field team in overall safeguards assurance monitoring, undertake corrective actions, and report to the senior environment/OHS specialist at PMU.

81. **Contractor**. The contractor supporting civil works under DWRI and FFEWS under DHM shall include cost for preparing and implementing site-specific environmental management and OHS plan (SEMP) along with mobilizing a full-time senior safeguard officer and a senior safety officer and includes the cost in their BOQ. Inclusion of sufficient cost for EMP and safeguard/OHS staff shall be verified and assured by the senior environment/IOHS specialist at PMU. The integrated SEMP will be approved by the employer prior to their field mobilization. Contractor will submit the resume of the proposed senior safeguard officer and senior safety officer at least 15 days prior to their mobilization at site. The SEMP shall include (i) the proposed locations and specification of workers camp and associated facilities; (ii) operation of quarry; (iii) transport and storage of construction materials (aggregates, fabricated structural components, fuel, lubricants, paints etc.); (iv) spoil management and waste disposal site, (v) tree plantation plan; (vi) OHS and emergency plan; (vii) budget for SEMP/OHS implementation; and (viii) template of daily safeguards reporting checklist. No work shall commence prior to the approval of the integrated SEMP and resume of the senior safeguard officer and a senior safety officer by the Employer. The contractor will fill daily safeguard assurance checklist and report to the safeguard field monitors in the respective field offices. The contractor will furthermore compile and report on adherence to the involuntary resettlement and indigenous people safeguard engagements set out in this PAM and GESI action plan. The contractor will report to the field office Social Safeguard Focal Point through safeguard field monitors.

82. A copy of the approved SEMP will be kept at site at all time during construction. Non-compliance with, or any deviation from, the conditions set out in the SEMP shall constitute a failure in compliance and will require corrective actions. Prolonged non-compliance upon repeated notices to correct may lead to financial punishment through deducting agreed percentage of claim in the interim bills up to termination of contract, if required. Such provision shall be clearly stated in the contract agreement. Any non-compliance with the EMP would be a breach of the contract and trigger penalties associated with the breach, in accordance with the terms and conditions of contract.

83. **Capacity Building**. The SEC of PIC will provide training to the (i) PMU's safeguards focal persons (environment); (ii) PIU staff; (iii) field office staff and safeguard field monitors; and (iv) contractor's safeguard/OHS staff. Training modules will cover safeguards awareness and management, OHS plan implementation, and emergency plan for the project. The SEC and SSC will provide training to the (i) PIU staff and (ii) contractors about the project's environmental and social safeguard commitments and GESI action plan. ADB will provide the project staff and contractors with safeguard and GESI trainings in the request of PMU or ADB assessment during the implementation period.

84. **Prohibited investment activities.** Pursuant to ADB's SPS, ADB funds may not be applied to the activities described on the ADB Prohibited Investment Activities List set forth at of the ADB's SPS.

VIII. GENDER AND SOCIAL DIMENSIONS

85. **Poverty.** Nepal remains one of the poorest countries in the world despite considerable progress in poverty reduction in recent decades. About one-fourth of the population lives below the poverty, which is defined at NRs19,261 or about $165 per capita per year according to the

Central Bureau of Statistics, Nepal, 2011. The Nepalese population are primarily rural and agrarian. About 80% of the population live in rural areas and 70% of the labor force depend on agriculture for livelihoods and subsistence.[27] The project is anticipated to protect about 3,300 ha of land and 16,000 people from flood impacts across the six river basins. Findings from the project's Poverty and Social Assessment highlight that beneficiary households experience food insecurity (60%), and earn their livelihood from daily wage work, agricultural labor, construction work, including small business. About 65% of the directly impacted population are from marginalized ethnic or caste groups. Vulnerability to flooding is an exacerbating factor of high poverty levels, particularly where marginalized communities are affected. Nepal is particularly prone to natural hazards and flooding poses a recurrent risk to large sections of the population especially for communities in the southern Terai region bordering India. This region covers some 17% of the national area and is home to about 50% of the country's population. Community consultations highlight that recurrent flooding affects farmland, crops and livestock and the livelihoods and property. Agricultural and residential lands frequently wash into the river canals causing landlessness and physical displacement. Children's school routines are disrupted during the monsoon season. Households abandon land plots for fear of flooding, despite that land is a critical livelihood asset. The affected communities, especially the women, are not adequately prepared to manage flood-induced risks. The project outputs will significantly benefit poor and marginalized groups. Project outputs will reduce (i) damage to property and infrastructure, (ii) losses of livestock, (iii) crop losses, (iv) medical and funeral costs and (v) coping costs (e.g. the cost of repairing damage to paddy fields and other on-farm infrastructure as well as to local roads and any temporary higher food costs). The positive impact to poor and marginalized groups is particularly significant given that the majority (84%) have rural-based agricultural livelihoods which are frequently affected by flooding.

86. **Gender**. The project is categorized as *effective gender mainstreaming*. Over 50 community consultations were held across the subproject areas; of the 1,595 total participants about 30% were women and girls from diverse ethnic and caste groups. During consultations, women and girls expressed the collective perception; they are disproportionately impacted by flooding events compared with men. Women are greatly burdened during flooding events and post-disaster recovery given their status as primary care givers. Women struggle to protect children and seniors during flooding events as they lack life-saving skills and wear traditional Nepali dresses for modesty reducing their mobility in a flood scenario. Women also struggle to feed their families when productive assets, cows, and food gardens, are washed away. In flood prone areas, there is a pertinent need to address Nepalese women's preparedness, responsiveness, and post-flooding recovery. The Project will actively support marginalized groups, including women, persons with disability and caste and ethnic minorities through the GESI action plan. The GESI action plan comprises 10 targets aimed at mainstreaming a gender sensitive and socially inclusive approach to all project activities. The project management unit's social safeguards focal will be responsible for overseeing the implementation, monitoring, and evaluation of the GESI action supported by the PIC GESI expert and DWRI Social Development Officers located at each subproject field office. The PMU Social Safeguards Focal will monitor and report on the implementation and budget of the GESI action plan in the QPRs and SMRs. GESI activities and time-bound responsibilities of different stakeholders are shown below in Table 17.

[27] International Labour Organization. ILOSTAT. https://www.ilo.org/global/statistics-and-databases/lang--en/index.htm. The agriculture sector employment includes non-wage-based self-employment.

Table 17: Gender Equality and Social Inclusion Action Plan

Activities	Targets and indicators	Responsibility	Time
Output 1: Flood protection infrastructure improved			
1. Ensure that construction activities abide by core labor standards including OHS, prohibition of child labor and gender related aspects.	(i) Adequate facilities and separate women/men toilets exist in each construction site for labors. (ii) Orientation sessions on labor standards/ equal wages/OHS and awareness on HIV/AIDS, human trafficking, sexual harassment, exploitation and abuse targeting 10 sessions from PMU/field office staff/Contractors.[a]	PMU and Contractors. DWRI Field Office Social Development Officers	1–5 years
2. Ensure participation of women and members from indigenous people, excluded and vulnerable households in rehabilitation and construction of flood control infrastructures including nature-based solutions for flood risk (such as bio-engineering and river embankment).	(i) Specific conditions included in contractors' bid document whereby at least 15% employment opportunities be given to women. (ii) At least 10% of those employed on flood infrastructure rehabilitation and construction works are indigenous peoples and Dalits, and 15% are women.	PMU and Contractors DWRI Field Office Social Development Officers	2–5 years
3. Ensure participation of women and members from indigenous peoples, excluded and vulnerable households in safeguards related consultations.	(i) Men and women of affected households of 5 basins participated in safeguards related consultations (land use agreements, involuntary resettlement and indigenous peoples) and informed on process (data disaggregated by sex, caste, ethnicity and vulnerability. (basins baseline to be established during inception.)	PMU, Local Government and community representatives	1 year
Output 3: Flood prevention and preparedness capacity improved			
4. Increase institutional capacity of DWRI staff in flood risk management.	(i) At least 20% of trained DWRI staff and local government staff (at least 15% women) demonstrated skills in flood risk management	PMU DWRI Field Office Social Development Officers	1–5 years

Activities	Targets and indicators	Responsibility	Time
5. Establish CDRMCs.	(i) Each CDRMC consists of 33% women members. Inclusion of at least one person with disability (PWD) and one from indigenous peoples group, as applicable.	PMU, DWRI, NGO, Local communities DWRI Field Office Social Development Officers	1–5 years
6. Enhance capacity of community including women, vulnerable, indigenous peoples and persons with disability on flood risk management.	(i) At least 50% of women, members from vulnerable groups, indigenous people and PWD of CDRMC are trained community-based FFEWS. (ii) Community risk reduction plan identified risks for women, men, children, elderly, indigenous peoples, vulnerable groups, including any special needs of PWD for each subproject and the measures to address.	PMU, DWRI, NGO, CBDRMU DWRI Field Office Social Development Officers	1–5 years
7. Prepare CBDRM plans and deliver a training program on CBDRM for local communities in flood prone areas of the subprojects.	(i) 6 gender-inclusive CBDRM plans (one for each river basin area) prepared by the community with at least 33% women participation and inclusion of at least one differently abled affected person and one from indigenous peoples group (ii) CBDRM training program incorporates identified risks to women, men, children, elderly, indigenous peoples, vulnerable groups, including any special needs of PWD differently abled persons. (iii) 10 CBDRM committee members per river basin area reported knowledge and skills on disaster preparedness including at least 33% women and proportionate number of indigenous peoples, excluded and vulnerable groups including persons with disability.	PMU, DWRI, NGO, CBDRMUs DWRI Field Office Social Development Officers	1–2 years
8. GESI budget and training for project implementation, monitoring and reporting	(i) Adequate budget allocated for GESI action plan. (ii) GESI training for PMU staff, incl. all eligible women staff, conducted, with focus on GESI action plan implementation, monitoring and reporting (iii) implementation and quarterly progress reports submitted.	PMU, DWRI	1–5 years

Activities	Targets and indicators	Responsibility	Time
9. Maintain MIS at DWRI for project monitoring, reporting and evaluation.	(i) Maintained MIS includes sex, caste, ethnicity disaggregated data of all project activities (including data of vulnerable households including indigenous and differently-abled persons).	PMU, DWRI DWRI Field Office Social Development Officers	1–5 years
10. Ensure participation of women and members from indigenous people, excluded and vulnerable households in construction of flood control infrastructures	(i) 48 gender-responsive flood shelters constructed - Design of Flood Shelters include separate toilets and washrooms for women and men, special ramp for the persons with disability and elderly persons, separate rooms for men and women.	PMU, DWRI, NGO, CBDRMU	

CBDRM = community-based disaster risk management; CBDRMU = community-based disaster risk management units; CDRMC = Community Disaster Risk Management Committee; DWRI = Department of Water Resources and Irrigation; FFEWS = flood forecasting and early warning system; GESI = Gender Equality and Social Inclusion; MIS = Management Information System; NGO = nongovernment organization; OHS = occupational health and safety; PMU = project management unit.

[a] At least one orientation in PMU and one in each Site office; and minimum 2 times over the project period to verify and ensure that conditions are met. The person in charge of giving the orientations sessions will be the GESI expert or an equivalent from the PIC.

IX. PERFORMANCE MONITORING, EVALUATION, REPORTING, AND COMMUNICATION

A. Project Design and Monitoring Framework

87. The Design and Monitoring Framework (DMF) of the project is in ATTACHMENT A.

B. Monitoring

88. **Project performance monitoring.** The PMU, with the support of the PIU and field offices, will be responsible for monitoring and reporting on project performance. The basis for project performance monitoring will be the DMF, which identifies performance targets for the impact, outcomes, and outputs of the project. The PMU will collect the data, calculate the indicators, analyze the results, and prepare a brief report describing the extent to which the project is generating the intended outputs and outcomes. The PMU and PIU will (i) develop a project performance management system framework at the start of project implementation; (ii) confirm that targets are achievable; (iii) develop recording, monitoring, and reporting arrangements; and (iv) establish systems and procedures no later than 6 months after project inception.

89. **Compliance monitoring.** Compliance with covenants will be monitored through ADB's project administration missions–including project inception mission to discuss and confirm the timetable for compliance with the loan covenants; project review missions to assess the government's compliance with particular loan covenants and, where there is any noncompliance or delay, discuss proposed remedial measures with the government; and mid-term review mission, if necessary, to assess whether the covenants are still relevant or need to be changed, or waived due to changing circumstances.

90. **Safeguards monitoring.** The PMU is responsible for environmental and social safeguards monitoring. Within the PMU social and environmental experts that monitor and manage the safeguards. Starting from loan effectivity, PMU will prepare an (i) semi-annual environmental monitoring report (EMR, template provided in ATTACHMENT H) about the progress of the EMP implementation during construction and will reduce to annual during the operation and maintenance phase until the project completion report, and a (ii) semi-annual SMR detailing all social safeguards and due diligence implementation activities (template provided in

91.

Sl.	Position	Person month
I.	**International Key Expert**	
1	Team Leader cum River Engineer	12
2	Community Based Disaster Risk Management (CBDRM) Expert	3
3	Geotechnical/Design Engineer	1
	International Key Expert Sub-Total	**16**
II.	**National Key Expert**	
1	Deputy Team Leader cum Senior Contract Management Expert	34
2	Monitoring Expert	16
3	Design/Structural Engineering Expert	2

91. Sl.	Position	Person month
4	Financial Management cum Training Expert	12
5	Procurement Expert	1
6	Gender Equality and Social Inclusion Expert	3
7	Social Safeguard Expert	9
8	Environmental Safeguard Expert	9
9	Community Based Disaster Risk Management Expert	9
	National Key Expert Sub-Total	**95**
III.	**National Non-Key Experts**	
1	Construction Engineers (6 number x 36 months each)	216
2	MIS Technician	36
3	AutoCAD Expert	2
4	Quantity Surveyor cum Estimator	6
5	Survey and Mapping Expert	2
	National Non-Key Expert Sub-Total	**262**

PART B–Detailed Design Preparation (Lump Sum)

Sl.	Position	Person month
I.	**International Key Expert**	
1	Team Leader cum River Engineer	3
2	Geotechnical/Design Engineer	3
	International Key Expert Sub-Total	**6**
II.	**National Key Expert**	
1	Deputy Team Leader cum Senior Design Engineer	6
2	Design/Structural Engineering Expert (2 numbers)	12
3	Hydraulic Modelling Expert	4
4	Procurement Expert	2
	National Key Expert Sub-Total	**24**
III.	**National Non-Key Experts**	
1	AutoCAD Expert (2 numbers)	12
2	Survey and Mapping Expert	4
	National Non-Key Expert Sub-Total	**16**

1. For mobilization and demobilization of all international, national key and non-key experts for deployment, one-month prior PMU's written approval shall be a prerequisite.

2. PMU can mobilize or demobilize the key as well as non-key experts on a short notice as and when deemed necessary.

3. **Expected Qualification Requirements and Tasks Assigned to the Key and Non-Key Experts:** The Consulting firm is expected to propose adequately qualified and experienced experts to undertake efficiently the assigned tasks and responsibilities. The tasks and responsibilities assigned and detailed educational qualification and experience requirement for the respective experts are reported below.

PART A–CONSTRUCTION SUPERVISION (Time-Based)

I. International Consultants

4. **Team Leader cum River Engineer (International):** The Team Leader cum River Engineer shall preferably have:

(i) a post-graduate degree (master's degree or above) in Civil Engineering with a specialty in River Engineering or equivalent;

(ii) an overall 15 years of working experience with 12 years of experience in river training works, canal/hydraulic structures, canal works projects; and experience in project development, processing management and implementation of river training works, particularly with ADB or World Bank projects shall have added advantage;

(iii) sound knowledge of ADB policies and procedures and team leadership experience, in particular on ADB projects is desirable.

Reporting: The position will report to the Project Director, PMU.

Scope of Work: The Team Leader cum River Engineer will have overall responsibility for the project implementation, consultants' coordination, and the timely delivery of all outputs.

Expected Tasks: As Team Leader, the main outputs include:

(i) Under PMU, the Team Leader will be responsible for overall project management and administration, advice on ADB's procedures and policies;
(ii) Coordinate all activities, including stakeholder participation where appropriate and coordination with DHM and the FFEWS consultants;
(iii) Prepare a detailed work plan for the project implementation and get it approved by PM;
(iv) Manage the consultant team members, both international and national;
(v) Prepare the project preparation inception report;
(vi) Prepare the project implementation schedule and detailed implementation plan for approval by PMU;

(vii) Procurement and Bid process management, finalize bidding documents for CBDRM, ensure it complies with ADB standards and guidelines and obtain PMU and ADB approvals;
(viii) Contract management, establishment of construction management and project performance monitoring system for various project activities;
(ix) Manage effective construction supervision and quality control and monitoring,
(x) Facilitate and support PMU/ADB during ADB missions;
(xi) Organize and implement training to the executing and implementing agencies on project implementation and capacity building;
(xii) Assist in resolving contractual issue;
(xiii) Suggest innovative measures that can be adopted for the better implementation of the projects in hands.
(xiv) Preparation of progress and other reports as required; and
(xv) Ensures and develops a mechanism to see that all the staffs pay their 8-hour duty.

As River Engineer, the main tasks include:

(i) Oversee the project design, review the designs and drawings and other documents, conduct due diligence;
(ii) In collaboration with the Deputy Team Leader/ Senior Design Engineer (National), and contractor develop an operation and maintenance manual for the completed embankment, spurs and outlets.
(iii) Work with the international and national experts in identifying locations and types of hydraulic structures for each of the balance sub-project, and in developing the engineering designs for the hydraulic structures required in each basin in the project;
(iv) Using information from the hydrologist and river morphologists, work with the international and national engineer to produce detailed designs for hydraulic structures on river basins in a number of balanced sub-projects amounting;
(v) Detailed engineering designs and cost estimates and specifications prior to tendering for procurement;
(vi) Provide guidance to the team members on carrying out all those tasks that are required to provide quality works as well as quality documents;
(vii) Guide the engineering survey team on the use of appropriate equipment to acquire the types of survey data required and how the survey data is to be recorded;
(viii) Guide the engineering drafters to produce detailed CAD designs for all infrastructure;
(ix) Review the work of the national design engineer to estimate the type and quantity of materials required to build each structure; and
(x) The expert is required to undertake frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits.

5. **Geotechnical Engineer (International):** The expert shall preferably have:

(i) A master's degree in Civil Engineering/Geotechnical Engineering;

(ii) an overall 15 years of working experience with 10 years of experience in geotechnical engineering in water resources, river training projects and experience with GeoStudio or similar slope stability software; and

(iii) experience in working in a similar geographical location.

Reporting: The position will report to the Team Leader and PMU.

Scope of Work: The Geotechnical Engineer will be responsible for all geotechnical tasks.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(i) Review of contractors geotechnical and soil investigation and ensure its adequacy;
(ii) Adherence to international and national best practices;
(iii) Identify if any additional geotechnical investigations are required for the detailed designed projects and support PMU with the recruitment of suitable contractor;
(iv) Supervise the work of the sub-contracted drilling sampling and testing services to ensure compliance with best geotechnical practice;
(v) Review the available detailed design, stability and seismic hazard analyses, and comment on the various types of construction materials. If necessary, undertake additional stability analyses and improve the design for technical and/or financial reasons;
(vi) Complete detailed design, stability and seismic hazard analyses, for remaining subprojects. Undertake stability analyses and improve the design for technical and/or financial reasons;
(vii) Establish the need for foundation treatment measures as required and the availability of local construction materials and review the appropriate material parameters to be applied in the analysis and design of the works;
(viii) Training of PIU staff on geotechnical aspect, if required; and
(ix) The expert is required to undertake frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits.

6. **Community Based Disaster Risk Management (CBDRM) Expert (International):**The expert shall preferably have:

(i) a graduate degree, with post graduate degree in community development, social studies, governance, disaster risk mitigation/ management or related field;

(ii) an overall 15 years of working experience with 12 years of experience in community- based disaster risk mitigation/management, development planning, disaster control administration or related field; and

(iii) sound knowledge of ADB policies and procedures, and knowledge on Disaster Management Act of Nepal will be an advantage.

Reporting: The position will report to the Team Leader and PMU.

Scope of Work: The CBDRM Expert will be responsible for supporting the implementation, management and administration of CBDRM activities and supervise the performance of CBDRM consulting firm.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(i) The Community-Based Disaster Risk Management (CBDRM) Expert shall be responsible for stakeholder consultation and identification of the need for CBDRM activities at all three levels – national, provincial and local;
(ii) Preparation of detailed implementation schedule for PMU's approval;
(iii) Preparation of TOR, including training and small-scale mitigation works and livelihood requirements;
(iv) Prepare the budget and RFP for the recruitment of one or more local NGOs/Community Based Organizations (CBOs) to implement CBDRM activities in accordance with the project proposal;
(v) Assist the PMU in issuing EOI,RFP, addendum/corrigendum and clarifications to firms' queries;
(vi) Assist the PMU in obtaining ADB's approval in all recruitment activities in accordance with the agreed procurement plan, government regulations and ADB's requirements;
(vii) Support in proposal opening, evaluation of EOI, and Technical and Financial proposals, preparation of relevant submissions/reports, and obtaining ADB's no-objection for awarding of contract and signing of contract;
(viii) Prepare contract documentation;
(ix) Oversee the performance of CBDRM consulting firm and other local NGOs/CBOs to implement CBDRM activities;
(x) Identify the potential risks and propose advance corrective action in time; and
(xi) The expert is required to undertake frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks, and therefore, the candidate should possess good health and be physically able to undertake such field visits.

II. National Consultants

7. **Deputy Team Leader cum Senior Contract Management Expert (National):** Deputy Team Leader cum Contract Management Expert shall preferably have:

(i) a master's degree in Civil Engineering, with added qualification in River Engineering, Water Resources Management, Project or Construction Management or Hydraulics/Structural Engineering or related fields;

(ii) overall 15 years of working experience with 12 years of experience as Project Manager/Assistant Project Manager and contract administration particularly related to river training works, canal/hydraulic structures, canal works projects; and

(iii) experience in similar capacity and sound knowledge of ADB policies and procedures, small works contract conditions, contract management, arbitration and dispute management. Experience in working on externally funded infrastructure projects shall have added advantage.

Reporting: The position will report to the Team Leader and PMU.

Scope of Work: Deputy Team Leader cum Contract Management Expert will be responsible for establishing coordination, overall project management, advice on ADB's policies and procedures, and contract administration.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(i) Support in project management during design and construction stage;
(ii) Coordination in data collection, design, construction supervision, quality control and monitoring;
(iii) Coordination among various stakeholders and agencies viz. PMU, DHM, FFEWS Consultant, CBDRM Consultant, etc.;
(iv) Establishment of effective construction management and project performance monitoring system;
(v) Monitor activities and progress of various works contractors and consulting firms;
(vi) Ensure adequate documentation on contract administration, progress, time and cost control, variations and change orders, billing and payments to the contractors;
(vii) Exercise efficient contractual control on the contracts and minimize the cost over-run and time over-run; establish the 'S' curve and monitor the progress and proactively advice the contractor through PMU;
(viii) Timely review and advise on the settlement of contractor's claims;
(ix) Ensure safety at workplaces, progress of works, billing & payments to the contractors;
(x) Preparation and maintenance of contractual correspondence and documentation;
(xi) Provide inputs for managing and support in time and cost control;
(xii) Assist in resolving contractual issue and dispute resolutions during implementation;
(xiii) Ensure timely completion and delivery of monthly, quarterly, annual and Project Completion Reports;
(xiv) Identification and developing related training programs and impart training as and when required;
(xv) Ensure that all the staffs fulfill their daily minimum hour duty and
(xvi) The expert is required to undertake frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits.

(xvii) Act as Team Leader in the absence of Team Leader.

8. **Monitoring Expert (National):** The expert shall preferably have:

(i) a graduate degree in Civil Engineering, with added qualification in Construction/Project Management, Quality assurance or post-graduate (masters) degree in Civil/Hydraulics/Structural Engineering, Geotechnical Engineering or related fields;

(ii) an overall 15 years of working experience with 12 years of experience in construction and supervision activities related to river training works, canal/hydraulic structures, canal works projects; and

(iii) experience in similar capacity and sound knowledge of contract management and experience in small works contract conditions, experience in computer-based contract management tools shall be preferred. Experience in externally funded projects shall have added advantage.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert.

Scope of Work: The Construction Supervision cum Quality Control Expert will be responsible for the overall construction management, quality assurance/control and administration of multiple contracts and assist in coordinating with the FFEWS.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(i) Diligently supervise the construction activity during the implementation of the work;
(ii) Provide training on best practices in quality assurance and quality control (QA/QC) in construction activities;
(iii) Assist in construction management, contract management and performance monitoring of various contractors;
(iv) Support in preparing progress reports, as built drawings and provide necessary information from time to time;
(v) Ensure adequate documentation on QA/QC, site data, variations, progress and other contractual matters;
(vi) Ensure safety at works and compliance with ADB's safeguard policies and procedure, and applicable laws of Nepal;
(vii) Assist in resolving contractual issues;
(viii) The task of the expert envisages frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits.

9. **Design/Structural Engineering Expert (National):** The expert shall preferably have:

(i) a graduate degree in Civil Engineering, with added qualification of post-graduate(masters) degree in Structure Engineering;

(ii) an overall 15 years of working experience with 10 years of experience in areas of engineering design of hydraulic structures, particularly that used for river control and flood protection; and

(iii) experience in similar capacity and sound knowledge of design softwares, preparing detailed CAD drawings, estimating quantities of materials for construction of hydraulic structures, ADB policies and procedures, experience working in externally funded infrastructure projects shall have added advantage.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert.

Scope of Work: The Design/Structural Engineering Expert will be responsible for adequacy of overall structural designs for each structure to be constructed for the works packages under the civil works contracts as per feasibility study report, change orders and for the works required for community-based disaster risk management (CBDRM).

Expected Tasks: The main tasks related to the position shall include but not limited to:

(i) Will be responsible for delivery of final detailed engineering designs for each structure to be constructed for the works packages under the civil works contracts as per feasibility study report and for the works required for CBDRM;
(ii) The designs and engineering details/drawings shall be based on the best engineering practice and acceptable to ADB for inclusion in the bidding documents;
(iii) Provide instruction and guide the engineering drafters to produce detailed CAD designs for all related structures;
(iv) Assist the procurement expert and quantity surveyor in estimating the costs for each structure, obtain PMU approvals on the detailed engineering designs and cost estimates prior to commencement of bidding process;
(v) Assist the procurement expert in finalizing the technical specifications;
(vi) Address the design changes required during the implementation of the Project related to all ongoing packages and ensure timely delivery of modified designs;
(vii) The task of the expert envisages frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits.

10. **Financial Management cum Training Expert (National):** The expert shall preferably have:

(i) a recognized professional accountancy qualification (e.g., CPA, CA or equivalent) or equivalent in related fields;

(ii) an overall 15 years of working experience with 12 years of experience in financial management and training/capacity building on infrastructure investment projects; and

(iii) experience in similar capacity and sound knowledge of ADB policies and procedures and experience working in externally funded infrastructure projects shall have added advantage.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert.

Scope of Work: The objective of the services is to strengthen the financial management capacity of the Department of Water Resources and Irrigation (DWRI) and Department of Hydrology and Meteorology (DHM) and the respective Project

management units (PMUs) in implementing ADB-assisted Priority River Basin Flood Risk Management Project to ensure:

(i) all project funds are used for the intended purpose and with due attention to considerations of economy and efficiency; and

(ii) full compliance with ADB's financial management and disbursement requirements as well the financial covenants of the loan and project agreement.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(i) Provide support to the project's financial staff to ensure they are aware of their duties and the relevant sections of project documents including the (a) Loan and project agreements;(b) Project Administration Manual; (3) ADB's loan disbursement handbook; as well the (4) national and ADB's Anti-Corruption Policy and whistle blowing mechanisms;
(ii) Provide capacity building to the PMUs in accounting and financial management and ADB's systems and procedures;
(iii) Assist the PMU/PIUs in preparing annual budget estimates and in maintaining proper budget controls as well as in monitoring budget execution;
(iv) Support the PMU/PIUs in ensuring compliance with the financial covenants outlined in the ADB loan/grant agreement;
(v) Support the PMU/PIUs in implementing the Financial Management Action Plan (FMAP) as agreed with ADB and outlined in the Project Administration Manual;
(vi) Review the adequacy and effectiveness of internal controls and make recommendations for improving systems and tools including the areas of accounting software; segregation of duties; level of authorization; written financial management procedures as well as monitoring and reporting;
(vii) Support the PMU in ensuring that (a) all payments are duly prepared, reviewed, authorized, and recorded in the accounting system correctly and in a timely manner; and (b) all expenditure items meet the eligibility criteria as defined in the ADB financing agreement, and are supported by adequate documentation (invoice, contracts, evidence of payments etc..) as outlined in the ADB disbursement handbook;
(viii) Conduct quarterly analysis of account balances in the General Ledger and verification of trial balance and advise the PMU on necessary corrections and adjusting entries (omissions, coding errors, double-counting, etc.) as required;
(ix) Conduct periodic analysis and follow-up on outstanding advances;
(x) Conduct an analysis of the financial execution of the approved budget (budget-to-actual by activity) as well as financial vs physical progress. Analyze and document any significant variations;
(xi) Support the project in conducting quarterly reconciliation of the project disbursement records and ADB's disbursement data available in the LFMIS to ensure the correctness and completeness of the project records. Follow-up on any discrepancies to ensure these are resolved in a prompt manner;
(xii) Support the PMUs in conducting monthly reconciliations of all project bank accounts including the advance accounts and subaccounts. Analyze and follow-up on all reconciliation items;
(xiii) Support the PMU in maintaining an up-to-date fixed asset register covering all assets constructed and purchased under the project;

(xiv) Assist the PMU in preparing withdrawal applications and in collection and filing of all supporting documentation in accordance with ADB loan disbursement handbook;
(xv) Assist the PMU in: (a) preparing quarterly financial reports and project annual financial statements in the agreed format and in a timely fashion as well as (b) reconciling the project accounts with the ADB disbursement data to ensure that all funds disbursed by ADB are correctly reflected in the periodic financial reports and the project financial statements;
(xvi) Support the PMU in ensuring that all financial records are orderly filed, physically stored in a safe location (flood and fireproof), and electronically backed-up daily/weekly on an external server or hard drive and updated regularly;
(xvii) Support the project in the follow-up of internal and external audit recommendations to further improve the internal controls of the project; and
(xviii) Assist the project in implementing financial recommendations as agreed between the project and ADB during review mission.

11. **Procurement Expert (National):** The expert shall preferably have:

(i) a graduate degree in Civil Engineering, with added post-graduate in Law/ Financial Management/ Contract Management/ Civil Engineering/Hydraulics/Structural Engineering or related fields;

(ii) an overall 15 years of working experience with 10 years of rich experience in contract procurement of works or goods or consulting services; and

(iii) experience in similar capacity and sound knowledge of small works contracts, conditions of contract, arbitration and dispute management, ADB policies and procedures, and experience working in externally funded infrastructure projects shall have added advantage.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert.

Scope of Work: The Procurement Expert will be responsible for the bid process management, procurement of the balanced civil works contracts and for the works required for community-based disaster risk management (CBDRM).

Expected Tasks: The main tasks related to the position shall include but not limited to:

(i) Ensure adequate procurement process in compliance with ADB and Government rules and regulation;
(ii) Preparation of bidding document for the balanced civil works contracts and for the works required for community-based disaster risk management (CBDRM);
(iii) Assist PMU in obtaining ADB's no-objection;
(iv) Assist in issuance of IFB, receiving and opening of bids and bid evaluation process;
(v) Contribute towards bid evaluation under the supervision of PMU, and assist in finalization of bid evaluation report and obtaining ADB's no-objection;
(vi) Ensure proper bid submission by the successful bidder and assist in contract award;

(vii) The task of the expert envisages frequent field visits to works locations spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits.

12. **Gender Equality and Social Inclusion Expert (National):** The expert shall preferably have:

(i) a master's degree or equivalent in social sciences, gender and development studies, gender and disaster risk management or another relevant discipline;

(ii) an overall 12 years of working experience with 10 years of experience working on gender equality and social inclusion; experience undertaking gender assessment – including apply gender sensitive participatory methods for data collection, gender analysis and report writing in projects and programs; experience delivering gender sensitization training and monitoring and evaluation of gender equality and social inclusion targets;

(iii) knowledge or experience of integrating gender equality and social inclusion activities in projects related to rural development, climate change and flood disaster;

(iv) knowledge of ADB gender procedures/policies and/or experience working on gender in multi-lateral funded infrastructure projects shall have added advantage; and

(v) The task of the expert envisages frequent field visits to works locations spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits. Women are encouraged to apply.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert.

Scope of Work: The Gender Equality and Social Inclusion (GESI) Expert will be responsible for overseeing implementation, monitoring and evaluation of the project GESI Action Plan. The GESI Expert will ensure that all project data recorded in the MIS is sex-disaggregated and relevant socio-economic baseline database for tracking GESI indicators included. The GESI Expert will work closely with all project stakeholders, including the executing and implementing agencies, contractors and affected peoples to promote a culture of gender equality and social inclusion.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(i) Review project commitments to gender equality and social inclusion within project documents. GESI commitments and intentions can be found in the project's (a) Project Administration Manual; (b) Poverty and Social Assessment; (c) Gender Equality and Social Inclusion Action Plan; (iv) Stakeholder Communications Strategy; and other;

(ii) Establish GESI baseline and monitoring indicators. Ensure GESI indicators are integrated into the project's MIS. Ensure that all data collected about local stakeholders in MIS are sex disaggregated and participation of excluded and vulnerable people including indigenous people and differently abled are tracked;

(iii) Implement and/or support the responsible party (PMU/Contractors/NGO) to implement all activities and targets in the GESI action plan;

(iv) Monitor and report on GESI action plan activities in the project's quarterly progress reports (QPRs). Specifically, report on progress towards achieving GESI targets and any activities completed by the project that promote gender equality and social inclusion; and

(v) Provide recommendations within the QPRs on how to better promote gender equality and social inclusion in all project activities.

13. **Social Safeguard Expert (National):** The expert shall preferably have:

a master's degree or equivalent in social sciences, development studies, social impact assessment or another relevant discipline;

(i) an overall 12 years of working experience with 10 years of experience working on social impact management; specifically with respect to safeguarding project affected peoples' interest and rights as per the international safeguard policies on Involuntary Resettlement and Indigenous Peoples;

(ii) knowledge of ADB's Safeguards Policy Statement (2009) Safeguard II: Involuntary Resettlement and Safeguard III Indigenous Peoples.

(iii) knowledge and understanding of Nepal Indigenous Peoples and Land Acquisition regulatory framework, policies and procedures an advantage;

(iv) experience producing and implementing safeguard plans and due diligence reports, including identifying corrective actions, monitoring and evaluating implementation in ADB/World Bank or any multi-lateral funded project in Nepal, preferably in rural areas.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert.

Scope of Work: The Social Safeguard Expert will be responsible for overall implementation, monitoring and reporting on the project's adherence to ADB's Safeguard Policy Statement (SPS) on Involuntary Resettlement and Indigenous Peoples as well as adherence to the Government of Nepal's own land acquisition and indigenous peoples laws, policies, standards and guidelines. Social Safeguard Expert will ensure that all agreed actions and safeguards plans and/or reports are updated, implemented and monitored as per the project's commitment in the Project Administration Manual and loan covenants. The Expert will provide guidance and training to PMU on ADB SPS 2009 and Government of Nepal safeguard requirements and ensure contractors and other implementing stakeholders comply with agreed actions.

Expected Tasks: The main tasks related to the position shall include, but are not limited to:

(i) Review all safeguards provisions that relate to involuntary resettlement and indigenous peoples safeguards within the project documents, including, but not limited to, the Project Administration Manual, Poverty and Social Assessment, Gender Equality and Social Inclusion action plan, social safeguards related frameworks, plans and/or due diligence reports.

(ii) Ensure that all institutional arrangements for implementing the IR and IP safeguard measures are in place; including a functioning PMU/PIC, an established grievance redress mechanism (GRM), information pamphlets and other materials to support information sharing with affected persons and beneficiaries.

(iii) Information sharing and meaningful consultation. Facilitate regular consultation sessions with the beneficiary communities, local leaders, proponents, and stakeholders including indigenous people (IPs) and potentially displaced people (DPs) and project staff (e.g. field engineers) so that DPs can voice concerns about the project design and ask questions. Ensure that project information is shared with DPs on a regular basis, including about the (a) project, (b) implementation schedule, (c) affected people's entitlements under the project, (d) how to access the GRM.

(iv) Verify and update social safeguards plans/reports to reflect detailed design and the cadastral maps. Verify and update all safeguard plans per sub-basins based on the detailed design of each sub-basin. Work closely with the design engineers and government line agencies (land department, ward members and other authorities) to verify the affected persons. Undertake a census with100% of displaced people based on final design of subprojects, to finalize inventory of losses, record percentage of economic losses and confirm vulnerable groups. Identify entitlements as described in ADB's SPS;

(v) Implement safeguard plans/reports in consultation with affected people ahead of civil works. Support the PMU and PIUs to track the provision of entitlement packages and cash compensation (if any). As per ADB's requirement, compensations and/or mechanisms to deliver all assistance must be provided or in place ahead of civil works. Ensure that the mechanism for providing compensations/assistance is well documented, using third party verification for accountability.

(vi) Support the PMU and PIUs to implement any corrective actions identified by the independent external party which is responsible for verifying that donation of land use is voluntary and that negotiated settlements and/or voluntary donations do not severely affect the living standards of the displaced persons and will benefit them directly.

(vii) Conduct safeguards training for the executing and implementing agencies on implementation of the project's land acquisition/use and indigenous peoples plans/reports;

(viii) Work with the PMU, PIUs and technical colleagues to ensure inclusive outcomes with IPs are attained for the CBDRM and flood shelter objectives. Assist the CBDRM NGO to assess land access options with local communities and prepare plans or due diligence reports for all subproject basins as per SPS 2009.

(ix) Assist the PMU and PIUs in establishing effective grievance redress mechanisms for all project related grievances, including mechanisms to ensure that IPs have culturally appropriate mechanisms for reporting of complaints, follow-up actions, and results;

(x) Assist the PMU and PIUs in establishing an internal monitoring and reporting system for safeguards implementation;
(xi) Assist the PMU to monitor compliance with the safeguards plans/reports, assess key implementation issues, formulate remedial measures, and assist them in conducting follow-up actions;
(xii) The task of the expert envisages frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits; and
(xiii) Complete other relevant tasks related to land access and IP requirements as directed by the Deputy Team Leader.

14. **Environmental Safeguard Expert (National)**: The expert shall preferably have:

(i) a graduate degree in Civil or Environmental Engineering/Science, with added qualification of post-graduate (masters) in Environmental Engineering/ science or related field;

(ii) an overall 15 years of working experience with 10 years of experience in preparation or implementation of Environmental Management/Monitoring Plans. Demonstrated experience in Environmental Impact Assessment (EIA) including water infrastructure investment project and knowledge of best engineering practice and approaches and experience in similar capacity on river/canal/flood control projects and shall be of added advantage; and

(iii) sound knowledge of ADB policies and procedures, experience working in externally funded infrastructure projects shall have added advantage.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert.

Scope of Work: The Environmental Safeguard Expert will be responsible for overall management and implementation of environmental management and monitoring plan, and organization of training seminars regarding the environmental requirements.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(i) Conduct site visits, undertake and/or supervise the environmental monitoring and management plans;
(ii) Prepare and implement/supervise the Environmental Safeguard Action Plan;
(iii) Prepare detailed guidelines and procedures for compliance with IEE and/or Environmental Management Plan (EMP);
(iv) Prepare due diligence reports;
(v) Provide inputs on procurement and bidding process;
(vi) Assist in construction supervision and compliance with the ADB Safeguard requirements;
(vii) Coordinate among various stakeholders and agencies;
(viii) Ensure timely submission of reports on safeguard compliance as per ADB Safeguard Policies, and assist in timely preparation and quality submission of various reports as per requirements;

(ix) The task of the expert envisages frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits.

15. **Community Based Disaster Risk Management (CBDRM) Expert (National):**The expert shall preferably have:

(i) a graduate degree in Civil Engineering, with post-graduate degree in community development, social studies, governance, disaster risk mitigation/management or related field;

(ii) an overall 15 years of experience with 12 years of experience in community-based disaster risk mitigation/management, development planning, disaster control administration or related field; and

(iii) sound knowledge of ADB policies and procedures, Disaster Management Act of Nepal, experience working in externally funded infrastructure projects shall have added advantage.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert.

Scope of Work: The CBDRM Expert will be under the guidance of international CBDRM Expert, the expert will be responsible for supporting in the implementation, management and administration of CBDRM activities and assist in supervising the performance of CBDRM consulting firm.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(i) The expert shall obtain guidance and advise from the international CBDRM expert and be responsible for stakeholder consultation and identification of the need for CBDRM activities;
(ii) Under the supervision of international CBDRM expert, assist in preparation of detailed implementation schedule;
(iii) Assist in preparation of TOR, including training and small-scale mitigation works and livelihood requirements;
(iv) Prepare the budget and RFP for the recruitment of one or more local NGOs/CBOs to implement CBDRM activities in accordance with the project proposal;
(v) Assist the PMU in issuing EOI and RFP, addendum/corrigendum and clarifications to firms' queries;
(vi) Assist the PMU in obtaining ADB's approval in all recruitment activities in accordance with the agreed procurement plan, government regulations and ADB's requirements;
(vii) Support in proposal opening, evaluation of EOI, and technical and financial proposals, preparation of relevant submissions/reports, and obtaining ADB's no-objection for awarding of contract and signing of contract;
(viii) Assist in compilation and preparing contract documentation;
(ix) Oversee the performance of CBDRM consulting firm and other local NGOs/CBOs to implement CBDRM activities;

(x) Identify the potential risks and propose advance corrective action in time;
(xi) The expert is required to undertake frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks, and therefore, the candidate should possess good health and be physically able to undertake such field visits.

16. **Construction Engineers (National Non-Key Experts):** The engineers shall preferably have:

(i) a graduate degree in Civil Engineering; and

(ii) an overall 10 years of working experience with 5 years of relevant experience in construction supervision/management, quality control, contract administration of infrastructure projects.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert, and to the Construction Supervision cum Quality Control Expert and respective PIU

Scope of Work: The Construction Engineers will ensure quality assurance/control (QA/QC) and supervise the construction activity diligently during the implementation of the work. They will be based in the field in each of the six PIU field offices.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(i) Seek instructions from Monitoring Expert/DTL on construction supervision, quality assurance/control, and on ADB's safeguard policies and procedure.
(ii) Supervise the construction activity diligently during the implementation of the work;
(iii) Provide inputs for contract administration of multiple contracts;
(iv) Provide inputs for preparing daily reports on construction progress and completion;
(v) Provide inputs towards assistance in resolving contractual issue;
(vi) Ensure safety at works and compliance;
(vii) Hold community consultation meetings to inform local people about the embankment design and rational and to answer questions related to the technical aspects of the project.
(viii) Verify the work-progress as per agreed Time schedule
(ix) Conduct the laboratory test in personal and report the results to Monitoring Expert/DTL
(x) Monitor the progress keeping in mind the time over-run and cost over-run.
(xi) The task of the expert envisages frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits.

17. **AutoCAD Expert (National Non-Key Experts)**: The expert shall preferably have:

(i) a diploma/certificate in Civil Engineering or higher Engineering Degree with adequate certification/training in AutoCAD ; and

(ii) an overall 10 years of working experience with 5 years of relevant experience in development of AutoCAD drawings of civil engineering

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert.

Scope of Work: The AutoCAD Expert, under the guidance of subject experts and the Deputy Team Leader cum Contract Management Expert, will prepare AutoCAD drawings for balanced civil works packages, shelter houses for putting into the balanced Bidding Documents for works, and prepare AutoCAD drawings for change orders as required.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(i) Assist in development of AutoCAD drawings for the civil works packages as per detailed designs for balanced works contracts, and for the works required for community-based disaster risk management (CBDRM);
(ii) The designs/drawings shall be produced on a CAD system and be suitable for tendering for construction of infrastructure works;
(iii) Assist in preparation of Bidding documents; and
(iv) Assist in the development of drawings during the construction stage, to manage design changes, change orders and variations.

18. **Survey and mapping experts (National Non-Key Expert)**: The experts shall preferably have:

(i) a graduate degree in Civil Engineering, with advance qualification in using sophisticated surveying equipment(LiDAR), data handling, 3D mapping etc;

(ii) an overall 15 years of working experience with 12 years of experience in conducting survey related to rivers/canals/roads/railways etc; and

(iii) experience in similar capacity and use of advance technologies and equipment (LiDAR), data handling, 3D mapping etc, data analysis and producing maps. Experience and sound knowledge of ADB policies and procedures, experience in river training works/hydraulic infrastructure projects will be an advantage.

Reporting: The position will report to the Team Leader cum River Engineer.

Scope of Work: Survey and mapping experts will be responsible for carrying out topographical/land surveying activities (3D), data analysis and producing mapping using advance technology. Guide national Survey and Mapping Expert in conducting surveys and mapping.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(i) Carry out cadastral survey for reference and cross-checking;
(ii) Carry out topographical survey in the basins and data analysis;
(iii) Ensure safe keeping of survey data maps, flight index, survey reports, etc.;
(iv) Compile data and report on the conditions of stations and benchmarks on the ground;

(v) Provide inputs for design and implementation of FFEWS activities;
(vi) Engage in various office activities such as submission of field records, digitization, plotting and printing of documents for field reference and fair drawing;
(vii) Contribute inputs towards the finalization of designs for the remaining sub-projects; and
(viii) The task of the expert envisages frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits.

19. **Quantity Surveyor cum Estimator (National Non-Key Experts):** The Quantity Surveyor cum Estimator shall preferably have:

(i) a graduate degree in Civil Engineering; and

(ii) an overall 10 years of working experience with 5 years of relevant experience in quantity surveying, rate analysis, estimation and costing and finalization of Bill of Quantities (BOQ) of civil works contracts.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert.

Scope of Work: The Quantity Surveyor cum Estimator, under the guidance of the Deputy Team Leader cum Contract Management Expert, will be responsible in preparing and finalizing the rate analysis, detailed estimate and Bill of Quantities for balanced civil works packages, shelter houses for putting into the balanced Bidding Documents for works, and. preparing detailed estimate for change orders as required.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(i) Be responsible for quantity surveying, rate analysis, estimation and costing and finalizing of Bill of Quantities (BOQ) of balanced civil works packages as per detailed designs and drawings;
(ii) Prepare quantity surveying, rate analysis, estimation for the works required for community-based disaster risk management (CBDRM);
(iii) Ensure that the BOQ prepared shall be suitable for tendering for construction of infrastructure works;
(iv) Assist Deputy Team Leader cum Contract Management Expert in preparing Bidding documents;
(v) Assist in costing during the construction stage, manage design changes, change orders and variations.

20. **MIS Technician (National Non-Key Expert):** The technician shall preferably have:

(i) a bachelor’s degree in any discipline; and

(ii) an overall 10 years of working experience with 7 years of relevant experience in MIS and GIS development, use and maintenance. Good knowledge of English is required.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert.

Scope of Work: The MIS Technician, under the guidance of Deputy Team Leader cum Contract Management Expert, will be responsible for data entry of selected parameters of the automated system and project implementation progress and document management in PMU and set-up a database of available information and set-up a system for easy retrieval.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(i) Develop program management and tracking system, using commonly available computer software to schedule and monitor all aspects of activities including but not limited to construction activities, payment and disbursements;
(ii) Assist in development and use of Information Technology (IT) based Project Performance Management Evaluation tool to monitor and evaluate implementation of the project;
(iii) Data entry of selected parameters of the automated system and project implementation progress;
(iv) Document management in PMU and set-up a database of available information and set-up a system for easy retrieval;
(v) Conduct MIS training to PIUs;
(vi) Computer hardware and software technical assistance to PIUs; and
(vii) Provide troubleshooting for daily use of system.

21. **Support Staff:** The Consulting firm will be required to deploy suitably qualified and experienced additional secretarial/managerial/office staff as deemed fit for timely delivery of deliverables and for smooth operation of office function. As a minimum, the consulting firm shall deploy the following support staff:

(i) One office secretary (for documentation and record keeping); and

(ii) One coordinating assistant (for coordination and resource management for smooth functioning of PIC).

22. The consulting firm shall keep in mind that no separate payments shall be made for such staff and the cost of support staff shall be deemed covered in out-of-pocket expenses.

PART B–DETAILED DESIGN PREPARATION

I. International Consultants

23. The team of international Key Experts required for Part B: Detailed Design comprising i) Design Team Leader cum River Engineer and ii) Geotechnical/Design Engineer will remain the same as proposed for Part A: Construction Supervision.

24. However, there shall be two different teams of national Key Experts for Part A and Part B. National Key Experts proposed for Part A shall not be proposed for Part B. Any repetition will lead to disqualification of that Key Expert and his/her CV will be excluded from further evaluations.

II. National Consultants (Key)

25. **Deputy Team Leader/ Senior Design Engineer (National)**: The Deputy Team Leader/Design Engineer will preferably have:

(i) a graduate degree in Civil Engineering, preferably with a post-graduate (masters) degree in civil/hydraulics/structural engineering or related fields;

(ii) an overall 15 years of working experience with 12 years of experience as Project Manager/Deputy Project Manager and detailed design experience particularly related to river training works, canal/hydraulic structures, canal works projects; and

(iii) experience in similar capacity and sound knowledge of ADB policies and procedures, small works contract conditions, and contract management. Experience working in externally funded infrastructure projects shall have added advantage.

Reporting: The position will report to the Design Team Leader and PMU.

Scope of Work: The Deputy Team Leader cum Design Engineer will be responsible for establishing coordination, overall project management, advice on ADB's policies and procedures, and contract administration.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(i) Support in project management during design stage;
(ii) Coordinate in data collection, design, and monitoring of the whole task of producing quality design report and cost estimate;
(iii) Coordinate among various stakeholders and agencies viz. PMU, DHM etc.;
(iv) Monitor activities and progress of various design activities and surveys;
(v) Provide inputs for managing and support in time and cost control;
(vi) Ensure timely completion and delivery of monthly, quarterly, annual and Project Completion Reports;
(vii) Support the international team leader/river engineer to develop an operation and maintenance manual for the completed embankment, spurs and outlets.

(viii) Identify and develop related training programs and impart training as and when required;
(ix) The expert is required to undertake frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits.

26. **Design/Structural Engineering Expert (National):** The expert shall preferably have:

(i) a graduate degree in Civil Engineering, with added qualification of post-graduate(masters) degree in Hydraulic Structure Engineering;

(ii) an overall 15 years of working experience with 12 years of experience in areas of engineering design of hydraulic structures, particularly that used for river training and flood control ; and

(iii) experience in similar capacity and sound knowledge of design softwares, preparing detailed CAD drawings, estimating quantities of materials for construction of hydraulic structures, ADB policies and procedures, experience working in externally funded infrastructure projects shall have added advantage.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert.

Scope of Work: The Design/Structural Engineering Expert will be responsible for adequacy of overall structural designs for each structure to be constructed for the works packages under the civil works contracts as per Feasibility study (FS) report, change orders and for the works required for community-based disaster risk management (CBDRM).

Expected Tasks: The main tasks related to the position shall include but not limited to:

(i) Will be responsible for the delivery of final detailed engineering designs for each structure to be constructed for the works packages under the civil works contracts as per Feasibility study (FS) report and for the structural works required for community-based disaster risk management (CBDRM);
(ii) The designs and engineering details/drawings shall be based on the best engineering practice and acceptable to PMU and ADB for inclusion in the Bidding documents;
(iii) Provide instruction and guide the survey team to acquire necessary field data based on which the detailed engineering designs will be prepared, and instruct engineering drafters to produce detailed CAD designs for all related structure;
(iv) Assist the Procurement Expert and Quantity Surveyor in estimating the costs for each structure, obtaining PMU/DWRI approvals on the detailed engineering designs and cost estimates prior to commencement of bidding process;
(v) Assist the procurement expert in finalizing the technical specifications; and
(vi) The task of the expert envisages frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits. /

27. **Hydraulic Modelling Expert (National):** The expert shall preferably have:

(i) a graduate degree in Civil Engineering, with added qualification of post-graduate (masters) degree in Hydrology, Water Resources Engineering or related fields;

(ii) an overall 15 years of working experience with 10 years of experience in areas of hydrological studies, modelling and estimating flows, detailed hydraulic designs, particularly that used for river control and flood protection; and

(iii) experience in similar capacity and sound knowledge of design/modelling softwares, preparing hydraulic designs and running hydraulic models, estimating flows. Knowledge of ADB policies and procedures, experience

working in externally funded infrastructure projects shall have added advantage.

Reporting: The position will report to the Design Deputy Team Leader cum Design Engineer.

Scope of Work: The Hydraulic Modelling Expert will be responsible for adequacy of hydraulic model, collecting data, and conducting analysis that will determine optimal types and locations of structures that will control and train a river to reduce the amount of soil loss and bank scouring.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(i) Collect, process and analyze hydraulic data;
(ii) Carry out hydrological studies and update the hydrological analysis and data in the Feasibility Study reports;
(iii) In close coordination with the FFEWS Expert and DHM, facilitate and assist in determining optimum locations for installation of hydrological observational equipment;
(iv) Assist and supervise the installation of hydrological observational equipment;
(v) Review Feasibility Study Report and confirm design data based on catchment area.
(vi) The task of the expert envisages frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits.

28. **Procurement Expert (National):** The expert shall preferably have:

(i) a graduate degree in Civil Engineering, with added postgraduate in Law/ Financial Management/ Contract Management/Civil /Hydraulics/Structural Engineering or related fields;

(ii) an overall 15 years of working experience with 12 years of rich experience in contract procurement of works or goods or consulting services; and

(iii) experience in similar capacity and sound knowledge of small works contracts conditions of contract, arbitration and dispute management, ADB policies and procedures, experience working in externally funded infrastructure projects shall have added advantage.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert and PMU

Scope of Work: The Procurement Expert will be responsible for bid process management, procurement of the balanced civil works contracts and for the works required for community-based disaster risk management (CBDRM).

Expected Tasks: The main tasks related to the position shall include but not limited to:

(i) Ensure adequate procurement process in compliance with ADB and Government rules and regulation;

(ii) Prepare bidding document for the balanced civil works contracts and the CBDRM works contract.
(iii) Assist PMU in obtaining ADB's no-objection;
(iv) Assist in issuance of IFB, receiving and opening of Bids and bid evaluation process
(v) Contribute towards bid evaluation under the supervision of PMU, and assist in finalizing bid evaluation report for all the works undertaken by the PMU and obtaining ADB's no-objection;
(vi) Ensure proper bid submissions by the successful bidder and assist in contract award.
(vii) The task of the expert envisages frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits.

III. National (Non-Key Experts)

29. **AutoCAD Expert (National Non-Key Expert)**: The expert shall preferably have:

(i) a diploma/certificate in Civil Engineering or higher Engineering degree with adequate certification/training in AutoCAD ; and

(ii) an overall 10 years of working experience with 5 years of relevant experience in development of AutoCAD civil engineering drawings.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert.

Scope of Work: The AutoCAD Expert, under the guidance of subject experts and the Deputy Team Leader cum Contract Management Expert, will prepare AutoCAD drawings for the balanced civil works packages, shelter houses for putting into the balanced Bidding Documents for works. Prepare AutoCAD drawings for change orders as required.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(i) Assist in developing AutoCAD drawings for the civil works packages as per detailed designs for balanced works contracts, and for the works required for community-based disaster risk management (CBDRM);
(ii) The designs/drawings shall be produced on a CAD system and be suitable for tendering for construction of infrastructure works;
(iii) Assist in preparing Bidding documents;
(iv) Assist in developing drawings during the construction stage, to manage design changes, change orders and variations.

30. **Survey and Mapping Experts (National Non-Key Experts)**: The experts shall preferably have:

(i) a graduate degree in Civil Engineering, with advance qualification in using sophisticated surveying equipment's (LiDAR), data handling, 3D mapping etc;

(ii) an overall 15 years of working experience with 12 years of experience in conducting survey related to rivers/canals/roads/railways etc; and

(iii) experience in similar capacity and use of advance technologies and equipment (LiDAR), data handling, 3D mapping etc, data analysis and producing maps. Experience and sound knowledge of ADB policies and procedures, experience in river training works/hydraulic infrastructure projects will be an advantage.

Reporting: The position will report to the Design Team Leader.

Scope of Work: The Survey and Mapping Experts will be responsible for carrying out topographical/land surveying activities (3D), data analysis and producing mapping using advance technology. Guide the national Survey and Mapping Expert in conducting surveys and mapping.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(i) Carry out cadastral survey for reference and cross-checking;
(ii) Carry out topographical survey in the basins and data analysis;
(iii) Ensure safe keeping of survey data maps, flight index, survey reports, etc.;
(iv) Compile data and report on the conditions of stations and benchmarks on the ground;
(v) Provide inputs for design and implementation of FFEWS activities;
(vi) Engage in various office activities such as submission of field records, digitization, plotting and printing of documents for field reference and fair drawing;
(vii) Contribute inputs towards the finalization of designs for the remaining sub-projects;
(viii) Guide and impart training to national Survey and Mapping Expert in conducting surveys and mapping; and
(ix) The task of the expert envisages frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits.

31. **Support Staff:** The Consulting firm will be required to deploy suitably qualified and experienced additional secretarial/managerial/office staff as deemed fit for timely delivery of deliverables and for smooth operation of office function. As a minimum, the consulting firm shall deploy the following support staff:

(i) One office secretary (for documentation and record keeping); and

(ii) One coordinating assistant (for coordination and resource management for smooth functioning of PIC).

32. The consulting firm shall keep in mind that no separate payments shall be made for the support staff and the cost shall be deemed covered in out-of-pocket expenses.

A. Procurement of Additional Studies, Equipment and Training

33. Consultants for additional studies will be recruited in accordance with ADB's Procurement Policy: Goods, Works, Non-consulting and Consulting Services (2017, as amended from time to time) and shall follow the Procurement Act/Regulations for ADB Borrowers (2017, as amended from time to time). Provisional sums have been included in the consultancy agreement for procurement of various requirements that will support the project. The PIC will be responsible for preparing the exact implementation arrangements, TORs, specifications, and detailed cost estimates of the procurement which will be approved by the Project Director before initiating procurement. The tentative scopes of provisional items are summarized in Table 2.

Table 2: Indicative Provisional Items

Item	Description
Surveys and Studies	Surveys and specific studies including topographic surveys, geotechnical investigations, laboratory tests, and socioeconomic surveys.
Office Equipment	Procurement of office equipment including computers, software, printers, photocopiers, GPS power inverter, etc. for field office using the shopping procurement method.
Meetings, workshops and training	For routine meetings, workshops and training sessions convened by the PIC or PIU.
Communication Materials	Publishing of communication materials and media including the video diary of the investment program and development and hosting of the website.

B. Reporting Requirements and Schedule of Deliverables

34. During the performance of the services, the Consultant will prepare required reports in English for submission to the Client in electronic form and/or hard copies as per PMU instructions.

35. Unless otherwise agreed, all deliverables are to be submitted as drafts for review and comment by the PMU and ADB, and thereafter amended and submitted as final versions. Other occasional deliverables may be required from time to time on an informal basis. The Consulting firm shall assist PIU to maintain an electronic safe backup of all contract related documentation and submit one electronic version of every report listed in Table 2 below.

36. The reporting/submission format will be consistent with the requirements of ADB and Government of Nepal and will be agreed between the Consultant and PMU from time to time. The reporting formats shall further be subject to the amendment/modifications from time-to-time in consultation with the PMU and ADB. The consultant will submit at least the following reports at periods stated hereunder in **Table 3.**

Table 3: List of Minimum Deliverables and Schedule

Reports	Number of Hard Copies	Time Schedule
PART A – CONSTRUCTIONSUPERVISION		

Reports	Number of Hard Copies	Time Schedule
Inception Report: demonstrating Consulting firm's understanding of the TOR and ensuring plan of action and timeline for various activities.	5	Within 30 days from the date of issuance of Notice to Proceed.
Monthly Progress Reports: covering a summary of the activities performed (including the Detailed design progress) and mobilization during the month, problems encountered, solutions proposed/adopted, corrective actions (if required) and the activities planned for the coming month.	5	Every month within 5 days of the commencement of next calendar month.
Quarterly Progress Reports: covering a summary of the activities performed and mobilization and disbursement during the quarter, problems encountered, solutions proposed/adopted, risks identified, corrective actions (if required) and the activities planned (and disbursement projected) for the coming quarter.	5	Every quarter within 10 days of commencement of next quarter.
Annual Progress Report: covering a summary of the activities performed, disbursement achieved and mobilization status during the year, problems encountered, solutions proposed/adopted, risks identified, corrective actions (if required) and the activities planned (and disbursement projected) for the coming year.	5	Every year within 15 days of commencement of next year. For the purpose of Annual Progress Report the year shall mean and refer either to calendar year or other suitable period as the Client may decide in consultation with the Consultant.
Mid Term Report: covering a summary of the activities performed, disbursement achieved and mobilization status during the period, problems encountered, solutions proposed/ adopted, risks identified, corrective actions (if required) and the activities planned (and disbursement projected) for each coming quarter.	5	Within 30 days after 18 months of Consulting Services Assignment.
Draft Completion Report: The document shall comprise completion report of each packages and completion report of the project on the whole. Describing the project background, activities performed v/s committed timeline, problems encountered, risks identified, corrective actions taken, and lessons learnt.	5	Within 30 days of completion of Consulting Services Assignment.

Reports	Number of Hard Copies	Time Schedule
Final Completion Report: Incorporating the comments of the PMU and ADB, describing the project background, activities performed v/s committed timeline, problems encountered, risks identified, corrective actions taken, and lessons learnt.	5	Within 30 days of issuance of Client's comments on Draft Completion Report.
Safeguard (Environmental, social and resettlement etc) Reports for the remaining subprojects: As per ADB's procedure and format.	5	Starting from 3 months (and no longer than 6 months) from the date of issuance of Notice to Proceed (unless agreed otherwise during the Contract negotiation).
Survey reports	5	Starting from 3 months (and no longer than 6 months) from the date of issuance of Notice to Proceed (unless agreed otherwise during the Contract negotiation).
Management Information System tool/ PPMES: Information Technology (IT) based Project Performance Management Evaluation tool capable of monitoring and implementation of the project; identify performance constraints; and formulate and implement practical measures to address shortcomings. This tool shall be capable of disclosing key project-related information, including costs, safeguards, procurement status and progress, amount of contract awarded, billing and disbursement, etc.	Soft copy only	Within 60 days from the date of issuance of Notice to Proceed.
Project Completion Report: In ADB format covering (i) a concise description and assessment of the project from identification to completion; (ii) evaluating the adequacy of preparation, design, appraisal, implementation arrangements, and performance of the DWRI, DHM and ADB, including how problems were handled, whether they were foreseen as potential risks, and the adequacy of the solutions adopted during implementation;	5	Within 3 months from the date of completion of the Project.

Reports	Number of Hard Copies	Time Schedule
(iii) a preliminary evaluation of initial operation, and achievement and sustainability of benefits; (iv) a preliminary evaluation of the extent of achievement of the outcome of the project and the project's contribution to achieving the expected impact; (v) suggest follow-up actions required during project operation; and (vi) makes recommendation - based on the evaluation and lessons - for future project implementation and operation, as well as improvements in related ADB procedures.		
Any other reports	As required	As and when required by the PMU/PIU/ADB.
PART B – DETAILED DESIGN PREPARATION		
Draft Detailed design and Drawings cost estimate and specification of the remaining subprojects	3	Starting from 2 months (and no longer than 4 months) from the date of issuance of Notice to Proceed (unless agreed otherwise during the Contract negotiation).
Detailed design and Drawings of the remaining subprojects	5	Starting from 3 months (and no longer than 6 months) from the date of issuance of Notice to Proceed (unless agreed otherwise during the Contract negotiation).
Maintenance manual	5	Within 9 months from the date of issuance of Notice to Proceed (unless agreed otherwise during the Contract negotiation).
Draft Bidding documents for the balance civil works contracts as per Detailed Report and for the works required for community-based disaster risk management (CBDRM): As per approved Master bidding document - based on ADB's SBD works (small) for Single-stage Two-envelope bidding procedure.	5	Starting from 6 months (and no longer than 9 months) from the date of issuance of Notice to Proceed (unless agreed otherwise during the Contract negotiation).
Final Bidding documents for the balance Civil works contracts as per Detailed design and for the works required for	5	Within 9 months from the date of issuance of Notice to Proceed (unless agreed otherwise during the Contract negotiation).

Reports	Number of Hard Copies	Time Schedule
community-based disaster risk management (CBDRM): Covering the Comments of PMU and ADB.		

37. Since the Services consist of and include the supervision of civil works, the following actions require prior approval by the Client:

C. Client's Input and Counterpart Personnel

(i) Services, facilities and properties to be made available to the Consultant by the Client:

(a) The documents related to the ongoing works (already awarded) and those in the procurement stage shall be made available to the Consultant for performance of its obligations;

(b) Office premises including its maintenance, electricity and water shall be provided by the Client free of cost;

(c) Cost of necessary office furniture and office equipment shall be covered under Provisional Sums that shall be spent with prior approval of the PMU;

(d) Cost of surveys and studies required to be conducted for resettlement activities shall be covered under the Provisional Sums (unallocated) and shall be spent only on the PMU's prior approval; and

(e) Two 4WD vehicles will be provided by PMU/DWRI for national transport needs between project office, construction sites, and for meetings in Kathmandu. Six motorcycles will be supplied to support construction supervision activities between the project site office and construction sites.

38. The consulting firm shall price all cost direct or indirect that Consulting firm envisages to incurred for the performance of its services (except those stated above) in its Financial proposal. No additional payments shall be made for such expenses and the cost of shall be deemed covered in out of pocket expenses.

(ii) Professional and support counterpart personnel to be assigned by the Client to the Consultant's team: The Client shall provide the counterpart staff for supervision of works in the field as available; it will be discussed, agreed, and finalized during contract negotiations.

D. The client will provide the following project data and reports to facilitate preparation of the Proposals:

(i) Copy of Procurement Plan (latest available);

(ii) Copy of Feasibility Study (FS) Reports (as available);

(iii) Copy of Detailed Design Reports of CW1 and CW2; and

(iv) Copy of Project Administration Manual (PAM), if finalized between the Government of Nepal and ADB.

92. **ATTACHMENT G**

92.). Specifically, the PMU will provide details about all due diligence activities undertaken to avoid involuntary land acquisition, physical and economic displacement. The PMU will furthermore outline details regarding project activities that ensure compliance with ADB's indigenous people safeguard policy, including with respect to ongoing and meaningful consultations and culturally appropriate benefit sharing. Finally, the PMU will include a brief review of safeguards related progress, issues and required mitigating measures or corrective actions will be reported in quarterly progress reports and shared with the ADB. The PMU will submit the EMR and SMR for ADB review within 45 days following the monitoring period. The EMR and SMR will be disclosed on the ADB website. If unanticipated impacts were found from EMRs warranting a revision of EMP, the EMP/IEE should be updated, reviewed by ADB, and disclosed on ADB's website. Based on this, the SEMP shall also be updated by contractor. The content will be disclosed with project beneficiaries through community consultations held at the field site of the six subprojects at least semi-annually.

93. **Gender Equality and Social Inclusion monitoring.** The PMU will monitor the GESI action plan progress, compliance, outstanding actions, and responsibility. The progress, issues, and required mitigating measures will be reported in the SMR and QPR.

C. Evaluation

94. In addition to regular monitoring, project performance will be reviewed at least once a year jointly by ADB, DWRI, and DHM. The review will assess implementation performance and achievement of project outcomes and outputs, assess financial progress, identify issues and constraints affecting implementation, and work out a time-bound action plan for their resolution.

95. ADB will undertake annual project reviews during the project period. Additionally, ADB, DWRI, and DHM will undertake a midterm review of the project in 2023, covering all institutional, administrative, organizational, technical, environmental, social, poverty reduction, economic, financial, procurement, and other relevant aspects that may have an impact on the performance of the project and its continuing viability. The review will (i) examine the progress in implementing project outputs; (ii) evaluate environment, social, and poverty impact; (iii) ensure compliance with assurances in the loan agreement; and (iv) evaluate effectiveness of the implementation activities of the executing agency. The review shall also undertake a comprehensive review of potential loan savings, identify areas for reallocation of loan proceeds to increase outcome and impact results.

96. Within 6 months of physical completion of the project, DWRI will submit a project completion report to ADB.

D. Reporting

97. DWRI will provide ADB with (i) QPRs in a format consistent with ADB's project performance reporting system (refer ATTACHMENT I); (ii) consolidated annual reports including: (a) progress achieved by output as measured through the indicator's performance targets, (b) key implementation issues and solutions, (c) updated procurement plan, and (d) updated implementation plan for the next 12 months; (iii) semi-annual EMR and SMR; and (iv) a project completion report within 6 months of physical completion of the project. To ensure that projects will continue to be both viable and sustainable, project accounts and the executing agency audited financial statement together with the associated auditor's report, should be adequately reviewed.

E. Stakeholder Communication Strategy

98. During the feasibility stage, social surveys, environmental surveys, and public consultation meetings have been conducted together with the field offices at each subproject involving the local community members and leaders (majority indigenous peoples) and ward representatives. During the consultations, the field offices explained various features of the project including design, environmental considerations, land use requirement and the process of voluntary land contribution and mitigation measures. A project information booklet in Nepali has been distributed to the communities during these consultation meetings. The targeted beneficiaries, including indigenous peoples, were consulted about, and informed of, the Project's social impacts, voluntary donation, and grievance redress procedures through the village-level consultation.

99. Beneficiary communities in the six sub-projects will receive gender and socially inclusive CBDRM training about how to respond in case a flood warning is received. Communities will be trained to make informed decisions and take action. It is essential that communities understand their risks; they must respect the warning service and should know how to react. Indigenous knowledge and practices relating to decision making and flood warning will be integrated into the CBDRM design; no specific practices were identified during feasibility stage consultation.

100. The PMU Stakeholder, Community & Public Relations Manager/Association Organizer Focal will prepare a stakeholder communication strategy and submit to ADB for review by the end of the first quarter after loan effectiveness. The strategy will follow ADB's Public Communications Policy 2011 and ensure that all project communications are accessible to women, differently abled, illiterate, and other vulnerable groups considering literacy, language and culture of beneficiary communities and existing local practices of warning. The stakeholder communication strategy will be based on a stakeholder analysis and will incorporate the following components:[28]

(i) Compilation of stakeholder communication activities undertaken so far, including gender-disaggregated data on participants, minutes of meetings and photographs, role of the PMU, PIU and field offices in coordinating and communicating with government or institutional stakeholders;

(ii) Public communication plan for disseminating project related information to the (a) general public, particularly those who may be impacted by the proposed projects; (b) indigenous peoples' groups who may be benefited or affected by the proposed projects; (c) communities facing loss of common property resources; and (d) vulnerable groups, particularly regarding the project's social inclusion policy and how to avail benefits under the project;

(iii) Disclosure of social safeguards and environment monitoring reports and any updated resettlement plans and IEEs in the ADB and PMU websites and to affected persons and local non-government organizations/community-based organizations, in local language; and

(iv) Other communication arrangements at the local community level including through notice boards, newspapers, local radio stations and cable television, etc.

[28] Guidance on the preparation of a Stakeholder Communication Strategy is available at the following link: https://www.adb.org/sites/default/files/institutional-document/512211/stakeholder-communication-strategies-guidance-note.pdf

X. ANTICORRUPTION POLICY

101. ADB reserves the right to investigate, directly or through its agents, any violations of the Anticorruption Policy relating to the project.[29] All contracts financed by ADB shall include provisions specifying the right of ADB to audit and examine the records and accounts of the executing agency and all project contractors, suppliers, consultants, and other service providers. Individuals and/or entities on ADB's anticorruption debarment list are ineligible to participate in ADB-financed activity and may not be awarded any contracts under the project.[30]

102. To support these efforts, relevant provisions are included in the loan agreement and the bidding documents for the project. In particular, all contracts financed by ADB in connection with the project will include provisions specifying the right of ADB to audit and examine the records and accounts of the executing agency and all contractors, suppliers, consultants, and other service providers as they relate to the project.

XI. ACCOUNTABILITY MECHANISM

103. People who are, or may in the future be, adversely affected by the project may submit complaints to ADB's Accountability Mechanism. The Accountability Mechanism provides an independent forum and process whereby people adversely affected by ADB-assisted projects can voice, and seek a resolution of their problems, as well as report alleged violations of ADB's operational policies and procedures. Before submitting a complaint to the Accountability Mechanism, affected people should make an effort in good faith to solve their problems by working with the concerned ADB operations department. Only after doing that, and if they are still dissatisfied, should they approach the Accountability Mechanism.[31]

XII. RECORD OF CHANGES TO THE PROJECT ADMINISTRATION MANUAL

104. All revisions and/or updates during the course of implementation should be retained in this section to provide a chronological history of changes to implemented arrangements recorded in the PAM, including revision to contract awards and disbursement s-curves.

[29] Anticorruption Policy: http://www.adb.org/Documents/Policies/Anticorruption-Integrity/Policies-Strategies.pdf
[30] ADB's Integrity Office web site: http://www.adb.org/integrity/
[31] Accountability Mechanism. http://www.adb.org/Accountability-Mechanism/.

ATTACHMENT A: DESIGN AND MONITORING FRAMEWORK

Impact the Project is Aligned with Social and economic losses due to water-induced disasters reduced (Nepal National Water Plan 2002–2027)[a]			
Results Chain	**Performance Indicators with Targets and Baselines**	**Data Sources and Reporting Mechanisms**	**Risks**
Outcome Resilience of communities to flood risks of selected river basins in the Terai region improved.	By 2028: a. 2,300 ha of agricultural land and 2,850 households protected from 1-in-50-year flood (2019 baseline: 0 ha agricultural lands, 0 households) (OP 3.2, OP 3.2.1). b. Daily river flow information of five sub-basins displayed on DHM river watch system, and flood risk bulletin based on FFEWS forecasts disseminated to communities and relevant agencies in line with Nepal's standard operating procedures (2020 baseline: 0 flood warnings).[b]	a. Project technical and progress reports. b. Project technical and progress reports, FFEWS reports and bulletins.	Future climate change impact exceeds projections and results in extreme damage to properties and households.
Outputs 1. Flood protection infrastructure and maintenance system improved.	By 2026: 1a. 36,200 m of resilient flood embankments constructed, 430 spurs and 35 outlets constructed (2020 baseline: 0 m of flood embankment constructed, 0 spurs and 0 outlets) (OP 3.2.5). 1b. 24,000 m of resilient bio-engineered embankments piloted and recommendations for future rollout presented to DWRI (2020 baseline: 0) (OP 3.2.5).[c] 1c. Flood protection O&M plans, manuals and asset management databases developed for five river basins. (2020 baseline: NA) (OP 3.2.4).[d] 1d. At least 50% of DWRI staff (including 33% eligible women) reported knowledge on flood protection O&M and asset management (2019 baseline: 0) (OP 6.1.1). 1e. At least 10% of those employed on flood infrastructure rehabilitation and construction works are indigenous peoples and Dalits, and 15% are women (2019 baseline: 0).	1a–b. Project technical and progress reports. 1c. River basin planning documents, manuals, database reports, quarterly progress reports. 1d. Pre- and post-training assessment. 1e. Contractors' payroll.	Impact of ongoing federalization process or COVID-19 on supply chain delays implementation and capacity development activities.
2. Flood forecasting and response systems enhanced.	By 2027: 2a. Additional new 40 rain gauge stations and 30 hydrometeorological stations commissioned and operational (2019 baseline: 337 rain gauge stations, 175 hydrometeorological stations) (OP 5.1.1) 2b. Five FFEWS in priority river basins installed and made operational (2019 baseline: 0 FFEWS) (OP 5.1.1)[e]	2a–b. Project technical and progress reports. 2c. Copy of annual O&M plan	

	2c. Annual O&M plan and budget for five FFEWS prepared and submitted to DHM for endorsement (2019 baseline: Not applicable) (OP 3.2.4)	and budget submitted to DHM.	
3. Flood prevention and preparedness capacity improved.	By 2027: 3a. At least 20% of eligible DWRI and local government staff trained (including 15% eligible women), of which 80% reporting improved skills in flood risk management (2020 baseline: 0) (OP 6.1.1) 3b. Six gender-inclusive CBDRM plans (one for each river basin area) prepared by the community with participation of at least 33% women and at least one representative from vulnerable groups (2019 baseline: 0)[f] 3c. 10 CBDRM committee members per river basin area (or total of 60 committee members, including 33% women and girls and at least one representative from vulnerable groups) trained, of which at least 50% reporting improved knowledge and skills on disaster preparedness (2019 baseline: 0) (OP 2.3, OP 3.2.2, OP 6.2.4) 3d. 48 gender-responsive flood shelters constructed (2019 baseline: 0)[g] (OP 2.5.2)	3a. Pre- and post-training evaluation. 3b. Approved CBDRM plan, progress reports. 3c. Pre- and post- training assessment. 3d. Approved CBDRM plan, progress reports.	

Key Activities with Milestones

1. Flood protection infrastructure and maintenance system improved

1.1 Advance contracting and procurement of works (CW-01 and CW-02) by Q4 2020
1.2 Procure project implementation consulting services (CS-01) by Q1 2021
1.3 Prepare detailed engineering designs and bid documents for CW-03–CW-06 by Q4 2022
1.4 Procure works (CW-03, CW-04, and CW-05) by Q2 2022
1.5 Complete construction of CW-01 and CW-02 by Q2 2023
1.6 Complete construction of CW-03, CW-04, and CW-05 by Q2 2025.
1.7 Prepare and disseminate O&M manuals for hydraulic structures and monitor performance by Q2 2023 (CW-01 and CW-02) and by Q2 2026 (CW-03, CW-04, and CW-05)
1.8 Hand over sites to DWRI (CW-01 and CW-02 by Q4 2023; CW-03, CW-04, and CW-05) by Q4 2026

2. Flood forecasting and response systems enhanced

2.1 Procure FFEWS (FF-01) by Q4 2021
2.2 Design, supply, and install FFEWS equipment (FF-01) by Q1 2022
2.3 Verify flood forecast system by Q4 2024
2.4 Develop decision support system for early warning system Q2 2026
2.5 O&M period under contract by Q4 2024
2.6 FFEWS training and handover by Q2 2027

3. Flood prevention and preparedness capacity improved

3.1 Procure nongovernment organization for implementation of CBDRM (CS-02) by Q3 2022
3.2 Procure CW-06 flood shelter houses by Q3 2022
3.3 Inception phase (identify target communities, baseline resilience survey, project plans) by Q2 2023
3.4 Establish community disaster risk management and local disaster risk management committees and prepare plans by Q1 2025
3.5 Construct flood shelters by Q3 2025
3.6 Exit phase (end-line review, project evaluation) by Q2 2027

Project management activities

• Establish steering committee and project implementation unit (Q4 2020). • Prepare annual work plans and ensure 100% of milestones are met (Q4 2020–Q2 2027). • Implement and monitor project activities (Q4 2020–Q2 2024). • Prepare semi-annual progress reports, including inception, midterm, and final reports (Q4 2020–Q4 2027).
Inputs ADB: $40.00 million (concessional loan) ADB: $10.00 million (Asian Development Fund Disaster Risk Reduction grant) Government of Nepal: $13.00 million Transaction technical assistance: $500,000 Technical Assistance Special Fund (TASF 6) grant basis, $750,000 Netherlands Trust Fund under the Water Financing Partnership Facility grant basis
Assumptions for Partner Financing Not Applicable

ADB = Asian Development Bank, CBDRM = community-based disaster risk management, COVID-19 = coronavirus disease, CS = consulting services package, CW = civil works packages, DHM = Department of Hydrology and Meteorology, DWRI = Department of Water Resources and Irrigation, FF = flood forecasting package, FFEWS = flood forecasting and early warning system, ha = hectare, m = meter, O&M = operation and maintenance, OP = operational priority, Q = quarter, TASF = Technical Assistance Special Fund

[a] Government of Nepal, Water and Energy Commission Secretariat. 2002. *Nepal National Water Plan, 2002–2027*. Kathmandu.

[b] Government of Nepal. 2018, Ministry of Energy, Water Resources and Irrigation; DHM. *Standard Operating Procedure (SOP) for Flood Early Warning System in Nepal*. Kathmandu. Flood information is disseminated via Internet, display boards and SMS when the water level crosses a specified flood watch mark. There are three warning levels: (i) flood watch: be prepared to act. (ii) flood warning: act in response to advisories and (iii) severe flood warning: Act in cooperation with others including emergency services.

[c] The bio-engineered embankments are a subset of the 36.2 km resilient embankments

[d] Attached Technical Assistance Report (accessible form the list of linked documents in Appendix 2 of the report and recommendation of the President).

[e] Only five subprojects will have a FFEWS as the West Rapti subproject has an existing FFEWS.

[f] Vulnerable groups include indigenous peoples, persons with disability, and excluded and vulnerable groups.

[g] Flood shelters are strong elevated structures that can be used by local residents for refuge during an extreme weather event. Design of flood shelters include separate toilets and washrooms for women and men, special ramps for persons with disability and elderly persons, and separate rooms for men and women.

Contribution to Strategy 2020 Operational Priorities

OP 2.3	Women represented in decision-making structures and processes (number). Target: 60 people (based on 60 CBDRM committees being formed).
OP 2.5.2	Climate- and disaster-resilient infrastructure assets and/or services for women and girls established or improved Target: 48.
OP 3.2	People with strengthened climate and disaster resilience. Target: 2,850 households (14,000 individuals).
OP 3.2.1	Area with reduced flood risk (ha). Target: 2,300 ha.
OP 3.2.2	Gender-inclusive climate and disaster resilience capacity development initiatives implemented (number). Target: 60 people (based on 60 CBDRM committees being formed).
OP 3.2.4	National and subnational disaster risk reduction and/or management plans supported in implementation. Target: 10.
OP 3.2.5	New and existing infrastructure assets made climate and disaster resilient (number). Target: 36,200 m of climate-resilient embankments.
OP 5.1.1	Rural infrastructure assets established or improved (number). Target: 1.
OP 6.1.1	Government officials with increased capacity to design, implement, monitor, and evaluate relevant measures. Target: 10.
OP 6.2.4	Citizen engagement mechanisms adopted. Target: 1.

Source: ADB

ATTACHMENT B: IMPLEMENTATION PROGRAM

Indicative Activities	2019		2020 (Mth/Qtr)				2021 (Mth/Qtr)				2022 (Mth/Qtr)				2023 (Mth/Qtr)				2024 (Mth/Qtr)				2025 (Mth/Qtr)				2026 (Mth/Qtr)				2027 (Mth/Qtr)			
Output 1: Flood Protection Infrastructure Improved[32]																																		
Activity 1.1: Advance Contracting - Procurement of works (CW-01 & CW-02) by Q4 2020.				●	●	●																												
Activity 1.2: Procurement of consulting services (CS-01: Project Implementation Consultants) by Q1 2021.		●	●	●	●	●	●																											
Activity 1.3: Prepare detailed engineering designs and bid documents for CW-03, CW-04, CW-05 & CW-06 by Q4 2022.						●	●	●	●	●	●	●	●	●																				
Activity 1.4: Procurement of works (CW-03, CW-04 & CW-05) by Q2 2022.									●	●	●	●																						
Activity 1.5: Construction completion of CW-01 & CW-02 by Q2 2023.							●	●	●	●	●	●	●	●	●	●																		
Activity 1.6: Construction completion of CW-03, CW-04 & CW-05 by Q2 2025.													●	●	●	●	●	●	●	●	●	●	●	●										
Activity 1.7: Prepare and disseminate O&M manuals for hydraulic structures and monitor performance by Q2 2023 (CW-01 & CW-02) and Q2 2025 (CW-03, CW-04 & CW-05).															●	●							●	●										
Activity 1.8: Handover of sites to DWRI (CW-01 & CW-02 by Q4 2023; CW-03, CW-04 & CW-05 by Q4 2025).																	●	●							●	●								
Output 2: Flood forecasting and response systems enhanced																																		
Activity 2.1: Procurement of FFEWS (FF-01) by Q4 2021.					●	●	●	●	●	●																								
Activity 2.2: Design, supply and installation of FFEWS equipment (FF-01) by Q4 2023.							●	●	●	●	●	●	●	●	●	●	●	●																
Activity 2.3: Verification of flood forecast system by Q4 2024.																			●	●	●	●												
Activity 2.4: Develop decision support system for early warning system by Q2 2026.																						●	●	●	●	●	●	●						

[32] Under Output 1 implementation is expected to be completed within 5 years.

Indicative Activities	2019		2020 (Mth/Qtr)				2021 (Mth/Qtr)				2022 (Mth/Qtr)				2023 (Mth/Qtr)				2024 (Mth/Qtr)				2025 (Mth/Qtr)				2026 (Mth/Qtr)				2027 (Mth/Qtr)			
Activity 2.5: O&M period under contract by Q4 2024.															●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				
Activity 2.6: FFEWS training and handover by Q2 2027.																													●	●	●	●		
Output 3: Flood prevention and preparedness capacity improved																																		
Activity 3.1: Procurement of NGO for implementation of CBDRM (CS-02: CBDRM NGO) by Q3 2022.										●	●	●	●																					
Activity 3.2: Procurement of CW-06: Flood Shelter Houses by Q3 2022.										●	●	●	●																					
Activity 3.3: Inception phase (identification target communities, baseline resilience survey, detailed project plans) by Q2 2023.													●	●	●	●																		
Activity 3.4: Establishment of community DRMs and local DRM committees and preparation of plans by Q1 2025.																●	●	●	●	●	●	●	●											
Activity 3.5: Construction of flood shelters by Q3 2025.														●	●	●	●	●	●	●	●	●	●	●	●									
Activity 3.6: Exit phase (end-line review, project evaluation) by Q2 2027.																													●	●	●	●		
B. Management Activities																																		
Procurement plan key activities to procure contract packages																																		
CW-01 & CW-02																																		
Bid document preparation and approval				●	●																													
Invitation to bid and bid period					●	●																												
Bid evaluation and ADB approval						●	●																											
Contract negotiation and award							●																											
CW-03, CW-04 & CW-05																																		
Bid document preparation and approval									●	●																								
Invitation to bid and bid period										●																								
Bid evaluation and ADB approval										●	●																							

Indicative Activities	2019		2020 (Mth/Qtr)				2021 (Mth/Qtr)				2022 (Mth/Qtr)				2023 (Mth/Qtr)				2024 (Mth/Qtr)				2025 (Mth/Qtr)				2026 (Mth/Qtr)				2027 (Mth/Qtr)			
Contract negotiation and award												●																						
Consultant selection procedures																																		
CS-01: PIC																																		
Recruitment		●	●	●	●	●	●																											
Contract negotiation and award							●																											
Services							●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●												
CS-02: CBDRM NGO																																		
Recruitment										●	●	●																						
Contract negotiation and award													●																					
Services														●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
Others																																		
Environment management plan key activities						●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
Gender action plan key activities						●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
Annual review and midterm review						●				●				●				●				●				●				●				
Project completion report (September 2028)																																		

ADB = Asian Development Bank, CBDRM = community-based disaster risk management, CS = consulting services, CW = civil works, DMF = design and monitoring framework, DRM = disaster risk management, DWRI = Department of Water Resources and Irrigation, FFEWS = flood forecasting and early warning system, Mth = month, NGO = non-government organization, O&M = operation and maintenance, PIC = project implementation consultant, Qtr = quarter.
Source: Asian Development Bank.

ATTACHMENT C: PROJECT STEERING COMMITTEE AND SUBPROJECT MANAGEMENT COMMITTEE

Project Steering Committee

Ref	Designation / Organization
1	Chair – Secretary MEWRI
2	Joint Secretary MOF
3	Joint Secretary MEWRI
4	Director General DWRI
5	Director General DHM
6	National Planning Commission
7	Ministry of Home Affairs (MoHA)
8	Ministry of Federal Affairs and General Administration (MOFAGA)
9	Representative from the concerned Provincial Government
10	Project Director PMU

Subproject Consultation Committee (in each basin)

Ref	Designation / Organization
1	Provincial Government Secretary (Physical Infrastructure and Development)
2	Municipality representative of concerned municipality/village municipality
3	Municipality engineer of concerned municipality
4	Provincial Government – Ministry of Physical Infrastructure and Development Engineers
5	DWRI field office chief
6	DWRI field office engineers

ATTACHMENT D: PMU AND PIU STAFFING

Project Management Unit (DWRI)

Ref	Position	Type
1	Project Director	Full time
2	Deputy Project Director (2 no's)	Full time
3	Project Accountant (Financial Manager)	Full time
4	Environmental Officer	Full time
5	Social Safeguards Focal	Full time
6	Community Based Disaster Risk Management and FFEWS Coordinator	Full time
7	Engineer (3 no's)	Full time
8	Sub – Engineers (3 no’s)	Full time
9	Accountant	Full time
10	Office Clerks (2 no's)	Full time
11	Supervisors (4 no's)	Full time
12	Office Assistant (2 no's)	Full time
13	Driver (4 no's)	Full time

Project Implementation Unit (DHM)

Ref	Position	Type
1	Project Manager - Senior Divisional Hydrologist	Full time
2	Senior Accountant	Full time
3	Accountant	Full time
4	Hydrologist 1	Full time
5	Hydrologist 2	Full time
6	Meteorologist 1	Full time
7	Meteorologist 2	Full time
8	Hydraulic Modelers	Full time
9	Hydraulic Modelers	Full time
10	Hydraulic Modelers	Full time
11	IT expert	Full time
12	IT expert	Full time
13	IT expert	Full time
14	Supervisor (2 no's)	Full time
15	Office Clerk (2 no's)	Full time
16	Office Assistant (2 no's)	Full time
17	Driver (2 no's)	Full time

Field Office one for each subproject (DWRI)

Ref	Position	Type	Jhapa CW01 MK	Kailali CW02 MR	Dang CW03 WR	Sarlahi CW04 LAK	Morang CW05 BK	Makwanpur East Rapti
Technical								
1	Project Manager - Senior Divisional Engineer	Fulltime	1	1	1	1	1	1
2	Senior Accountant	Fulltime	1	1	1	1	1	1
3	Stakeholder, Community & Public Relations Manager/ Association Organizer	Fulltime	1	1	1	1	1	1
4	Social Development Officer	Fulltime	1	1	1	1	1	1
5	Environmental/OH&S officer	Fulltime	1	1	1	1	1	1
6	Engineer	Fulltime	2	2	2	1	1	1
7	Civil Sub Engineer	Fulltime	2	2	2	1	1	1
8	Surveyor	Fulltime	2	2	2	1	1	
9	Assistant Surveyor/ CAD/GIS	Fulltime	1	1	1	1	1	
Total			**12**	**12**	**12**	**9**	**9**	**7**
Non-technical								
11	Office Clerk	Fulltime	1	1	1	1	1	1
12	Office Assistant	Fulltime	1	1	1	1	1	1
13	Driver	Fulltime	1	1	1	1	1	1

BK = Bakraha, CW = civil works, ER = East Rapti, LAK = Lakhandei, MK = Mohana Khutiya , MR = Mawa Ratuwa, WR = West Rapti.

ATTACHMENT E: PROCUREMENT PLAN

Basic Data

Project Name: Priority River Basins Flood Risk Management Project		
Project Number: 52195-001	**Approval Number:**	
Country: Nepal	**Executing Agency**: Ministry of Energy, Water Resources and Irrigation	
Project Procurement Risk: Medium	**Implementing Agency**: Department of Hydrology and Meteorology, Babarmahal Department of Irrigation, Kathmandu, Department of Water Resources and Irrigation formerly known as Department of Irrigation, Jawalakhel	
Project Financing Amount: US$ 63,750,000 **ADB Financing:** US$ 50,000,000 **Cofinancing (ADB Administered):** US$ 750,000 **Non-ADB Financing:** US$ 13,000,000	**Project Closing Date:** 30 September 2027	
Date of First Procurement Plan: 3 March 2020	**Date of this Procurement Plan**: 5 August 2020	
Procurement Plan Duration (in months): 18	**Advance Contracting:** Yes	**e-GP:** Yes www.bolpatra.gov.np

A. Methods, Review and Procurement Plan

Except as the Asian Development Bank (ADB) may otherwise agree, the following methods shall apply to procurement of goods, works, and consulting services.

Procurement of Goods and Works	
Method	**Comments**
Open Competitive Bidding (OCB) for Goods	International advertising for goods greater than $2 million. National advertising for goods less than $2 million; adequate number of domestic suppliers available below $2 million.
Request For Quotation for Goods	For goods less than $100,000
Open Competitive Bidding (OCB) for Works	International advertising for works greater than $5 million; local contractors have insufficient capacity to bid for works above $5 million, international bidders or joint ventures would participate. National advertising for works less than $5 million; local contractors are competitive below $5 million.
Request for Quotation for Works	For works less than $100,000
Community Participation in Procurement for Works	Each contract up to US Dollar equivalent of NRs10,000,000 (Government of Nepal threshold for community contract). Small service contracts may be directly contracted. Works considered non-competitive in nature (i.e., excavation of small channels, earth shifting, turfing, tree planting, bio-engineering and other misc. works in adjoining areas).

Consulting Services	
Method	**Comments**
Quality- and Cost-Based Selection for Consulting Firm	Two consulting services packages required, and international advertising is warranted.
Competitive for Individual Consultant	International and national

B. Lists of Active Procurement Packages (Contracts)

The following table lists goods, works, non-consulting and consulting services contracts for which the procurement activity is either ongoing or expected to commence within the procurement plan duration.

Goods and Works							
Package Number	**General Description**	**Estimated Value (in US$)**	**Procurement Method**	**Review**	**Bidding Procedure**	**Advertisement Date** (quarter/year)	**Comments**
CW-01	Flood Control Works at Mohana Khutiya River Basin in Terai of Nepal	9,840,000.00	OCB	Prior	1S2E	Q3 / 2020	Non-Consulting Services: No Advertising: International No. Of Contracts: 1 Prequalification of Bidders: No Domestic Preference Applicable: Yes Advance Contracting: Yes Bidding Document: Small Works High Risk Contract: No e-GP: No
CW-02	Flood Control Works at Mawa Ratuwa River Basin in Terai of Nepal	11,470,000.00	OCB	Prior	1S2E	Q3 / 2020	Non-Consulting Services: No Advertising: International No. Of Contracts: 1 Prequalification of Bidders: No Domestic Preference Applicable: Yes Advance Contracting: Yes Bidding Document: Small Works High Risk Contract: No e-GP: No
CW-03	Flood Control	13,930,000.00	OCB	Prior	1S2E	Q3 / 2021	Non-Consulting

	Works at West Rapti River Basin in Terai of Nepal						Services: No Advertising: International No. Of Contracts: 1 Prequalification of Bidders: No Domestic Preference Applicable: Yes Advance Contracting: No Bidding Document: Small Works High Risk Contract: No e-GP: No
CW-07	Community Participation in Procurement for Works and Goods	250,000.00	CPP	Prior		Q3 / 2021	Non-Consulting Services: No No. Of Contracts: 15 Advance Contracting: No High Risk Contract: No e-GP: No Comments: Prior review for first 3 contracts; on sample basis for the rest. Direct contracting; no advertisement. Simplified format of bidding document as provided for in PAI 5.10, Appendices 2 and 3.
EQ-01	Vehicles	230,000.00	RFQ	Post (Sampling)		Q1 / 2021	Non-Consulting Services: No No. Of Contracts: 11 Advance Contracting: No High Risk Contract: No e-GP: No Comments: Multiple

							contracts (9 motorcycles, 2 4WD vehicles)
FF-01	Flood Forecasting Early Warning System	6,700,000.00	OCB	Prior	1S2E	Q4 / 2020	Non-Consulting Services: No Advertising: International No. Of Contracts: 1 Prequalification of Bidders: No Domestic Preference Applicable: No Advance Contracting: Yes Bidding Document: Goods High Risk Contract: No e-GP: No Comments: To be procured by DHM
OS-01	Regular office supplies and consumables	710,000.00	RFQ	Post (Sampling)		Q1 / 2021	Non-Consulting Services: No No. Of Contracts: 8 Advance Contracting: No High Risk Contract: No e-GP: No Comments: Multiple contracts (each below $100,000).

Consulting Services							
Package Number	**General Description**	**Estimated Value (in US$)**	**Selection Method**	**Review**	**Type of Proposal**	**Advertisement Date** (quarter/year)	**Comments**
CS-01	Project Implementation Consultant	2,300,000.00	QCBS	Prior	FTP	Q4 / 2019	Non-Consulting Services: No Type: Firm Assignment: International

							Quality-Cost Ratio: 90:10 Advance Contracting: Yes e-GP: No Comments: Quality is critical to the assignment
CS-03	Various individual consultants as and when required	100,000.00	Competitive	Prior		Q2 / 2021	Non-Consulting Services: No Type: Individual Assignment: International Expertise: Various Advance Contracting: No e-GP: No Comments: Still to be determine. Various consultants as and when required.

C. List of Indicative Packages (Contracts) Required Under the Project

The following table lists goods, works, non-consulting and consulting services contracts for which procurement activity is expected to commence beyond the procurement plan duration and over the life of the project (i.e., those expected beyond the current procurement plan duration).

Goods and Works						
Package Number	**General Description**	**Estimated Value (in US$)**	**Procurement Method**	**Review**	**Bidding Procedure**	**Comments**
CW-04	Flood Control Works at Lakhandei River Basin in Terai of Nepal	1,160,000.00	OCB	Prior	1S2E	Non-Consulting Services: No Advertising Type: National No. Of Contracts: 1 Prequalification of Bidders: No Domestic Preference Applicable: No Bidding Document: Small

						Works e-GP: Yes Comments: Q4/2021; e-GP
CW-05	Flood Control Works at Bakraha River Basin in Terai of Nepal	3,630,000.00	OCB	Prior	1S2E	Non-Consulting Services: No Advertising Type: National No. Of Contracts: 1 Prequalification of Bidders: No Domestic Preference Applicable: No Bidding Document: Small Works e-GP: Yes Comments: Q1/2022; e-GP
CW-06	Construction of Shelter Houses in various River Basins Lot 1: Lot 2: Lot 3: Lot 4: Lot 5:	2,130,000.00 355,000.00 355,000.00 355,000.00 355,000.00 355,000.00	OCB	Prior	1S2E	Non-Consulting Services: No Advertising Type: National No. Of Contracts: 6 Prequalification of Bidders: No Domestic Preference Applicable: No Bidding Document: Small Works e-GP: Yes Comments: Q4/2022; e-GP

	Lot 6:	355,000.00				
EQ-02	CBDRM Equipment	640,000.00	RFQ	Post (Sampling)		Non-Consulting Services: No No. Of Contracts: 7 e-GP: No Comments: Q1/2024; multiple contracts

Consulting Services						
Package Number	**General Description**	**Estimated Value (in US$)**	**Selection Method**	**Review**	**Type of Proposal**	**Comments**
CS-02	Community-Based Disaster Risk Management Consultant	948,000.00	QCBS	Prior	STP	Non-Consulting Services: No Type: Firm Advertising: International Quality-Cost Ratio: 90:10 e-GP: No Comments: Quality is critical to the assignment

ATTACHMENT F: TERMS OF REFERENCE AND SCOPE OF WORK FOR CONSULTANT PACKAGES

F-1 Community-Based Disaster Risk Management (CBDRM) Consultants

A. Background

1. Nepal is considered one of the most disaster-prone countries in the world. Alongside other natural hazards, such as earthquakes and landslides, flooding, river erosion, river shifting, and loss of lands pose a recurrent risk to large sections of the population. The Terai region of Nepal has approximately 17% of the country's total area and has a population of 50.3% of country's total population (CBS, 2012 and www.kullabs.com) and agriculture in the Terai region is the basis of the economy in Nepal. Flooding and erosion is particularly significant in the Terai has a major impact on communities, livelihoods, agriculture and development.

2. Acknowledging the importance of the Terai region to Nepal, the Government, through the Ministry of Energy, Water Resources and Irrigation (MEWRI), is implementing the Priority River Basins Flood Risk Management Project in the Southern Nepal Terai region. The project is the continuation of the pre-feasibility study: Package 3: Flood Hazard Mapping and Risk Management Project (DWRI, 2016), which has identified six priority basins for the project: were selected and included in the cost-benefit analysis: (i) West Rapti, (ii) Mawa Ratuwa, (iii) Lakhandei, (iv) Mohana Khutiya, (v) East Rapti, (vi) Bakraha.

3. The interventions in the subprojects are designed to (i) reduce the incidence of severe floods; (ii) protect resident houses and public infrastructure, particularly in urban areas and market centers in the basins, from severe floods; (iii) protect agricultural land by reducing bank scouring and soil erosion, (iv) reduce the loss of life and injuries by implementing community based disaster risk management (CBDRM) project to be operational in the above six basins over a period of 5 years, including an advanced flood forecasting and early warning system (FFEWS).

B. Project Scope

4. The CBDRM project (the Project) has been developed within the context of the legal and policy framework of the Government and taking into account national best practices and lessons learned from the country's extensive experience in CBDRM over many years. The full details of the project are included in the CDBRM project design document.

5. Purpose: to compliment the structural components of the 'Priority River Basins Flood Risk Management Project'. Through a participatory, community-based approach, this project aims to: (i) reduce the loss of life, household and community assets, property and livelihoods from flood-related and other disasters; and (ii) strengthen community resilience and a create safer environment for economic and social development.

6. Component 1: Institutional DRM capacity building: focusses on strengthening capacities for DRM at municipality level, which will provide an important framework for supporting community-based DRM initiatives. It involves the establishment of institutional structures and plans, as well as the establishment of early warning systems and structural and non-structural preparedness measures.

7. Component 2: Community-based DRM capacity building: directly engages communities in understanding and managing the risks they face through enhancing community decision-

making and resource mobilization. It also encourages community participation in municipality-level DRM planning, to foster strong institutional linkages between the two levels and support the sustainability of the CDRMCs.

8. A maximum of 10 target communities will be identified in each of the six basins for the implementation of the CBDRM project based on a number of selection criteria identified in the CBDRM project design document, representing a maximum of 60 communities of approximately 100-200 households each, although the number of households may vary significantly depending on the site selection process.

9. Under the overall supervision of the Government's executing agency, the Ministry of Energy, Water Resource and Irrigation (MEWRI) and implementing agency, the Department of Water Resource and Irrigation (DWRI), the project will be guided by a Project Steering Committee comprising representatives from key Government ministries and departments and the Asian Development Bank.

10. A Project Implementation Consultant Team (PIC) will provide overall management support and oversight of all activities as well as technical support to relevant ministries/departments through FFEWS and preparedness infrastructure and CBDRM experts.

11. The local non-government organization (NGO), community-based organization (CBO) or consortium of NGOs/CBOs (the Consultants) selected for this project will provide management support and oversight of the community-based project activities described in these TORs within each basin.

C. Scope of Services

12. The selected Consultants will work with and report to the PIC, PMU and, as required, the Project Steering Committee through the PMU. The Consultants must also maintain close coordination and review with ADB, and consultation with ADB on critical decisions is required, so that project preparation meets ADB quality and specific requirements.

13. The consulting services required for the project will include, but are not limited to, the services described in these terms of reference. These broadly encompass the activities of Component 2 of the project, with some additional input into some aspects of Component 1.

14. Resilience surveys: The Consultants will support the PIC to design and conduct baseline, midline and endline resilience surveys in all 60 identified target communities. The consultants will also engage with the community leaders will in developing of the resilience surveys. The surveys will involve a combination of household questionnaires, key informant interviews and focus group discussions and will be used to measure the impact of the project interventions on the perceptions of overall resilience of communities. The Consultant will recruit, train and manage a sufficient number of community mobilisers and volunteers to conduct the survey and will support the PIC in the compilation and analysis of the data collected.

15. **Establishment of community disaster risk management committees (CDRMC):** Through a process of inclusive community engagement, the Consultants will support municipalities to establish CDRMC in all target communities in accordance with through the existing framework for constituting committees at the municipal level, the process described in the CBDRM project design document, with a view to the CDRMCs being self-sustaining by the end of the project.

16. Development of community disaster risk management plans (CDRMP): The Consultants will support the CDRMCs to undertake a consultative process to develop CDRMPs which identify the highest priority risks and hazards facing each community and use a combination of local and traditional knowledge and national / international best practice to mitigate and better prepare for disasters. Suggested content is included in the CBDRM project design document.

17. Establishment of community disaster response teams (CDRTs): The Consultants will support the CDRMCs to establish CDRTs. These are comprised of 20-30 volunteers trained in immediate rapid response to emerging hazards and disasters, complementary to other response mechanisms at ward and municipality level. The Consultants will support the training of the volunteers in the core activities of (i) early warning and risk communication; (ii) First aid, search and rescue; and (iii) evacuation shelter management and relief distribution. The volunteers will be provided with necessary equipment and visibility materials to perform their tasks. The consultants will investigate how to partner with existing volunteer networks.

18. **Small scale disaster risk reduction measures and livelihood support**: Through a process of community engagement and Vulnerability and Capacity Assessments (VCAs), the Consultants will support the CDRMCs to identify, design and implement small scale risk reduction measures and support to better protect households and their livelihoods from the impact of floods and other relevant hazards in each target community. Livelihood support, through adaptation and risk reduction measures to enhance existing livelihood activities and diversifying sources of income, should primarily be targeted to women and female-headed households. Examples of such measures are provided in the CBDRM project design document.

19. Technical support for other project components: The Consultants will also work collaboratively with the PIC to provide local knowledge and technical support to ensure the engagement of communities and the community-level structures with municipality-level actions including: (i) the establishment of Local Disaster Risk Management Committees (LDRMC); (ii) the development of Local Disaster Risk Management Plans (LDRMP); (iii) Early warning communication systems; (iv) identification and management of flood evacuation shelters; and (v) participation in mock drills. These are described further in the CBDRM project design document.

D. Expected timeframe

20. The following provides an estimate of the timeframe for the project, assuming a total implementation time of 5 years.

Activity	Yr1		Yr2		Yr3		Yr4		Yr5	
Inception phase (identification target communities, baseline resilience survey, detailed project plans)										
Establishment of Community DRM Committees										
Establishment of Local DRM Committees										
Development of Local DRM Plans										
Development of Community DRM Plans										
Flood forecasting and early warning systems										
Establishment of Disaster Response Teams and training										
Small scale mitigation measures and livelihoods										
Preparedness infrastructure and other measures										
Mid-term review (mid-line resilience survey, project evaluation and monitoring)										
Exit phase (end-line review, project evaluation)										

21. Specific tasks, reporting and deadlines will be agreed with the PIC and Project Steering Committee prior to the commencement of the project.

E. Key Personnel Requirements

22. It is suggested that the consultant services require a minimum of 32 personnel (excluding volunteers), with 1,560 person-months of input from as shown in the table below.

No.	Position	Input	Person-Months
1	Project Manager	1 person x 5 years	60
2	Administration/Finance Manager	1 person x 5 years	60
3	Project Coordinators	6 persons x 4 years	288
4	Community Mobilisers	24 persons x 4 years	1,152

23. Suggested expertise and tasks for the personnel follows below.

Position: Project Manager (60 person-months)

Expertise: Preferably (i) postgraduate degree in social science, economics, disaster risk management, or other relevant field, or equivalent; (ii) 10 years' experience in project development, management and implementation in the disaster/development sector with a local NGO or international organization; (iii) experience in community-based programming; (iv) financial and reporting experience for large multi-stakeholder projects; and (v) team leadership experience.

Reporting: The position will report to the PIC.

Scope of Work: The project manager will have overall responsibilities for the consultant's project preparation, coordination and implementation, and the quality of all outputs.

Expected Tasks: Some key outputs include:

(i) Coordinate all consulting activities, including engaging with key stakeholders;
(ii) Prepare a project inception report;
(iii) Prepare a detailed project workplan;
(iv) Manage the consulting team members and provide guidance on project implementation, including through the development of key guidelines, training materials and other documents required for the successful delivery of the project; and
(v) Oversee all project activities, administration and finance, and ensure the project is meeting deadlines, quality standards and reporting requirements.

Position: Administration/Finance Manager (60 person-months)

Expertise: Preferably (i) bachelor's degree in business, finance, accounting, or a related field; (ii) at least 7 years of overall professional experience, with at least 5 years of managerial experience in finance and administration; and (iii) experience working for a local NGO/ international organization.

Scope of Work: The administration/finance manager will be responsible for undertaking financial and administrative activities to support the implementation of the project.

Reporting: The position will report to the Project Manager.

Expected Tasks: Some key outputs include:

(i) Support the project manager in the preparation of the project inception report, including the development of a plan and timeline to perform the key administrative/financial tasks of the project;
(ii) Develop and maintain transparent financial and administrative procedures for the project;
(iii) Monitor and manage project finances, including procurement, and ensure adherence to all relevant procedures including the preparation and maintenance of all financial records;
(iv) Provide administration and financial support to project management and contribute to the preparation of required reports and auditing; and
(v) Provide administrative/finance training and support to other team members as needed.

Position: Project Coordinator (1 per river basin)

Expertise: Preferably (i) bachelor or postgraduate degree in social science, economics, disaster risk management, or other relevant field, or equivalent; (ii) 5 years' experience in project development, management and implementation in the disaster/development sector with a local NGO or international organization; (iii) experience in community-based programming; (iv) financial management and reporting experience; and (v) team leadership experience.

Reporting: The position will report to the Project Manager.

Scope of Work: Project Coordinators are responsible for the local implementation of the project in each of the identified target river basins.

Expected tasks: Some key outputs include:

(i) Provide technical inputs and manage the day-to-day implementation of the project in the target river basin, and engage with all relevant stakeholders, including oversight of the CDRMCs and CDRTs;
(ii) Contribute to the development and contextual adaptation of project guidance, implementation plans, training materials and other relevant project management tools;
(iii) Recruit, train and supervise the activities of community mobilisers;
(iv) Develop relevant community training, information, education and communication materials and other project related products; and
(v) Follow all administrative, financial and operational requirements and provide timely reports and record keeping of all project activities.

Position: Community Mobiliser (4 per river basin)

Expertise: Preferably (i) bachelor's degree in social science, economics, disaster risk management, or other relevant field, or equivalent; (ii) 3 years' experience in project implementation in the disaster/development sector with a local NGO or international organization; (iii) experience in community-based programming; (iv) financial management and reporting experience; and (v) team leadership experience.

Reporting: This position will report to the relevant Project Coordinator.

Scope of Work: Community Mobilisers are responsible for conducting community-based surveying, training and awareness on CBDRM and to support the work of the CDRMCs and CDRTs.

Expected Tasks: Some key outputs include:

(i) Develop and maintain strong communication channels and linkages with communities;
(ii) Conduct community surveys, training and awareness raising activities;
(iii) Support the recruitment, training and activities of the CDRMCs and CDRTs; and
(iv) Follow all administrative, financial and operational requirements and provide timely reports and record keeping of all project activities.

F. Cost Estimates

24. The Consultants shall prepare estimates and a financing plan for the project as per ADB standards and guidelines (ADB's Guidelines for the Economic Analysis of Projects (1997), Financial Due Diligence Note (2009), and Note on Preparation and Presentation of Cost Estimates (2008, revised 2010).

F-2 Project Implementation Consultants Terms of Reference

E. Background

39. Nepal's low level of development and complex topography renders the country highly vulnerable to climate change impacts and prone to natural hazards.[33] During the monsoon season (June to September), Nepal receives 80% of the country's annual rainfall resulting in widespread inundation in low lying areas. Flooding is reported to account for about 12% of total deaths and 63% of total families affected by all types of natural hazard-induced disasters in the country. Development activities and increasing population have caused further vulnerability and pressure on already scarce land resources. The increasingly frequent flood events threaten the country's economic development and undermine the country's progress toward poverty reduction.

40. The Terai Region of Nepal is particularly vulnerable to flood events. The region lies at the foothills of the Siwalik and Mahabharata mountains, which are highly degraded and have a high rate of deforestation. The mountains' exposure to high-intensity precipitation extremes are projected to increase in frequency and intensity with climate change.[34] A network of rivers originating from the mountains carry significant sediment loads leading to deposition in the riverbeds, reducing the channel capacity, inundating riverbanks causing recurrent and severe flooding of the adjacent floodplains. Flooding causes significant damage to infrastructure, crops and erodes agricultural land affecting the lives and livelihoods of the population living in the area.

41. Communities vulnerable to floods in the Terai is increasing due to migration of people from the mountains and hills, in search of better livelihoods, to flood prone areas in the region. The region's climate-sensitive agriculture sector is dominated by small-scale farmers with the women contributing substantially in terms of farm labour and decision-making. Both farmers and communities are not fully prepared for flooding due to limited warnings of impending flood events. The region's inadequate investment in disaster risk management including flood protection affects the poor and marginalized, who are occupying the most hazard-exposed areas.

42. Flooding in the Terai can have a significant impact on the country. The region has only 17% of Nepal's total land area but accounts for 51% of the 2.64 million hectares (ha) of cultivable land. During heavy monsoon rainfall in August 2017, the southern Terai plains were critically affected, with an estimated $340.3 million of damages to agriculture, irrigation and livestock. The total damage by the flooding was estimated at $584.7 million, almost 3% of Nepal's gross domestic product.

43. Several government agencies are actively involved in flood risk management, employing structural measures such as river protection works, and non-structural measures such as early warning systems, district and village disaster risk management plans.[35] However, effective prioritization of disaster risk management at local level in the Terai Region remains challenging and consequently flood mitigation is less effective. This is primarily due to a lack of financial investment (both in construction and maintenance of assets), and limited technical capacity of the government agency with reactive interventions being a priority. The Department of Water Resources and Irrigation (DWRI) is responsible for all protection works for water induced disasters, however, there are no guidelines for prioritizing works requested by communities. This

[33] Nepal's human development index of 0.574, is below the average of 0.638 for countries in South Asia (UNDP, 2018. *Human Development Indices and Indicators: 2018 Statistical Update*).

[34] R. Karkiet all. 2017. Rising Precipitation Extremes Across Nepal. *Climate 2017*. 5(1).

[35] MoHA. 2011. Guidelines for Disaster Preparedness and Response Plan. Kathmandu; Ministry of Federal Affairs and Local Development. 2012. *Local Disaster Risk Management and Planning Guideline*. Kathmandu.

results in non-optimal construction of embankment works without consideration of impacts to other areas. Furthermore, there is a lack of flood forecasting, gaps in Nepal's hydro-meteorological stations and minimal communication strategies for effective early warning systems.

44. The Government of Nepal has requested the Asian Development Bank (ADB) to support the development of the Priority River Basins Flood Risk Management Project which focuses on seven priority river basins in the Terai Region: West Rapti, Mawa–Ratuwa, Lakhandei, Mohana, Khutiya, East Rapti, and Bakraha.[36] The project areas have minimal reactive embankment interventions which provide limited flood protection. Between 1991 and 2015, the priority river basins experienced 390 floods, of which: (i) 35 floods caused economic damage of at least NPR1 million; (ii) 37 floods caused a total of 440 deaths; and (iii) 79 floods caused total destruction of greater than 10 households. The flood risk is expected to increase as more people and assets locate in vulnerable areas in the Terai Region, which will be further exacerbated by climate change.[37] The project aims to reduce flood-related economic and social losses in the priority river basins by strengthening integrated disaster risk management approaches. The direct project beneficiaries include local communities within the project area, DWRI and the Department of Hydrology and Meteorology (DHM).

45. The flood management interventions in the sub-projects are designed to (i) reduce the damage caused by severe floods; (ii) protect resident houses and public infrastructure, particularly in urban areas and market centers in the basins, from severe floods; (iii) protect agricultural land by reducing river-bank scouring and soil erosion; (iv) reduce the loss of life and injuries by implementing an early warning system for floods and implementing a training program on CBDRM for at-risk communities in the project areas.

46. The project is expected to alleviate poverty by protecting resident property and incomes from flood events, and provide an increased range of livelihood opportunities, particularly on land that will be protected from floods. The project will mainstream opportunities for women by developing and implementing a gender action plan.

47. The consulting firm will provide services for project management, assistance in implementation and ensuring compliance with safeguards and financial requirements related to the project. In summary, the works comprise:(i) preparation of detailed designs and completion of preliminary designs for civil works for 3 river basins (Lakhandei, West Rapti, Bakraha); (ii) supervision of the implementation of civil works in 6 river basins (Mohana, Khutiya, Mawa–Ratuwa, Lakhandei, West Rapti and Bakraha); (iii) completion of detailed designs for 3 river basins (Mohana,Khutiya and Mawa–Ratuwa); and (iv) coordination of Flood Forecasting and Early Warning System (FFEWS) output with DHM and supervision of CBDRM activities for 7 river basins (Mohana, Khutiya, Mawa–Ratuwa, Lakhandei, East Rapti, West Rapti and Bakraha.

F. Implementation Arrangements

48. The executing agency of the project is the Ministry of Energy, Water Resource and Irrigation (MEWRI) and the implementing agencies are DWRI and DHM.

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[36] Priority rivers were selected from 25 river basins from ADB. 2016. *Flood Hazard Mapping and Preliminary Preparation of Flood Risk Management Projects: Final Report.* Manila. Factors such as likelihood/ magnitude of flood damage, poverty index, impact on human wellbeing, loss of life, as well as equitable distribution of projects between regions, were taken into consideration. The river basins were agreed during ADB (South Asia Department). 2016. Review Mission to Nepal: Water Resources Project Preparatory Facility (Aide Memoire). November 2016 (internal).

[37] S. Dhakal. 2013. *Flood Hazard in Nepal and New Approach of Risk Reduction*. Kathmandu.

49. The implementation of the Project will be monitored by the Project Steering Committee at MEWRI.

50. DWRI will establish a Project Management Unit (PMU) at Jawalakhel, Lalitpur. A Project Implementation Unit (PIU) will be formed in DHM to implement the flood forecasting and early warning system output. There will be PIUs in six People Embankment Program field offices located in the respective sub-project areas in the districts of Jhapa, Morang, Sarlahi, Makwanpur, Dang, Kailali for the sole purpose of implementing the Project. The PMU will be headed by a Project Manager (gazetted first class) and appropriately staffed. The PIC will report to the Project Director of PMU at central level and to the respective Project Managers at field level to support the PIU. **Attachment 1** indicates the overall implementation arrangements.

51. At central level, the PIC will assist the PMU and its other advisory sections comprising: (i) a committee that will review designs and documents, and advise as necessary; (ii) an environment safeguards and social monitoring and evaluation section that will monitor, evaluate and report on required safeguard and social activities; (iii) an Accounts and Finance Section (AFS) that will be responsible for effective accounts and financial management; (iv) a Communications Section who will lead communication activities; and (v) a Procurement Section that will be responsible for obtaining approvals and issuing bid documents, managing bidding processes and bid evaluation until package award, and contract management including review and approval of contract variations. At field level the PIC will support respective PIUs in execution of works contracts and implementation of FFEWS. The PIC shall support PIUs particularly in the areas of day-to-day activities viz. contract management, quality assurance and quality control, construction supervision in maintaining line levels as per approved design drawings, monitoring progress and ensure safeguard compliance. The respective Project Manager shall be playing the role of the “Employer” under the measurement based small works contract during implementation. The PIC will furnish relevant project-related information to the PIUs, PMU and its advisory sections. On the advice of the PMU, the PIC will correct, revise, update, and improve its services and outputs comprising this consulting assignment.

52. Local bodies will interact with respective PIUs at field level, and PIC shall assist respective PIUs in addressing the issues.

G. Objective of the Consulting Services

53. The objective of the assignment is to assist the PMU, which shall be created under DWRI, and the PIU formed under DHM, in PRBFRMP-related activities, including but not limited to construction management, contract administration, construction supervision, quality assurance and quality control, procurement management, safeguards compliance, meeting disbursement targets, project management and monitoring, and coordination with other government authorities, non-governmental organizations (NGOs), etc., towards successful implementation of the Project.

54. The PIC is envisaged to support the PMU located in Lalitpur and PIUs located at respective sub-project areas in the districts of Jhapa, Morang, Sarlahi, Makwanpur, Banke, Dang, Kailali for a period of 48 months and the contract will be signed for the same period.

H. Scope of Services, Tasks (Components) and Expected Deliverables

55. **Scope of Services.** The consulting firm will be an engineering and project management consulting firm which will provide all technical and management services, design, engineering, project management and construction supervision services, including, but not limited to:

56. **PART A – Construction Supervision***:* Assist the client to (i) review detailed design and amend based on the geotechnical investigation; (ii) procurement, management, quality control and construction supervision of works under the small work contracts; (iii) contract administration; (iv) project management and monitoring; (v) ensure compliance with social and environmental safeguards, and, occupational health and safety aspects required for successful implementation of the project; (vi) prepare reporting requirements for PMU/PIU and ADB, as required; (vii) assist PMU/PIU with preparations and reporting for missions fielded by ADB, as necessary; and (viii) transfer knowledge to PMU and PIU staffs.

57. **PART B – Detailed Design Preparation***:* (i) conduct surveys, studies and investigations;(ii) prepare detailed engineering design; (iii) review and confirm designs and assist the client to get the design, cost estimates and drawings approved by DWRI;(iv) prepare bidding document and provide support in the bidding process; and (v) provide support in procurement and contract award.

58. The Consultant shall work under the guidance of the PMU (intended to be established under the DWRI), and in close collaboration with the other consultants envisaged to be engaged under the project.[38]The overall responsibility to deliver the project outputs and deliverables required under this Terms of Reference (TOR) will rest with the consulting firm through the team leader. The Consultant shall ensure timely and quality delivery of the services and documents, establish coordination among all stakeholders and team members, schedule mobilization/demobilization of team members after receiving written approval from the PMU beforehand and interact with the PMU and PIU (jointly and severally hereinafter called “client”) on regular basis.

59. The international experts in particular shall be, in all the cases, based in Nepal. If proposed, the home-based inputs shall be converted to field based inputs and evaluated accordingly.

60. The scope of services covered under these TOR shall include, but not limited to, the following tasks:

I. Detailed Outputs of the Assignment

61. The project will provide long-term sustainable solutions to two key causes of increasing flood vulnerability: (i) inadequate flood control infrastructure, and (ii) inadequate flood forecasting and early warning systems. Investments in infrastructure and early warning systems will be supplemented by CBDRM interventions and targeted capacity development. The project will have the following outputs:

(i) **Output 1. Flood protection infrastructure improved.** Specifically, the project will reduce direct impacts from flooding through: (a) rehabilitation and construction of

[38] The Project envisages to recruit a number of additional consultants, including (i) the Flood Forecasting and Early Warning System (FFEWS) Consultant, (ii) the Community-Based Disaster Risk Management (CBDRM) Consultant, and (iii) an NGO may also be recruited for increased safeguard and community participation activities.

flood control infrastructure;[39] (b) demonstration of nature-based solutions for better flood risk management, such as bio-engineering river embankments with suitable flora/vegetation to prevent soil erosion;[40]and (c) development of flood protection infrastructure maintenance manuals and monitoring systems.

(ii) **Output 2. Flood response capacity enhanced.** This project support government and communities in flood prone areas to improve early warnings systems through: (a) installation of hydro-meteorological stations and strengthening capacity for flood forecasting; (b) strengthening early warning communications system, possibly using sirens, mobile phone technology, to communicate advance flood warnings to local communities; and (c) flood forecasting and early warning system maintained.

(iii) **Output 3. Flood prevention and preparedness capacity improved.** This will be delivered by(a) preparing and implementing a project stakeholder communication and outreach program; (b) undertaking organizational capacity-building program on flood risk management and infrastructure planning for DWRI; and(c) developing CBDRM plans in line with local development plans and budgets that integrate disaster risk information.[41]

62. These outputs shall result in the following outcome: resilience of communities to flood risks of selected river basins in the Terai Region improved. The project will be aligned with the following impacts: (i) social and economic losses due to flood-induced disasters reduced;[42]and (ii) assessment, identification, monitoring and early warning system on potential disasters strengthened.[43]

63. **Detailed Tasks (Components) and Expected Deliverables**. To ensure successful implementation of the Project, the consulting firm shall carry out the following tasks (but not limited to):

PART A – Construction Supervision (Time-Based)

(i) Project management, monitoring, supervision, quality control and financial assistance and reporting of all sub projects. The PIC shall work under the PMU and PIU to ensure the effective and timely delivery of the project outputs to the highest standard. The PIC will assist with the overall project coordination and management through the relevant agencies at national, regional and local levels. The PIC shall maintain liaison with DWRI through PMU, PIU field units, DHM through PIU and with ADB through PMU. Other main activities related to project management will include, but not be limited to:

[39] The infrastructure could include (i) embankments to better control watercourses and prevent damage from flooding of land adjacent to a river; (ii)solid spurs or groynes, which are structures made to project flow from a river bank into a watercourse with the aim of deflecting the flow away from the side of the river on which the groyne is built; (iii) culverts with sluice-gates or flap gates; and (iv) check dams.

[40] For example: World Bank. 2017. *Implementing nature-based flood protection: Principles and implementation guidance*. Washington, DC; and United Nations World Water Assessment Programme.

[41] CBDRM includes developing community flood risk maps and supporting implementation of non-structural measures prioritized in community plans, especially measures related to strengthening livelihood resilience.

[42] Government of Nepal, Water and Energy Commission Secretariat. 2002. *National Water Plan, 2002–2027*. Kathmandu. pp. 37–38.

[43] Government of Nepal, MoHA. 2009. National Strategy for Disaster Risk Management (NSDRM). Kathmandu.

(a) Advise and support the PMU and PIU in overall strategic direction, planning, implementation, contract management, financial management, risk management, cost control, and scheduling;

(b) Prepare and submit detailed work program in consultation with all stakeholders, including all pertinent activities and critical paths, responsibility and function of each team member, coordination mechanism and communication procedures between the consulting firm, contractor and the PMU; reporting system and the procedure etc. shall ensure orderly and uninterrupted progress of the works; ensure gender and inclusion issues are integrated. The mechanism and procedures set by the consulting firm shall be subject to the approval by the PMU;

(c) Develop program management and tracking system, using commonly available computer software to schedule and monitor all aspects of activities including but not limited to construction activities, payment and disbursements;

(d) Assist in development and use of Information Technology (IT) based Project Performance Management Evaluation tool to monitor and evaluate implementation of the project; identify performance constraints; and formulate and implement practical measures to address shortcomings. Frequent performance evaluations shall be carried out based on assessment of the project. The tool is capable of disclosing key project-related information, including costs, safeguards, procurement status and progress, amount of contract awarded, billing and disbursement, etc.;

(e) Develop tools and assist in monitoring project financial disbursement and recommend ways to facilitate and streamline Government administrative procedures for disbursement, set up system for project financial book-keeping and financial accounts;

(f) Support to implement mitigation measures to minimize risk elaborated in risk management plan for the project;

(g) Identify all necessary approvals and permissions, etc. required during the implementation of the Contracts in accordance with the Government regulations and provisions of the Contracts;

(h) Plan and assist the PMU in obtaining, in a timely manner, the required clearances, permits, approvals, sanctions or any other information from relevant competent authorities so that the project activities are not unduly delayed;

(i) Establish document control and proper filing system for project offices, including official correspondence, drawings, site instructions, variation orders and site records. Establish channel and mode of communications;

(j) Review, comment, and recommend, for PMU's approval, the contractor's proposed implementation schedule and programs, including time over-run aspect and cost over-run, if any. Monitor the schedule and proactively instruct

the contractors through PMU to take corrective action to complete the works in time;

(k) Review and recommend on the contractor's statement for progress payments;

(l) Assist in resolution of contractual issues including review, evaluation and confirmation of contract variation orders;

(m) Review and examine the contractor's request for variation orders such as extra items, new rates, requests for time extension and extra payment, filed by the contractor etc. and submit recommendations for approval, if appropriate;

(n) Assist constructively and submit recommendations in resolving any potential difficulty, conflicts or dispute that may arise between the contractors and the PIU.

(o) Assist the PIU in certification of substantial and completion of the works in accordance with the provisions of the Contracts, including stage certification and final acceptance test;

(p) Assist on liaison with local authorities, government agencies and ADB. Assist the PMU/PIU in reporting to these agencies;

(q) Assist the PMU/PIU in meeting its obligations and reporting;

(r) Prepare essential documents including quick report on progress, quality, disbursement or any other relevant matter as may be required by the PMU or ADB;

(s) Assist the PMU/PIU in conducting regular meetings with contractors, government entities and all other stakeholders etc., to discuss progress and issues related to implementation, and prepare minutes for recording and circulation;

(t) Establish all necessary records and the procedures of maintaining/updating such records for each package and for the entire project;

(u) Develop and implement procedure for timely payments to the contractors and monitor for compliance;

(v) Assist the PMU in ensuring compliance with all loan covenants during project implementation;

(w) Provide project management support and capacity building for the PMU in planning and managing the project cycle (design, procurement, construction, commissioning stages, and defect liability period);

(x) Prepare a realistic project schedule (design, approval, tendering, construction, commissioning, handover) and corresponding projected cash flow in conjunction with the PMU;

(y) Establish and help PMU maintain an effective management system in accordance with the design and monitoring framework to monitor progress and project performance against key targets and indicators, including project performance management system (PPMS) to ensure timely, and high-quality implementation and completion;

(z) Integrate indicators related Gender action plan in the PPMS;

(aa) Review Quality Assurance Plan (QAP), prepare periodic reports, briefing materials, provide other information time-to-time as necessary;

(bb) Develop uniform working procedures, quality assurance and control system for the smooth implementation of all contracts;

(cc) Support to ensure compliance with all reporting requirements of the Project;

(dd) Assist PMU in planning, monitoring and reporting of project financial disbursement;

(ee) Make recommendations to facilitate and streamline Government administrative procedures for disbursement;

(ff) Develop operational guidelines on project financial matters using Government procedures in compliance with ADB requirements;

(gg) Set up procedures and maintain the project financial book-keeping and financial accounts at the PMU level;

(hh) Provide inputs to the cost estimation process;

(ii) Assist/Conduct relevant training/consultation/social survey and workshop as per client's approval and requirements.

(jj) Assist PMU in, maintaining, operating an IT based Management Information System (MIS) of preparing and reporting project financial statements periodically;

(kk) Capacity building of the PMU in accounting and financial management;

(ll) Perform PMU and PIU-related training and capacity building;

(mm) Prepare and produce monthly, quarterly, yearly progress and achievement report and project completion report or any other report required or requested by the PMU. The monthly progress report should also include the weekly output of the key as well as non-key experts (document produced, field visit report etc.); and

(nn) Acquire prior written approval from the PMU before leaving the workstation in case of experts deployed at the central level.

(ii) Survey, investigations, and general data collection.

(a) Conduct surveys and investigations as necessary, such as topographical surveys, geotechnical surveys, hydrological surveys, borehole investigations or other investigations to identify and/or to confirm the input data to proceed with detail design engineering and drawings;

(b) Supervise and control site investigation surveys and instruct contractors to abide to specified requirements;

(c) Conduct and document meaningful consultation and information sessions with project beneficiaries (local communities) and directly affected persons;

(d) Collect MoUs for voluntary land donation and certification from relevant land revenue and survey offices for finalization of detailed design and also in case of modifications required in detailed design due to change in river flow pattern.

(iii) Construction supervision, quality control and contract administration. The Consulting firm shall assist and be responsible to carry out the tasks appended hereunder. The tasks appended hereunder are neither limited nor conclusive; the consulting firm is obliged to support the PMU in performing their tasks and responsibilities.

(a) Coordinate with the Contractor, DWRI, DHM and other stakeholders viz CBDRM Consultant (NGO) and other contractors for construction of shelter houses, etc., to achieve timely completion of contractual obligations on the part of contractor and the Client;

(b) Establish a data transfer system for all documents between Contractor, DWRI, DHM and other stakeholders viz CBDRM Consultant (NGO) and other contractors for construction of shelter houses, etc;

(c) Support and assist the PIUs in performing its duties as “Engineer” under measurement-based small works contract;

(d) Support and assist the PIU in contract administration, undertake day-to- day construction supervision and monitoring, provide sound and timely advice to resolve problems that arise during construction and ensure compliance with contractual conditions;

(e) Review construction contracts/documents and conduct site visit of entire area covered under the project and identify (a) potential initial activities to be complied with by the construction contractors; and (b) the obligations of the PMU, if any. Bring to the attention of the PMU any potential contractual issue and construction problem that warrants their early attention;

(f) The Consulting firm shall maintain sufficient site-based staff, with clear allocation of duties, to supervise day-to-day construction activities;

(g) Ensure that the works/contractual deliverables comply with the approved engineering designs and technical specifications mentioned in the Contract, agreed schedule of payment and timelines, and terms of conditions of the Contract;

(h) Review construction drawings and design/drawing changes as prepared and submitted by the contractor during the construction stage and as-built drawings;

(i) Ensure compliance with standard international engineering practices by the contractors;

(j) Support and assist the PMU in taking engineering decisions;

(k) Develop quality assurance and quality enhancement system, quality control plan, prepare quality compliance reports and progress reports;

(l) Assist the PMU in forecasting the progress of works and finalization of periodic targets for the expenditure and disbursement;

(m) Assist the PIU in reviewing and approving the Contractor's monthly Interim Payment Certificates;

(n) Review the Contractor's construction methodology, method statements, work proposal and construction drawings to the extent required by respective contract. Submit comment on requirement of modifications, if any, and recommend for approval as appropriate;

(o) Proof checking of the Contractors' drawings, designs and recommend to the PMU for approval of contractors' design and drawings for execution as required;

(p) Examine, check, comment and recommend for necessary action on the Contractor's proposals, plans, detailed designs, drawings, request for change, if any. Monitor and report on physical progress of the works and financial disbursements, environmental and social compliance reports;

(q) Ensure required instructions received and complied with the requirements of the contract;

(r) Be responsible for management and supervision of construction contracts under the current law of the Employer's country;

(s) Check the adequacy and quality of Contractor's input in terms of material, equipment and machinery, workers and safety requirement prior to commencement of the works and time-to-time during construction activity;

(t) Facilitate in setting out the works and ensure its correctness during the implementation;

(u) Checking the line level, layout and workmanship of the construction to ensure conformity with the contract, proposal for approval of any changes in the plans that may be deemed necessary, duly indicating the effects due to the change on contract and preparation of variation orders accordingly;

(v) Inspect and supervise the day-to-day operations and activities of the contractors to ensure that the works follow the approved drawings and specifications of relevant construction contracts;

(w) Monitor the contractor's compliance with safety requirements during and prior to the commencement of construction activity. Assist in preparation of accident report in the event of unfortunate occurrence of any accident on the site;

(x) Monitor and report the engagement of child labour by the contractor, if any. Ensure the compliance by the contractor of the labour protection clause in the Contract or required by the regulatory authority including all relevant statutory provisions on labour- equal pay for equal work, health, safety, welfare, sanitation and working conditions;

(y) Ensure the compliance by the Contractor of the Environmental Monitoring/Environmental Management Plan in the Contract or required by the regulatory authority and ADB;

(z) Ensure the compliance by the Contractor of the ADB's safeguard policy and requirements;

(aa) Ensure that the Labour Camps are complying with regulations and take steps to conduct frequent health camps, HIV awareness, etc. in the labour camps. Ensure the facilities are provided separately for women in the labour camps;

(bb) Maintain at site or at project office, all duplicates of the Contracts, technical drawings, catalogues and drawings, and specifications, survey notes, quality control documents and any other documents, as necessary;

(cc) Ensure that the Contractor is setting up all labs, testing facilities as per contract conditions and the equipment are calibrated;

(dd) Assist the PMU and the Contractor to develop alternative methods to overcome unexpected obstacles which may affect the execution of the works;

(ee) Assist the PMU in identification and documentation of underground utilities and removal designs, as required;

(ff) Cooperate, facilitate and report on all removal/relocation of on-site activities pertaining to ground or underground utilities;

(gg) Review the aspect of traffic management in the Contractor's programs and, ensure and facilitate its compliance by the Contractors during the execution of construction activity and removal/relocation of utilities;

(hh) Examine and ensure the completion drawings/as-built drawings/ operation and maintenance manual if any, prepared and submitted by the Contractor (hard and soft copies), submit recommendations in the event of change or correction is required therein prior to acceptance by the PMU;

(ii) Ensure maintenance of documentations on the quality control and quality assurance, test reports, logbooks, etc. by the Contractors in an acceptable manner;

(jj) Check internal quality management system of the contractors-documentation, quality management method, quality control reporting, quality control staffing. Submit its recommendation for any change, if warranted/deemed necessary. Periodically audit contractor's compliance with quality control/quality assurance requirements and submit report to the PMU;

(kk) In case of any new items or modifications of works, prepare specifications, carry out rate analysis (with supporting documents) for justifying/negotiating the rates quoted by the Contractors and furnish these to the PMU for their approval. Check to ensure that type and frequency of test requirements for material on site and in laboratory comply with technical specifications as required in the contract. Test equipment to be used or installed prior to its incorporation in the works;

(ll) Carry out, witness and supervise testing of materials and all equipment to be incorporated in the works at site, laboratory, at source of materials and equipment or any other location. Check testing results to ensure compliance with the provisions of the contract;

(mm) Ensure contracts are progressing in time and for any deviation recommend for initiation of imposing fine, Liquidation Damage etc.;

(nn) Ensure that all the required insurances are available and up to date with the Contractor;

(oo) Ensure that no additional claims (both for quantity as well as additional scope) shall be admitted without the prior written approval of the PMU;

(pp) Store all records and documents related to quality assurance/quality control at safe custody and make available when required;

(qq) In case of such of those works where measurements are hidden after completion as in the case of foundations, reinforcements in Reinforced Cement Concrete (RCC) structures etc.**,** measurements and check measurements are to be carried out immediately and pictorial evidences are recorded after each activity is completed;

(rr) Check the laboratory and field tests carried out by the Contractors and to develop a mechanism in consultation with the PMU in carrying out independent tests, if necessary, other than the regular testing done;

(ss) Recommend PMU to order special tests of materials and/or, completed works, and/or order removal and substitution of improper materials and/or works as required;

(tt) Maintain daily notes/site order book/diary of manpower, material and machines used by the contractor to execution progress for each construction activity on site as well as notes of arising potential problem on site that may affect the execution progress or require change or variation;

(uu) Attend periodic meetings with PMU/PIU, the contractors and other stakeholders to discuss, approve the execution progress, remaining progress, difficulties, and any potential problem anticipated that may affect execution, progress, propose constructive solutions/remedies to overcome problem and difficulties for smooth operations of execution progress;

(vv) Attend, facilitate constructively and report all feedback/complaints of community related to execution of works;

(ww) Record measurements of works executed at site from beginning to completion of project; sector experts will ensure that works are carried out as per the approved design/drawings and specification and shall supervise pre-construction, construction activities and commissioning tests at works;

(xx) Endorsement/certification that quality is confirming to all relevant specifications and drawings;

(yy) Measurement and endorsement/certification of the works completed and for certifying and recommending payments to the contractors;

(zz) Convey approvals and/or issue construction drawings including variations thereof, in this connection, give instructions to the Contractor; verify and get corrected the “as-built drawings” supplied by the Contractor and certify the same;

(aaa) Assist the PMU in taking over of completed works from the Contractors in particular by preparing list of defects to be corrected by the contractor;

(bbb) Prepare specific engineering reports when required, which shall include an analysis of the problems encountered and proposed solutions;

(ccc) Identify and assist PMU to agree with the Contractors on measures necessary to remedy unsatisfactory performance in order to remain within the cost and time period of the contract;

(ddd) The Consulting firm shall carry out their assignment in accordance with the working schedule of the Contractor, including late working hours, weekends and holidays etc., when warranted.

(iv) Social, environmental, occupational health and safety aspects

(a) Ensure compliance with ADB safeguard requirement and project safeguard frameworks (Environmental Assessment Review Framework and Resettlement Framework). Provide guidance on safeguards and issue instructions to the contractors and monitor compliance;

(b) Assist in obtaining all necessary relevant permissions and complying with statutory requirements;

(c) Prepare stakeholder consultation strategy and plan for creating positive ownership on project activities and outputs;

(d) Conduct consultation with all stakeholders and affected persons, collect MoUs for voluntary land donation and certification from relevant Land Revenue and Survey offices for finalization of detailed design and also in case of modifications required in detailed design due to change in river flow pattern.

(e) Review and update the Initial Environmental Examination (IEE) report, Environmental and Resettlement Framework (EARF) in respect of future packages prepared for the project; and prepare/update IEE accordingly; carry out disclosure as necessary during and after detailed designs;

(f) Support in establishing grievance redress mechanism acceptable to ADB under the project through following activities; (a) prepare a project specific guideline on complaint handling and conflict resolution; (b) maintain and regularly update a complaint/resolution data base; and (c) monitor complaint, handling, to ensure follow up resolution efforts at levels;

(g) Assist in obtaining all necessary permissions and complying with statutory requirements as required prior to construction;

(h) Prepare a periodic safeguard monitoring report for PMU and submit to ADB;

(i) Ensure that all bidding documents and contract documents contain the Environmental Management Plan (EMP) and such items are included in bill of quantities (BOQ); also monitor the implementation of the EMP during construction and pre-phases;

(j) Update the EMP as necessary;

(k) Review the Contractor's Environmental Management Plan (CEMP) for adequacy in terms of compliance with the requirements of the EMP and instruct amendments and additions as necessary;

(l) Prepare or update the environmental monitoring plan and report format to reflect detailed design and the CEMP. Monitor and ensure compliance with implementation of the EMP during the construction phase;

(m) Ensure and control the compliance by the Contractor to the Environmental Monitoring/EMP, the relevant Occupational Health and Safety (OHS) regulations as stipulated in the contract or required by the country law or by the regulatory authority and submit regular monitoring reports on the format and to the frequency set out in the EMP;

(n) In compliance with the EMP, develop a strategy to overcome potentially arising difficulties of construction/traffic management and also prepare, in due consultation with the contractor and PMU, detailed traffic plans during works; propose and implementation mechanism for coordination among all stakeholders such as traffic police, roads department, user committees, etc., for smooth construction execution;

(o) As part of the EMP, prepare a project focused OHS Plan to be adopted by the PMU and the Contractor; and

(p) Ensure that relevant provisions in contracts on OHS are abided by the Contractors during the construction works.

(q) Ensure fair working condition to workers through implementing following activities:

1. provide awareness raising programs for workers at construction sites informing them about their opportunities, rights and duties;

2. ensure that workers are fully aware of the insurance facilities provided under the contract and facilitate claims arising out of injuries, disabilities and death;

3. enforce strictly the provisions of use of labor cards;

4. provision of equal pay for both the men and women for equal volume of works performed;

5. provide training on OHS, environmental impacts and mitigation measures to the Contractors including contractors' workers.

(r) Confirm the involuntary resettlement/indigenous peoples impacts based on detailed design and prepare or update social safeguards reports as required. Monitor and ensure compliance with the agreed principles of voluntary land donation;

(s) Assist the PMU and PIU to establish the project’s grievance redress mechanism, including GRM register and ensure that the mechanism is widely publicized and available to displaced people, project beneficiaries, indigenous peoples and workers in a language and form that is appropriate for them;

(t) Monitor safeguards implementation and identify corrective actions as needed; and

(u) Monitor and ensure gender equality and social inclusion (GESI) targets are achieved and approaches in stakeholder participation and consultation.

PART B – Detailed Design Preparation of Lakhandehi, Bakhara and West Rapti subprojects

(ii) Project management, monitoring and financial assistance. The PIC will work under the PMU and PIU to ensure the effective and timely delivery of the project outputs to the highest standard. The PIC will assist with the overall project coordination and management through the relevant agencies at national, regional and local levels. The PIC will maintain liaison with DWRI through PMU, DHM though PIU and with ADB. Other main activities related to project management will include, but not be limited to:

(a) Prepare and submit detailed work program, including all pertinent activities and critical paths, responsibility and function of each team member, co-ordination mechanism and communication procedures between the consulting firm, and the PMU; reporting system and the procedure etc. shall ensure orderly and uninterrupted progress of the works. The mechanism and procedures set by the consulting firm shall be subject to the prior approval by the PMU;
(b) Prepare a realistic project schedule (design, approval, tendering, construction, commissioning, handover) and corresponding projected cash flow in conjunction with the PMU;
(c) Provide inputs to the cost estimation process;

(iii) Survey and investigations, detail design engineering, develop specifications and detailed design drawings, quantity estimate and costing for the balanced civil works contracts as per feasibility study report and for the works required for CBDRM

(a) Conduct surveys and investigations as necessary, such as topographical surveys, geotechnical surveys, hydrological surveys, borehole Investigations or other Investigations to identify and/or to confirm the input data to proceed with detail engineering design, cost estimation, specifications and drawings;
(b) Conduct consultation with all stakeholders and affected persons, collect MOUs for voluntary land donation and certification from relevant land revenue and survey offices for finalization of detailed design and also in case of modifications required in detailed design due to change in river flow pattern;
(c) Preparation of detailed design engineering, technical specifications and detailed design drawings, detailed quantity estimate and costing for future civil works contracts in line withCW-01 and CW-02 detailed design; the regulatory requirements, and best engineering practice;
(d) Liaise with PMU and all relevant stakeholders including affected households to finalize the designs and drawings prior to finalizing the BOQ and estimates;
(e) Ensure findings in the safeguard documents are appropriately addressed in the designs/drawings and estimates/BOQ;
(f) Prepare detailed designs including construction drawings in accordance with sound and established engineering practices;
(g) Compile bill of quantity and specify equipment;

(h) Assist PMU to get all the cost estimates and detailed engineering design and drawings approved by the DWRI. Make changes and incorporate the comments as many times as required until the cost estimate as well as the design and drawings are approved by the DWRI.
(i) Prepare documents required for statutory and other clearances;
(j) Assess land requirement, preparation of land acquisition documents if required as consequence of detailed design; and
(k) Assess environmental aspects for detailed designs.

(iv) Detailed engineering design, estimation of works, bidding process management, procurement and contract award for the civil works contracts as per feasibility study report for Bakhara, Lakhandei, and West Rapti and for the works required for all sub basin CBDRM

(a) Review the proposed engineering designs, drawings, specifications, quantities and cost estimation for the new civil works as provided in the feasibility study and other reports;
(b) Conduct a workshop on the three basins and agree on the process for detailed design with DWRI and ADB;
(c) Prepare, in close collaboration with the PMU and PIU, the detailed engineering design, detailed design drawings, technical specifications, quantities and cost estimation for the new civil works based on the feasibility study report and in-line with the detailed design methodology adopted for the first two subprojects;
(d) Prepare measurement-based bidding documents (complete in all respect) for balance civil works (as per feasibility study report) including technical specifications, assist PMU in issuance of bidding document and bid process management evaluation and report writing as required;
(e) Ensure the bidding documents comply with safeguard requirements as approved by ADB;
(f) Assist in obtaining ADB's no-objection at various stages of procurement and construction activities; and
(g) Prepare the necessary documentation on procurement for future audit by the DWRI, Government regulatory authorities or ADB.

(v) Preparation of bidding documents, bid process management, procurement and contract award for the civil works contracts as per feasibility study report and detailed design and for the works required for CBDRM

(a) Prepare the bidding documents following ADB Procurement Policy - Goods, Works, non-consulting and consulting Services" and "Procurement regulations for ADB Borrowers – Goods, Works, Non-consulting and Consulting Services" amended time to time, and support PMU in all aspects of procurement;
(b) Assist PMU in bidding process management and all procurement activities in accordance with agreed procurement plan, Government regulations and ADB's requirements;
(c) Assist PMU in issuing invitation for bids, addendum/corrigendum, and clarifications to bidders' queries;

(d) If required, assist in bid opening, bid evaluation and preparation of Bid Evaluation Reports and obtain ADB's no-objection, award of contract and signing of contract;
(e) Prepare contract documentation to include letter of invitation, conditions of contract, specifications and requirements, design parameters; bills of quantities, safeguard documents, etc. in close coordination with the PMU;
(f) Prepare the TOR, Budget and RFP for recruitment of potential consultants following "ADB Procurement Policy - Goods, Works, non-consulting and consulting Services" and "Procurement regulations for ADB Borrowers – Goods, Works, Non-consulting and Consulting Services" amended time to time, and support PMU in all aspects of recruitment;
(g) Assist PMU in obtaining ADB's approval and all recruitment activities in accordance with agreed procurement plan, Government regulations and ADB's requirements;
(h) Assist PMU in issuing Expression of Interest (EOI) and Request for Proposal (RFP) for CBDRM, addendum/corrigendum, and clarifications to firms' queries;
(i) Assist in proposal opening, evaluation of EOI and Technical and Financial proposals, preparation of relevant submissions/reports and obtain ADB's no-objection, award of contract and signing of contract; and
(j) Prepare a detailed implementation schedule and management plan covering all stages of the procurement and implementation process right from field survey and investigations to acceptance of finished work.

(vi) Social, environmental, occupational health and safety aspects

(a) Ensure compliance with ADB safeguard requirement and project safeguard frameworks (Environmental Assessment Review Framework and Resettlement Framework)[44]
(b) Prepare necessary safeguard documents for the construction works proposed in feasibility study report. Ensure necessary safeguard documents are included in the bidding documents;
(c) Prepare stakeholder consultation strategy and plan for creating positive ownership on project activities and outputs;
(d) Conduct consultation with all stakeholders and affected persons, collect MoUs for voluntary land donation and certification from relevant land revenue and survey offices for finalization of detailed design;
(e) Review and update the Initial Environmental Examination (IEE) report, Environmental and Resettlement Framework (EARF) in respect of future packages prepared for the project; and prepare/update IEE accordingly; carry out disclosure as necessary during and after detailed designs;
(f) Update the Environmental Management Plan (EMP) as necessary;
(g) Assist in obtaining all necessary permissions and complying with statutory requirements as required prior to construction;
(h) Ensure that all bidding documents and contract documents contain the EMP and such items are included in BOQ;
(i) Prepare OHS Plan to be adopted for the project;

[44] Asian Development Bank Safeguards Policy Statement (2009).

(j) Provide technical inputs to ensuring GESI targets and approaches in stakeholder participation and consultation; and

(k) Confirm the involuntary resettlement/indigenous peoples impacts based on detailed design and prepare or update social safeguards reports as required. Monitor and ensure compliance with the agreed principles of voluntary land donation.

J. Team Composition and Qualification Requirements for the Key Experts (which will be used for evaluating the Key Experts under Data Sheet 21.1 of the ITC)

64. **Team composition with estimated inputs.** The consulting firm's team will include two sub-teams: **Part A** – three International Key Experts (16 person-months), nine National Key Experts (95 person-months) and ten National non-Key Experts (262 person-months excluding those required for consultant's administrative, clerical and office staff) and **Part B** – two International Key Experts (6 person-months), five National Key Experts (24 person-months) and three national Non-Key Experts (16 person-months). The consulting firm will be engaged for a period of four years. The expert positions and their estimated inputs are provided in **Table 1** below. The Client expects proposals to be based on person-months estimated by the Client as specified in the RFP. Any other staff deemed necessary to fulfil the consultant's obligations shall be provided by the Consultant at its own cost. Only key experts will be evaluated during the proposal evaluation stage, but the Consultant is required to submit the CVs of non-key experts meeting the qualification requirements in the RFP for the Client's approval before concluding the contract.

Table 1: Team Composition with Estimated Inputs

PART A–Construction Supervision (Time-Based)

Sl.	Position	Person month
I.	**International Key Expert**	
1	Team Leader cum River Engineer	12
2	Community Based Disaster Risk Management (CBDRM) Expert	3
3	Geotechnical/Design Engineer	1
	International Key Expert Sub-Total	**16**
II.	**National Key Expert**	
1	Deputy Team Leader cum Senior Contract Management Expert	34
2	Monitoring Expert	16
3	Design/Structural Engineering Expert	2
4	Financial Management cum Training Expert	12
5	Procurement Expert	1
6	Gender Equality and Social Inclusion Expert	3
7	Social Safeguard Expert	9
8	Environmental Safeguard Expert	9

Sl.	Position	Person month
9	Community Based Disaster Risk Management Expert	9
	National Key Expert Sub-Total	**95**
III.	**National Non-Key Experts**	
1	Construction Engineers (6 number x 36 months each)	216
2	MIS Technician	36
3	AutoCAD Expert	2
4	Quantity Surveyor cum Estimator	6
5	Survey and Mapping Expert	2
	National Non-Key Expert Sub-Total	**262**

PART B–Detailed Design Preparation (Lump Sum)

Sl.	Position	Person month
I.	**International Key Expert**	
1	Team Leader cum River Engineer	3
2	Geotechnical/Design Engineer	3
	International Key Expert Sub-Total	**6**
II.	**National Key Expert**	
1	Deputy Team Leader cum Senior Design Engineer	6
2	Design/Structural Engineering Expert (2 numbers)	12
3	Hydraulic Modelling Expert	4
4	Procurement Expert	2
	National Key Expert Sub-Total	**24**
III.	**National Non-Key Experts**	
1	AutoCAD Expert (2 numbers)	12
2	Survey and Mapping Expert	4
	National Non-Key Expert Sub-Total	**16**

65. For mobilization and demobilization of all international, national key and non-key experts for deployment, one-month prior PMU's written approval shall be a prerequisite.

66. PMU can mobilize or demobilize the key as well as non-key experts on a short notice as and when deemed necessary.

67. **Expected Qualification Requirements and Tasks Assigned to the Key and Non-Key Experts:** The Consulting firm is expected to propose adequately qualified and experienced

experts to undertake efficiently the assigned tasks and responsibilities. The tasks and responsibilities assigned and detailed educational qualification and experience requirement for the respective experts are reported below.

PART A–CONSTRUCTION SUPERVISION (Time-Based)

I. International Consultants

68. **Team Leader cum River Engineer (International):** The Team Leader cum River Engineer shall preferably have:

(i) a post-graduate degree (master's degree or above) in Civil Engineering with a specialty in River Engineering or equivalent;

(ii) an overall 15 years of working experience with 12 years of experience in river training works, canal/hydraulic structures, canal works projects; and experience in project development, processing management and implementation of river training works, particularly with ADB or World Bank projects shall have added advantage;

(iii) sound knowledge of ADB policies and procedures and team leadership experience, in particular on ADB projects is desirable.

Reporting: The position will report to the Project Director, PMU.

Scope of Work: The Team Leader cum River Engineer will have overall responsibility for the project implementation, consultants' coordination, and the timely delivery of all outputs.

Expected Tasks: As Team Leader, the main outputs include:

(xvi) Under PMU, the Team Leader will be responsible for overall project management and administration, advice on ADB's procedures and policies;
(xvii) Coordinate all activities, including stakeholder participation where appropriate and coordination with DHM and the FFEWS consultants;
(xviii) Prepare a detailed work plan for the project implementation and get it approved by PM;
(xix) Manage the consultant team members, both international and national;
(xx) Prepare the project preparation inception report;
(xxi) Prepare the project implementation schedule and detailed implementation plan for approval by PMU;
(xxii) Procurement and Bid process management, finalize bidding documents for CBDRM, ensure it complies with ADB standards and guidelines and obtain PMU and ADB approvals;
(xxiii) Contract management, establishment of construction management and project performance monitoring system for various project activities;
(xxiv) Manage effective construction supervision and quality control and monitoring,
(xxv) Facilitate and support PMU/ADB during ADB missions;
(xxvi) Organize and implement training to the executing and implementing agencies on project implementation and capacity building;
(xxvii) Assist in resolving contractual issue;

(xxviii) Suggest innovative measures that can be adopted for the better implementation of the projects in hands.
(xxix) Preparation of progress and other reports as required; and
(xxx) Ensures and develops a mechanism to see that all the staffs pay their 8-hour duty.

As River Engineer, the main tasks include:

(xi) Oversee the project design, review the designs and drawings and other documents, conduct due diligence;
(xii) In collaboration with the Deputy Team Leader/ Senior Design Engineer (National), and contractor develop an operation and maintenance manual for the completed embankment, spurs and outlets.
(xiii) Work with the international and national experts in identifying locations and types of hydraulic structures for each of the balance sub-project, and in developing the engineering designs for the hydraulic structures required in each basin in the project;
(xiv) Using information from the hydrologist and river morphologists, work with the international and national engineer to produce detailed designs for hydraulic structures on river basins in a number of balanced sub-projects amounting;
(xv) Detailed engineering designs and cost estimates and specifications prior to tendering for procurement;
(xvi) Provide guidance to the team members on carrying out all those tasks that are required to provide quality works as well as quality documents;
(xvii) Guide the engineering survey team on the use of appropriate equipment to acquire the types of survey data required and how the survey data is to be recorded;
(xviii) Guide the engineering drafters to produce detailed CAD designs for all infrastructure;
(xix) Review the work of the national design engineer to estimate the type and quantity of materials required to build each structure; and
(xx) The expert is required to undertake frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits.

69. **Geotechnical Engineer (International):** The expert shall preferably have:

(iv) A master's degree in Civil Engineering/Geotechnical Engineering;

(v) an overall 15 years of working experience with 10 years of experience in geotechnical engineering in water resources, river training projects and experience with GeoStudio or similar slope stability software; and

(vi) experience in working in a similar geographical location.

Reporting: The position will report to the Team Leader and PMU.

Scope of Work: The Geotechnical Engineer will be responsible for all geotechnical tasks.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(x) Review of contractors geotechnical and soil investigation and ensure its adequacy;
(xi) Adherence to international and national best practices;
(xii) Identify if any additional geotechnical investigations are required for the detailed designed projects and support PMU with the recruitment of suitable contractor;
(xiii) Supervise the work of the sub-contracted drilling sampling and testing services to ensure compliance with best geotechnical practice;
(xiv) Review the available detailed design, stability and seismic hazard analyses, and comment on the various types of construction materials. If necessary, undertake additional stability analyses and improve the design for technical and/or financial reasons;
(xv) Complete detailed design, stability and seismic hazard analyses, for remaining subprojects. Undertake stability analyses and improve the design for technical and/or financial reasons;
(xvi) Establish the need for foundation treatment measures as required and the availability of local construction materials and review the appropriate material parameters to be applied in the analysis and design of the works;
(xvii) Training of PIU staff on geotechnical aspect, if required; and
(xviii) The expert is required to undertake frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits.

70. **Community Based Disaster Risk Management (CBDRM) Expert (International):**The expert shall preferably have:

(iv) a graduate degree, with post graduate degree in community development, social studies, governance, disaster risk mitigation/ management or related field;

(v) an overall 15 years of working experience with 12 years of experience in community- based disaster risk mitigation/management, development planning, disaster control administration or related field; and

(vi) sound knowledge of ADB policies and procedures, and knowledge on Disaster Management Act of Nepal will be an advantage.

Reporting: The position will report to the Team Leader and PMU.

Scope of Work: The CBDRM Expert will be responsible for supporting the implementation, management and administration of CBDRM activities and supervise the performance of CBDRM consulting firm.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(xii) The Community-Based Disaster Risk Management (CBDRM) Expert shall be responsible for stakeholder consultation and identification of the need for CBDRM activities at all three levels – national, provincial and local;
(xiii) Preparation of detailed implementation schedule for PMU's approval;

(xiv) Preparation of TOR, including training and small-scale mitigation works and livelihood requirements;
(xv) Prepare the budget and RFP for the recruitment of one or more local NGOs/Community Based Organizations (CBOs) to implement CBDRM activities in accordance with the project proposal;
(xvi) Assist the PMU in issuing EOI,RFP, addendum/corrigendum and clarifications to firms' queries;
(xvii) Assist the PMU in obtaining ADB's approval in all recruitment activities in accordance with the agreed procurement plan, government regulations and ADB's requirements;
(xviii) Support in proposal opening, evaluation of EOI, and Technical and Financial proposals, preparation of relevant submissions/reports, and obtaining ADB's no-objection for awarding of contract and signing of contract;
(xix) Prepare contract documentation;
(xx) Oversee the performance of CBDRM consulting firm and other local NGOs/CBOs to implement CBDRM activities;
(xxi) Identify the potential risks and propose advance corrective action in time; and
(xxii) The expert is required to undertake frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks, and therefore, the candidate should possess good health and be physically able to undertake such field visits.

II. National Consultants

71. **Deputy Team Leader cum Senior Contract Management Expert (National):** Deputy Team Leader cum Contract Management Expert shall preferably have:

(iv) a master's degree in Civil Engineering, with added qualification in River Engineering, Water Resources Management, Project or Construction Management or Hydraulics/Structural Engineering or related fields;

(v) overall 15 years of working experience with 12 years of experience as Project Manager/Assistant Project Manager and contract administration particularly related to river training works, canal/hydraulic structures, canal works projects; and

(vi) experience in similar capacity and sound knowledge of ADB policies and procedures, small works contract conditions, contract management, arbitration and dispute management. Experience in working on externally funded infrastructure projects shall have added advantage.

Reporting: The position will report to the Team Leader and PMU.

Scope of Work: Deputy Team Leader cum Contract Management Expert will be responsible for establishing coordination, overall project management, advice on ADB's policies and procedures, and contract administration.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(xviii) Support in project management during design and construction stage;

(xix) Coordination in data collection, design, construction supervision, quality control and monitoring;
(xx) Coordination among various stakeholders and agencies viz. PMU, DHM, FFEWS Consultant, CBDRM Consultant, etc.;
(xxi) Establishment of effective construction management and project performance monitoring system;
(xxii) Monitor activities and progress of various works contractors and consulting firms;
(xxiii) Ensure adequate documentation on contract administration, progress, time and cost control, variations and change orders, billing and payments to the contractors;
(xxiv) Exercise efficient contractual control on the contracts and minimize the cost over-run and time over-run; establish the 'S' curve and monitor the progress and proactively advice the contractor through PMU;
(xxv) Timely review and advise on the settlement of contractor's claims;
(xxvi) Ensure safety at workplaces, progress of works, billing & payments to the contractors;
(xxvii) Preparation and maintenance of contractual correspondence and documentation;
(xxviii) Provide inputs for managing and support in time and cost control;
(xxix) Assist in resolving contractual issue and dispute resolutions during implementation;
(xxx) Ensure timely completion and delivery of monthly, quarterly, annual and Project Completion Reports;
(xxxi) Identification and developing related training programs and impart training as and when required;
(xxxii) Ensure that all the staffs fulfill their daily minimum hour duty and
(xxxiii) The expert is required to undertake frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits.

(xxxiv) Act as Team Leader in the absence of Team Leader.

72. **Monitoring Expert (National):** The expert shall preferably have:

(iv) a graduate degree in Civil Engineering, with added qualification in Construction/Project Management, Quality assurance or post-graduate (masters) degree in Civil/Hydraulics/Structural Engineering, Geotechnical Engineering or related fields;

(v) an overall 15 years of working experience with 12 years of experience in construction and supervision activities related to river training works, canal/hydraulic structures, canal works projects; and

(vi) experience in similar capacity and sound knowledge of contract management and experience in small works contract conditions, experience in computer-based contract management tools shall be preferred. Experience in externally funded projects shall have added advantage.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert.

Scope of Work: The Construction Supervision cum Quality Control Expert will be responsible for the overall construction management, quality assurance/control and administration of multiple contracts and assist in coordinating with the FFEWS.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(ix) Diligently supervise the construction activity during the implementation of the work;
(x) Provide training on best practices in quality assurance and quality control (QA/QC) in construction activities;
(xi) Assist in construction management, contract management and performance monitoring of various contractors;
(xii) Support in preparing progress reports, as built drawings and provide necessary information from time to time;
(xiii) Ensure adequate documentation on QA/QC, site data, variations, progress and other contractual matters;
(xiv) Ensure safety at works and compliance with ADB's safeguard policies and procedure, and applicable laws of Nepal;
(xv) Assist in resolving contractual issues;
(xvi) The task of the expert envisages frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits.

73. **Design/Structural Engineering Expert (National):** The expert shall preferably have:

(iv) a graduate degree in Civil Engineering, with added qualification of post-graduate(masters) degree in Structure Engineering;

(v) an overall 15 years of working experience with 10 years of experience in areas of engineering design of hydraulic structures, particularly that used for river control and flood protection; and

(vi) experience in similar capacity and sound knowledge of design softwares, preparing detailed CAD drawings, estimating quantities of materials for construction of hydraulic structures, ADB policies and procedures, experience working in externally funded infrastructure projects shall have added advantage.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert.

Scope of Work: The Design/Structural Engineering Expert will be responsible for adequacy of overall structural designs for each structure to be constructed for the works packages under the civil works contracts as per feasibility study report, change orders and for the works required for community-based disaster risk management (CBDRM).

Expected Tasks: The main tasks related to the position shall include but not limited to:

(viii) Will be responsible for delivery of final detailed engineering designs for each structure to be constructed for the works packages under the civil works contracts as per feasibility study report and for the works required for CBDRM;
(ix) The designs and engineering details/drawings shall be based on the best engineering practice and acceptable to ADB for inclusion in the bidding documents;
(x) Provide instruction and guide the engineering drafters to produce detailed CAD designs for all related structures;
(xi) Assist the procurement expert and quantity surveyor in estimating the costs for each structure, obtain PMU approvals on the detailed engineering designs and cost estimates prior to commencement of bidding process;
(xii) Assist the procurement expert in finalizing the technical specifications;
(xiii) Address the design changes required during the implementation of the Project related to all ongoing packages and ensure timely delivery of modified designs;
(xiv) The task of the expert envisages frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits.

74. **Financial Management cum Training Expert (National):** The expert shall preferably have:

(iv) a recognized professional accountancy qualification (e.g., CPA, CA or equivalent) or equivalent in related fields;

(v) an overall 15 years of working experience with 12 years of experience in financial management and training/capacity building on infrastructure investment projects; and

(vi) experience in similar capacity and sound knowledge of ADB policies and procedures and experience working in externally funded infrastructure projects shall have added advantage.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert.

Scope of Work: The objective of the services is to strengthen the financial management capacity of the Department of Water Resources and Irrigation (DWRI) and Department of Hydrology and Meteorology (DHM) and the respective Project management units (PMUs) in implementing ADB-assisted Priority River Basin Flood Risk Management Project to ensure:

(iii) all project funds are used for the intended purpose and with due attention to considerations of economy and efficiency; and

(iv) full compliance with ADB's financial management and disbursement requirements as well the financial covenants of the loan and project agreement.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(xix) Provide support to the project's financial staff to ensure they are aware of their duties and the relevant sections of project documents including the (a) Loan and project agreements;(b) Project Administration Manual; (3) ADB's loan disbursement handbook; as well the (4) national and ADB's Anti-Corruption Policy and whistle blowing mechanisms;

(xx) Provide capacity building to the PMUs in accounting and financial management and ADB's systems and procedures;

(xxi) Assist the PMU/PIUs in preparing annual budget estimates and in maintaining proper budget controls as well as in monitoring budget execution;

(xxii) Support the PMU/PIUs in ensuring compliance with the financial covenants outlined in the ADB loan/grant agreement;

(xxiii) Support the PMU/PIUs in implementing the Financial Management Action Plan (FMAP) as agreed with ADB and outlined in the Project Administration Manual;

(xxiv) Review the adequacy and effectiveness of internal controls and make recommendations for improving systems and tools including the areas of accounting software; segregation of duties; level of authorization; written financial management procedures as well as monitoring and reporting;

(xxv) Support the PMU in ensuring that (a) all payments are duly prepared, reviewed, authorized, and recorded in the accounting system correctly and in a timely manner; and (b) all expenditure items meet the eligibility criteria as defined in the ADB financing agreement, and are supported by adequate documentation (invoice, contracts, evidence of payments etc..) as outlined in the ADB disbursement handbook;

(xxvi) Conduct quarterly analysis of account balances in the General Ledger and verification of trial balance and advise the PMU on necessary corrections and adjusting entries (omissions, coding errors, double-counting, etc.) as required;

(xxvii) Conduct periodic analysis and follow-up on outstanding advances;

(xxviii) Conduct an analysis of the financial execution of the approved budget (budget-to-actual by activity) as well as financial vs physical progress. Analyze and document any significant variations;

(xxix) Support the project in conducting quarterly reconciliation of the project disbursement records and ADB's disbursement data available in the LFMIS to ensure the correctness and completeness of the project records. Follow-up on any discrepancies to ensure these are resolved in a prompt manner;

(xxx) Support the PMUs in conducting monthly reconciliations of all project bank accounts including the advance accounts and subaccounts. Analyze and follow-up on all reconciliation items;

(xxxi) Support the PMU in maintaining an up-to-date fixed asset register covering all assets constructed and purchased under the project;

(xxxii) Assist the PMU in preparing withdrawal applications and in collection and filing of all supporting documentation in accordance with ADB loan disbursement handbook;

(xxxiii) Assist the PMU in: (a) preparing quarterly financial reports and project annual financial statements in the agreed format and in a timely fashion as well as (b) reconciling the project accounts with the ADB disbursement data to ensure that all funds disbursed by ADB are correctly reflected in the periodic financial reports and the project financial statements;

(xxxiv) Support the PMU in ensuring that all financial records are orderly filed, physically stored in a safe location (flood and fireproof), and electronically

backed-up daily/weekly on an external server or hard drive and updated regularly;

(xxxv) Support the project in the follow-up of internal and external audit recommendations to further improve the internal controls of the project; and

(xxxvi) Assist the project in implementing financial recommendations as agreed between the project and ADB during review mission.

75. **Procurement Expert (National):** The expert shall preferably have:

(iv) a graduate degree in Civil Engineering, with added post-graduate in Law/ Financial Management/ Contract Management/ Civil Engineering/Hydraulics/Structural Engineering or related fields;

(v) an overall 15 years of working experience with 10 years of rich experience in contract procurement of works or goods or consulting services; and

(vi) experience in similar capacity and sound knowledge of small works contracts, conditions of contract, arbitration and dispute management, ADB policies and procedures, and experience working in externally funded infrastructure projects shall have added advantage.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert.

Scope of Work: The Procurement Expert will be responsible for the bid process management, procurement of the balanced civil works contracts and for the works required for community-based disaster risk management (CBDRM).

Expected Tasks: The main tasks related to the position shall include but not limited to:

(viii) Ensure adequate procurement process in compliance with ADB and Government rules and regulation;

(ix) Preparation of bidding document for the balanced civil works contracts and for the works required for community-based disaster risk management (CBDRM);

(x) Assist PMU in obtaining ADB's no-objection;

(xi) Assist in issuance of IFB, receiving and opening of bids and bid evaluation process;

(xii) Contribute towards bid evaluation under the supervision of PMU, and assist in finalization of bid evaluation report and obtaining ADB's no-objection;

(xiii) Ensure proper bid submission by the successful bidder and assist in contract award;

(xiv) The task of the expert envisages frequent field visits to works locations spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits.

76. **Gender Equality and Social Inclusion Expert (National):** The expert shall preferably have:

(vi) a master's degree or equivalent in social sciences, gender and development studies, gender and disaster risk management or another relevant discipline;

(vii) an overall 12 years of working experience with 10 years of experience working on gender equality and social inclusion; experience undertaking gender assessment – including apply gender sensitive participatory methods for data collection, gender analysis and report writing in projects and programs; experience delivering gender sensitization training and monitoring and evaluation of gender equality and social inclusion targets;

(viii) knowledge or experience of integrating gender equality and social inclusion activities in projects related to rural development, climate change and flood disaster;

(ix) knowledge of ADB gender procedures/policies and/or experience working on gender in multi-lateral funded infrastructure projects shall have added advantage; and

(x) The task of the expert envisages frequent field visits to works locations spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits. Women are encouraged to apply.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert.

Scope of Work: The Gender Equality and Social Inclusion (GESI) Expert will be responsible for overseeing implementation, monitoring and evaluation of the project GESI Action Plan. The GESI Expert will ensure that all project data recorded in the MIS is sex-disaggregated and relevant socio-economic baseline database for tracking GESI indicators included. The GESI Expert will work closely with all project stakeholders, including the executing and implementing agencies, contractors and affected peoples to promote a culture of gender equality and social inclusion.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(vi) Review project commitments to gender equality and social inclusion within project documents. GESI commitments and intentions can be found in the project's (a) Project Administration Manual; (b) Poverty and Social Assessment; (c) Gender Equality and Social Inclusion Action Plan; (iv) Stakeholder Communications Strategy; and other;

(vii) Establish GESI baseline and monitoring indicators. Ensure GESI indicators are integrated into the project's MIS. Ensure that all data collected about local stakeholders in MIS are sex disaggregated and participation of excluded and vulnerable people including indigenous people and differently abled are tracked;

(viii) Implement and/or support the responsible party (PMU/Contractors/NGO) to implement all activities and targets in the GESI action plan;

(ix) Monitor and report on GESI action plan activities in the project's quarterly progress reports (QPRs). Specifically, report on progress towards achieving GESI targets and any activities completed by the project that promote gender equality and social inclusion; and

(x) Provide recommendations within the QPRs on how to better promote gender equality and social inclusion in all project activities.

77. **Social Safeguard Expert (National):** The expert shall preferably have:

a master's degree or equivalent in social sciences, development studies, social impact assessment or another relevant discipline;

(v) an overall 12 years of working experience with 10 years of experience working on social impact management; specifically with respect to safeguarding project affected peoples' interest and rights as per the international safeguard policies on Involuntary Resettlement and Indigenous Peoples;

(vi) knowledge of ADB's Safeguards Policy Statement (2009) Safeguard II: Involuntary Resettlement and Safeguard III Indigenous Peoples.

(vii) knowledge and understanding of Nepal Indigenous Peoples and Land Acquisition regulatory framework, policies and procedures an advantage;

(viii) experience producing and implementing safeguard plans and due diligence reports, including identifying corrective actions, monitoring and evaluating implementation in ADB/World Bank or any multi-lateral funded project in Nepal, preferably in rural areas.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert.

Scope of Work: The Social Safeguard Expert will be responsible for overall implementation, monitoring and reporting on the project's adherence to ADB's Safeguard Policy Statement (SPS) on Involuntary Resettlement and Indigenous Peoples as well as adherence to the Government of Nepal's own land acquisition and indigenous peoples laws, policies, standards and guidelines. Social Safeguard Expert will ensure that all agreed actions and safeguards plans and/or reports are updated, implemented and monitored as per the project's commitment in the Project Administration Manual and loan covenants. The Expert will provide guidance and training to PMU on ADB SPS 2009 and Government of Nepal safeguard requirements and ensure contractors and other implementing stakeholders comply with agreed actions.

Expected Tasks: The main tasks related to the position shall include, but are not limited to:

(xiv) Review all safeguards provisions that relate to involuntary resettlement and indigenous peoples safeguards within the project documents, including, but not limited to, the Project Administration Manual, Poverty and Social Assessment, Gender Equality and Social Inclusion action plan, social safeguards related frameworks, plans and/or due diligence reports.

(xv) Ensure that all institutional arrangements for implementing the IR and IP safeguard measures are in place; including a functioning PMU/PIC, an established grievance redress mechanism (GRM), information pamphlets and other materials to support information sharing with affected persons and beneficiaries.

(xvi) Information sharing and meaningful consultation. Facilitate regular consultation sessions with the beneficiary communities, local leaders,

proponents, and stakeholders including indigenous people (IPs) and potentially displaced people (DPs) and project staff (e.g. field engineers) so that DPs can voice concerns about the project design and ask questions. Ensure that project information is shared with DPs on a regular basis, including about the (a) project, (b) implementation schedule, (c) affected people's entitlements under the project, (d) how to access the GRM.

(xvii) Verify and update social safeguards plans/reports to reflect detailed design and the cadastral maps. Verify and update all safeguard plans per sub-basins based on the detailed design of each sub-basin. Work closely with the design engineers and government line agencies (land department, ward members and other authorities) to verify the affected persons. Undertake a census with100% of displaced people based on final design of subprojects, to finalize inventory of losses, record percentage of economic losses and confirm vulnerable groups. Identify entitlements as described in ADB's SPS;

(xviii) Implement safeguard plans/reports in consultation with affected people ahead of civil works. Support the PMU and PIUs to track the provision of entitlement packages and cash compensation (if any). As per ADB's requirement, compensations and/or mechanisms to deliver all assistance must be provided or in place ahead of civil works. Ensure that the mechanism for providing compensations/assistance is well documented, using third party verification for accountability.

(xix) Support the PMU and PIUs to implement any corrective actions identified by the independent external party which is responsible for verifying that donation of land use is voluntary and that negotiated settlements and/or voluntary donations do not severely affect the living standards of the displaced persons and will benefit them directly.

(xx) Conduct safeguards training for the executing and implementing agencies on implementation of the project's land acquisition/use and indigenous peoples plans/reports;

(xxi) Work with the PMU, PIUs and technical colleagues to ensure inclusive outcomes with IPs are attained for the CBDRM and flood shelter objectives. Assist the CBDRM NGO to assess land access options with local communities and prepare plans or due diligence reports for all subproject basins as per SPS 2009.

(xxii) Assist the PMU and PIUs in establishing effective grievance redress mechanisms for all project related grievances, including mechanisms to ensure that IPs have culturally appropriate mechanisms for reporting of complaints, follow-up actions, and results;

(xxiii) Assist the PMU and PIUs in establishing an internal monitoring and reporting system for safeguards implementation;

(xxiv) Assist the PMU to monitor compliance with the safeguards plans/reports, assess key implementation issues, formulate remedial measures, and assist them in conducting follow-up actions;

(xxv) The task of the expert envisages frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits; and

(xxvi) Complete other relevant tasks related to land access and IP requirements as directed by the Deputy Team Leader.

78. **Environmental Safeguard Expert (National)**: The expert shall preferably have:

(iv) a graduate degree in Civil or Environmental Engineering/Science, with added qualification of post-graduate (masters) in Environmental Engineering/ science or related field;

(v) an overall 15 years of working experience with 10 years of experience in preparation or implementation of Environmental Management/Monitoring Plans. Demonstrated experience in Environmental Impact Assessment (EIA) including water infrastructure investment project and knowledge of best engineering practice and approaches and experience in similar capacity on river/canal/flood control projects and shall be of added advantage; and

(vi) sound knowledge of ADB policies and procedures, experience working in externally funded infrastructure projects shall have added advantage.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert.

Scope of Work: The Environmental Safeguard Expert will be responsible for overall management and implementation of environmental management and monitoring plan, and organization of training seminars regarding the environmental requirements.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(x) Conduct site visits, undertake and/or supervise the environmental monitoring and management plans;
(xi) Prepare and implement/supervise the Environmental Safeguard Action Plan;
(xii) Prepare detailed guidelines and procedures for compliance with IEE and/or Environmental Management Plan (EMP);
(xiii) Prepare due diligence reports;
(xiv) Provide inputs on procurement and bidding process;
(xv) Assist in construction supervision and compliance with the ADB Safeguard requirements;
(xvi) Coordinate among various stakeholders and agencies;
(xvii) Ensure timely submission of reports on safeguard compliance as per ADB Safeguard Policies, and assist in timely preparation and quality submission of various reports as per requirements;
(xviii) The task of the expert envisages frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits.

79. **Community Based Disaster Risk Management (CBDRM) Expert (National):** The expert shall preferably have:

(iv) a graduate degree in Civil Engineering, with post-graduate degree in community development, social studies, governance, disaster risk mitigation/management or related field;

(v) an overall 15 years of experience with 12 years of experience in community-based disaster risk mitigation/management, development planning, disaster control administration or related field; and

(vi) sound knowledge of ADB policies and procedures, Disaster Management Act of Nepal, experience working in externally funded infrastructure projects shall have added advantage.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert.

Scope of Work: The CBDRM Expert will be under the guidance of international CBDRM Expert, the expert will be responsible for supporting in the implementation, management and administration of CBDRM activities and assist in supervising the performance of CBDRM consulting firm.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(xii) The expert shall obtain guidance and advise from the international CBDRM expert and be responsible for stakeholder consultation and identification of the need for CBDRM activities;
(xiii) Under the supervision of international CBDRM expert, assist in preparation of detailed implementation schedule;
(xiv) Assist in preparation of TOR, including training and small-scale mitigation works and livelihood requirements;
(xv) Prepare the budget and RFP for the recruitment of one or more local NGOs/CBOs to implement CBDRM activities in accordance with the project proposal;
(xvi) Assist the PMU in issuing EOI and RFP, addendum/corrigendum and clarifications to firms' queries;
(xvii) Assist the PMU in obtaining ADB's approval in all recruitment activities in accordance with the agreed procurement plan, government regulations and ADB's requirements;
(xviii) Support in proposal opening, evaluation of EOI, and technical and financial proposals, preparation of relevant submissions/reports, and obtaining ADB's no-objection for awarding of contract and signing of contract;
(xix) Assist in compilation and preparing contract documentation;
(xx) Oversee the performance of CBDRM consulting firm and other local NGOs/CBOs to implement CBDRM activities;
(xxi) Identify the potential risks and propose advance corrective action in time;
(xxii) The expert is required to undertake frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks, and therefore, the candidate should possess good health and be physically able to undertake such field visits.

80. **Construction Engineers (National Non-Key Experts):** The engineers shall preferably have:

(iii) a graduate degree in Civil Engineering; and

(iv) an overall 10 years of working experience with 5 years of relevant experience in construction supervision/management, quality control, contract administration of infrastructure projects.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert, and to the Construction Supervision cum Quality Control Expert and respective PIU

Scope of Work: The Construction Engineers will ensure quality assurance/control (QA/QC) and supervise the construction activity diligently during the implementation of the work. They will be based in the field in each of the six PIU field offices.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(xii) Seek instructions from Monitoring Expert/DTL on construction supervision, quality assurance/control, and on ADB's safeguard policies and procedure.
(xiii) Supervise the construction activity diligently during the implementation of the work;
(xiv) Provide inputs for contract administration of multiple contracts;
(xv) Provide inputs for preparing daily reports on construction progress and completion;
(xvi) Provide inputs towards assistance in resolving contractual issue;
(xvii) Ensure safety at works and compliance;
(xviii) Hold community consultation meetings to inform local people about the embankment design and rational and to answer questions related to the technical aspects of the project.
(xix) Verify the work-progress as per agreed Time schedule
(xx) Conduct the laboratory test in personal and report the results to Monitoring Expert/DTL
(xxi) Monitor the progress keeping in mind the time over-run and cost over-run.
(xxii) The task of the expert envisages frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits.

81. **AutoCAD Expert (National Non-Key Experts)**: The expert shall preferably have:

(iii) a diploma/certificate in Civil Engineering or higher Engineering Degree with adequate certification/training in AutoCAD ; and

(iv) an overall 10 years of working experience with 5 years of relevant experience in development of AutoCAD drawings of civil engineering

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert.

Scope of Work: The AutoCAD Expert, under the guidance of subject experts and the Deputy Team Leader cum Contract Management Expert, will prepare AutoCAD drawings for balanced civil works packages, shelter houses for putting into the balanced Bidding Documents for works, and prepare AutoCAD drawings for change orders as required.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(v) Assist in development of AutoCAD drawings for the civil works packages as per detailed designs for balanced works contracts, and for the works required for community-based disaster risk management (CBDRM);
(vi) The designs/drawings shall be produced on a CAD system and be suitable for tendering for construction of infrastructure works;
(vii) Assist in preparation of Bidding documents; and
(viii) Assist in the development of drawings during the construction stage, to manage design changes, change orders and variations.

82. **Survey and mapping experts (National Non-Key Expert)**: The experts shall preferably have:

(iv) a graduate degree in Civil Engineering, with advance qualification in using sophisticated surveying equipment(LiDAR), data handling, 3D mapping etc;

(v) an overall 15 years of working experience with 12 years of experience in conducting survey related to rivers/canals/roads/railways etc; and

(vi) experience in similar capacity and use of advance technologies and equipment (LiDAR), data handling, 3D mapping etc, data analysis and producing maps. Experience and sound knowledge of ADB policies and procedures, experience in river training works/hydraulic infrastructure projects will be an advantage.

Reporting: The position will report to the Team Leader cum River Engineer.

Scope of Work: Survey and mapping experts will be responsible for carrying out topographical/land surveying activities (3D), data analysis and producing mapping using advance technology. Guide national Survey and Mapping Expert in conducting surveys and mapping.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(ix) Carry out cadastral survey for reference and cross-checking;
(x) Carry out topographical survey in the basins and data analysis;
(xi) Ensure safe keeping of survey data maps, flight index, survey reports, etc.;
(xii) Compile data and report on the conditions of stations and benchmarks on the ground;
(xiii) Provide inputs for design and implementation of FFEWS activities;
(xiv) Engage in various office activities such as submission of field records, digitization, plotting and printing of documents for field reference and fair drawing;
(xv) Contribute inputs towards the finalization of designs for the remaining sub-projects; and
(xvi) The task of the expert envisages frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits.

83. **Quantity Surveyor cum Estimator (National Non-Key Experts):** The Quantity Surveyor cum Estimator shall preferably have:

(iii) a graduate degree in Civil Engineering; and

(iv) an overall 10 years of working experience with 5 years of relevant experience in quantity surveying, rate analysis, estimation and costing and finalization of Bill of Quantities (BOQ) of civil works contracts.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert.

Scope of Work: The Quantity Surveyor cum Estimator, under the guidance of the Deputy Team Leader cum Contract Management Expert, will be responsible in preparing and finalizing the rate analysis, detailed estimate and Bill of Quantities for balanced civil works packages, shelter houses for putting into the balanced Bidding Documents for works, and. preparing detailed estimate for change orders as required.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(vi) Be responsible for quantity surveying, rate analysis, estimation and costing and finalizing of Bill of Quantities (BOQ) of balanced civil works packages as per detailed designs and drawings;
(vii) Prepare quantity surveying, rate analysis, estimation for the works required for community-based disaster risk management (CBDRM);
(viii) Ensure that the BOQ prepared shall be suitable for tendering for construction of infrastructure works;
(ix) Assist Deputy Team Leader cum Contract Management Expert in preparing Bidding documents;
(x) Assist in costing during the construction stage, manage design changes, change orders and variations.

84. **MIS Technician (National Non-Key Expert):** The technician shall preferably have:

(iii) a bachelor's degree in any discipline; and

(iv) an overall 10 years of working experience with 7 years of relevant experience in MIS and GIS development, use and maintenance. Good knowledge of English is required.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert.

Scope of Work: The MIS Technician, under the guidance of Deputy Team Leader cum Contract Management Expert, will be responsible for data entry of selected parameters of the automated system and project implementation progress and document management in PMU and set-up a database of available information and set-up a system for easy retrieval.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(viii) Develop program management and tracking system, using commonly available computer software to schedule and monitor all aspects of activities including but not limited to construction activities, payment and disbursements;
(ix) Assist in development and use of Information Technology (IT) based Project Performance Management Evaluation tool to monitor and evaluate implementation of the project;
(x) Data entry of selected parameters of the automated system and project implementation progress;
(xi) Document management in PMU and set-up a database of available information and set-up a system for easy retrieval;
(xii) Conduct MIS training to PIUs;
(xiii) Computer hardware and software technical assistance to PIUs; and
(xiv) Provide troubleshooting for daily use of system.

85. **Support Staff:** The Consulting firm will be required to deploy suitably qualified and experienced additional secretarial/managerial/office staff as deemed fit for timely delivery of deliverables and for smooth operation of office function. As a minimum, the consulting firm shall deploy the following support staff:

(iii) One office secretary (for documentation and record keeping); and

(iv) One coordinating assistant (for coordination and resource management for smooth functioning of PIC).

86. The consulting firm shall keep in mind that no separate payments shall be made for such staff and the cost of support staff shall be deemed covered in out-of-pocket expenses.

PART B–DETAILED DESIGN PREPARATION

IV. International Consultants

87. The team of international Key Experts required for Part B: Detailed Design comprising i) Design Team Leader cum River Engineer and ii) Geotechnical/Design Engineer will remain the same as proposed for Part A: Construction Supervision.

88. However, there shall be two different teams of national Key Experts for Part A and Part B. National Key Experts proposed for Part A shall not be proposed for Part B. Any repetition will lead to disqualification of that Key Expert and his/her CV will be excluded from further evaluations.

V. National Consultants (Key)

89. **Deputy Team Leader/ Senior Design Engineer (National)**: The Deputy Team Leader/Design Engineer will preferably have:

(iv) a graduate degree in Civil Engineering, preferably with a post-graduate (masters) degree in civil/hydraulics/structural engineering or related fields;

(v) an overall 15 years of working experience with 12 years of experience as Project Manager/Deputy Project Manager and detailed design experience particularly related to river training works, canal/hydraulic structures, canal works projects; and

(vi) experience in similar capacity and sound knowledge of ADB policies and procedures, small works contract conditions, and contract management. Experience working in externally funded infrastructure projects shall have added advantage.

Reporting: The position will report to the Design Team Leader and PMU.

Scope of Work: The Deputy Team Leader cum Design Engineer will be responsible for establishing coordination, overall project management, advice on ADB's policies and procedures, and contract administration.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(x) Support in project management during design stage;
(xi) Coordinate in data collection, design, and monitoring of the whole task of producing quality design report and cost estimate;
(xii) Coordinate among various stakeholders and agencies viz. PMU, DHM etc.;
(xiii) Monitor activities and progress of various design activities and surveys;
(xiv) Provide inputs for managing and support in time and cost control;
(xv) Ensure timely completion and delivery of monthly, quarterly, annual and Project Completion Reports;
(xvi) Support the international team leader/river engineer to develop an operation and maintenance manual for the completed embankment, spurs and outlets.

(xvii) Identify and develop related training programs and impart training as and when required;
(xviii) The expert is required to undertake frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits.

90. **Design/Structural Engineering Expert (National):** The expert shall preferably have:

(iv) a graduate degree in Civil Engineering, with added qualification of post-graduate(masters) degree in Hydraulic Structure Engineering;

(v) an overall 15 years of working experience with 12 years of experience in areas of engineering design of hydraulic structures, particularly that used for river training and flood control ; and

(vi) experience in similar capacity and sound knowledge of design softwares, preparing detailed CAD drawings, estimating quantities of materials for construction of hydraulic structures, ADB policies and procedures, experience working in externally funded infrastructure projects shall have added advantage.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert.

Scope of Work: The Design/Structural Engineering Expert will be responsible for adequacy of overall structural designs for each structure to be constructed for the works

packages under the civil works contracts as per Feasibility study (FS) report, change orders and for the works required for community-based disaster risk management (CBDRM).

Expected Tasks: The main tasks related to the position shall include but not limited to:

(vii) Will be responsible for the delivery of final detailed engineering designs for each structure to be constructed for the works packages under the civil works contracts as per Feasibility study (FS) report and for the structural works required for community-based disaster risk management (CBDRM);
(viii) The designs and engineering details/drawings shall be based on the best engineering practice and acceptable to PMU and ADB for inclusion in the Bidding documents;
(ix) Provide instruction and guide the survey team to acquire necessary field data based on which the detailed engineering designs will be prepared, and instruct engineering drafters to produce detailed CAD designs for all related structure;
(x) Assist the Procurement Expert and Quantity Surveyor in estimating the costs for each structure, obtaining PMU/DWRI approvals on the detailed engineering designs and cost estimates prior to commencement of bidding process;
(xi) Assist the procurement expert in finalizing the technical specifications; and
(xii) The task of the expert envisages frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits. /

91. **Hydraulic Modelling Expert (National):** The expert shall preferably have:

(iv) a graduate degree in Civil Engineering, with added qualification of post-graduate (masters) degree in Hydrology, Water Resources Engineering or related fields;

(v) an overall 15 years of working experience with 10 years of experience in areas of hydrological studies, modelling and estimating flows, detailed hydraulic designs, particularly that used for river control and flood protection; and

(vi) experience in similar capacity and sound knowledge of design/modelling softwares, preparing hydraulic designs and running hydraulic models, estimating flows. Knowledge of ADB policies and procedures, experience working in externally funded infrastructure projects shall have added advantage.

Reporting: The position will report to the Design Deputy Team Leader cum Design Engineer.

Scope of Work: The Hydraulic Modelling Expert will be responsible for adequacy of hydraulic model, collecting data, and conducting analysis that will determine optimal types and locations of structures that will control and train a river to reduce the amount of soil loss and bank scouring.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(vii) Collect, process and analyze hydraulic data;
(viii) Carry out hydrological studies and update the hydrological analysis and data in the Feasibility Study reports;

(ix) In close coordination with the FFEWS Expert and DHM, facilitate and assist in determining optimum locations for installation of hydrological observational equipment;
(x) Assist and supervise the installation of hydrological observational equipment;
(xi) Review Feasibility Study Report and confirm design data based on catchment area.
(xii) The task of the expert envisages frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits.

92. **Procurement Expert (National):** The expert shall preferably have:

(iv) a graduate degree in Civil Engineering, with added postgraduate in Law/ Financial Management/ Contract Management/Civil /Hydraulics/Structural Engineering or related fields;

(v) an overall 15 years of working experience with 12 years of rich experience in contract procurement of works or goods or consulting services; and

(vi) experience in similar capacity and sound knowledge of small works contracts conditions of contract, arbitration and dispute management, ADB policies and procedures, experience working in externally funded infrastructure projects shall have added advantage.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert and PMU

Scope of Work: The Procurement Expert will be responsible for bid process management, procurement of the balanced civil works contracts and for the works required for community-based disaster risk management (CBDRM).

Expected Tasks: The main tasks related to the position shall include but not limited to:

(viii) Ensure adequate procurement process in compliance with ADB and Government rules and regulation;
(ix) Prepare bidding document for the balanced civil works contracts and the CBDRM works contract.
(x) Assist PMU in obtaining ADB's no-objection;
(xi) Assist in issuance of IFB, receiving and opening of Bids and bid evaluation process
(xii) Contribute towards bid evaluation under the supervision of PMU, and assist in finalizing bid evaluation report for all the works undertaken by the PMU and obtaining ADB's no-objection;
(xiii) Ensure proper bid submissions by the successful bidder and assist in contract award.
(xiv) The task of the expert envisages frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits.

VI. National (Non-Key Experts)

93. **AutoCAD Expert (National Non-Key Expert)**: The expert shall preferably have:

(iii) a diploma/certificate in Civil Engineering or higher Engineering degree with adequate certification/training in AutoCAD ; and

(iv) an overall 10 years of working experience with 5 years of relevant experience in development of AutoCAD civil engineering drawings.

Reporting: The position will report to the Deputy Team Leader cum Contract Management Expert.

Scope of Work: The AutoCAD Expert, under the guidance of subject experts and the Deputy Team Leader cum Contract Management Expert, will prepare AutoCAD drawings for the balanced civil works packages, shelter houses for putting into the balanced Bidding Documents for works. Prepare AutoCAD drawings for change orders as required.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(v) Assist in developing AutoCAD drawings for the civil works packages as per detailed designs for balanced works contracts, and for the works required for community-based disaster risk management (CBDRM);
(vi) The designs/drawings shall be produced on a CAD system and be suitable for tendering for construction of infrastructure works;
(vii) Assist in preparing Bidding documents;
(viii) Assist in developing drawings during the construction stage, to manage design changes, change orders and variations.

94. **Survey and Mapping Experts (National Non-Key Experts)**: The experts shall preferably have:

(iv) a graduate degree in Civil Engineering, with advance qualification in using sophisticated surveying equipment's (LiDAR), data handling, 3D mapping etc;

(v) an overall 15 years of working experience with 12 years of experience in conducting survey related to rivers/canals/roads/railways etc; and

(vi) experience in similar capacity and use of advance technologies and equipment (LiDAR), data handling, 3D mapping etc, data analysis and producing maps. Experience and sound knowledge of ADB policies and procedures, experience in river training works/hydraulic infrastructure projects will be an advantage.

Reporting: The position will report to the Design Team Leader.

Scope of Work: The Survey and Mapping Experts will be responsible for carrying out topographical/land surveying activities (3D), data analysis and producing mapping using advance technology. Guide the national Survey and Mapping Expert in conducting surveys and mapping.

Expected Tasks: The main tasks related to the position shall include but not limited to:

(x) Carry out cadastral survey for reference and cross-checking;
(xi) Carry out topographical survey in the basins and data analysis;
(xii) Ensure safe keeping of survey data maps, flight index, survey reports, etc.;
(xiii) Compile data and report on the conditions of stations and benchmarks on the ground;
(xiv) Provide inputs for design and implementation of FFEWS activities;
(xv) Engage in various office activities such as submission of field records, digitization, plotting and printing of documents for field reference and fair drawing;
(xvi) Contribute inputs towards the finalization of designs for the remaining sub-projects;
(xvii) Guide and impart training to national Survey and Mapping Expert in conducting surveys and mapping; and
(xviii) The task of the expert envisages frequent field visits to works location spread across the widespread geographical areas of Terai and may require long walks and therefore the candidate should possess good health and be physically able to undertake such field visits.

95. **Support Staff:** The Consulting firm will be required to deploy suitably qualified and experienced additional secretarial/managerial/office staff as deemed fit for timely delivery of deliverables and for smooth operation of office function. As a minimum, the consulting firm shall deploy the following support staff:

(iii) One office secretary (for documentation and record keeping); and

(iv) One coordinating assistant (for coordination and resource management for smooth functioning of PIC).

96. The consulting firm shall keep in mind that no separate payments shall be made for the support staff and the cost shall be deemed covered in out-of-pocket expenses.

K. Procurement of Additional Studies, Equipment and Training

97. Consultants for additional studies will be recruited in accordance with ADB's Procurement Policy: Goods, Works, Non-consulting and Consulting Services (2017, as amended from time to time) and shall follow the Procurement Act/Regulations for ADB Borrowers (2017, as amended from time to time). Provisional sums have been included in the consultancy agreement for procurement of various requirements that will support the project. The PIC will be responsible for preparing the exact implementation arrangements, TORs, specifications, and detailed cost estimates of the procurement which will be approved by the Project Director before initiating procurement. The tentative scopes of provisional items are summarized in Table 2.

Table 2: Indicative Provisional Items

Item	Description
Surveys and Studies	Surveys and specific studies including topographic surveys, geotechnical investigations, laboratory tests, and socioeconomic surveys.

Item	Description
Office Equipment	Procurement of office equipment including computers, software, printers, photocopiers, GPS power inverter, etc. for field office using the shopping procurement method.[45]
Meetings, workshops and training	For routine meetings, workshops and training sessions convened by the PIC or PIU.
Communication Materials	Publishing of communication materials and media including the video diary of the investment program and development and hosting of the website.

L. Reporting Requirements and Schedule of Deliverables

98. During the performance of the services, the Consultant will prepare required reports in English for submission to the Client in electronic form and/or hard copies as per PMU instructions.

99. Unless otherwise agreed, all deliverables are to be submitted as drafts for review and comment by the PMU and ADB, and thereafter amended and submitted as final versions. Other occasional deliverables may be required from time to time on an informal basis. The Consulting firm shall assist PIU to maintain an electronic safe backup of all contract related documentation and submit one electronic version of every report listed in Table 2 below.

100. The reporting/submission format will be consistent with the requirements of ADB and Government of Nepal and will be agreed between the Consultant and PMU from time to time. The reporting formats shall further be subject to the amendment/modifications from time-to-time in consultation with the PMU and ADB. The consultant will submit at least the following reports at periods stated hereunder in **Table 3**.

Table 3: List of Minimum Deliverables and Schedule

Reports	Number of Hard Copies	Time Schedule
PART A – CONSTRUCTIONSUPERVISION		
Inception Report: demonstrating Consulting firm's understanding of the TOR and ensuring plan of action and timeline for various activities.	5	Within 30 days from the date of issuance of Notice to Proceed.
Monthly Progress Reports: covering a summary of the activities performed (including the Detailed design progress) and mobilization during the month, problems encountered, solutions proposed/adopted, corrective actions (if	5	Every month within 5 days of the commencement of next calendar month.

[45] All PIC key and non-key experts are responsible for providing their own computers or be supplied by the PIC firm. This provisional item is only for providing computers for the office support staff and providing general office IT equipment.

Reports	Number of Hard Copies	Time Schedule
required) and the activities planned for the coming month.		
Quarterly Progress Reports: covering a summary of the activities performed and mobilization and disbursement during the quarter, problems encountered, solutions proposed/adopted, risks identified, corrective actions (if required) and the activities planned (and disbursement projected) for the coming quarter.	5	Every quarter within 10 days of commencement of next quarter.
Annual Progress Report: covering a summary of the activities performed, disbursement achieved and mobilization status during the year, problems encountered, solutions proposed/adopted, risks identified, corrective actions (if required) and the activities planned (and disbursement projected) for the coming year.	5	Every year within 15 days of commencement of next year. For the purpose of Annual Progress Report the year shall mean and refer either to calendar year or other suitable period as the Client may decide in consultation with the Consultant.
Mid Term Report: covering a summary of the activities performed, disbursement achieved and mobilization status during the period, problems encountered, solutions proposed/ adopted, risks identified, corrective actions (if required) and the activities planned (and disbursement projected) for each coming quarter.	5	Within 30 days after 18 months of Consulting Services Assignment.
Draft Completion Report: The document shall comprise completion report of each packages and completion report of the project on the whole. Describing the project background, activities performed v/s committed timeline, problems encountered, risks identified, corrective actions taken, and lessons learnt.	5	Within 30 days of completion of Consulting Services Assignment.
Final Completion Report: Incorporating the comments of the PMU and ADB, describing the project background, activities performed v/s committed timeline, problems encountered, risks identified, corrective actions taken, and lessons learnt.	5	Within 30 days of issuance of Client's comments on Draft Completion Report.

Reports	Number of Hard Copies	Time Schedule
Safeguard (Environmental, social and resettlement etc) Reports for the remaining subprojects: As per ADB's procedure and format.	5	Starting from 3 months (and no longer than 6 months) from the date of issuance of Notice to Proceed (unless agreed otherwise during the Contract negotiation).
Survey reports	5	Starting from 3 months (and no longer than 6 months) from the date of issuance of Notice to Proceed (unless agreed otherwise during the Contract negotiation).
Management Information System tool/ PPMES: Information Technology (IT) based Project Performance Management Evaluation tool capable of monitoring and implementation of the project; identify performance constraints; and formulate and implement practical measures to address shortcomings. This tool shall be capable of disclosing key project-related information, including costs, safeguards, procurement status and progress, amount of contract awarded, billing and disbursement, etc.	Soft copy only	Within 60 days from the date of issuance of Notice to Proceed.
Project Completion Report: In ADB format covering (vii) a concise description and assessment of the project from identification to completion; (viii) evaluating the adequacy of preparation, design, appraisal, implementation arrangements, and performance of the DWRI, DHM and ADB, including how problems were handled, whether they were foreseen as potential risks, and the adequacy of the solutions adopted during implementation; (ix) a preliminary evaluation of initial operation, and achievement and sustainability of benefits; (x) a preliminary evaluation of the extent of achievement of the outcome of the project and the project's contribution to achieving the expected impact; (xi) suggest follow-up actions required during project operation; and (xii) makes recommendation - based on the evaluation and lessons - for future	5	Within 3 months from the date of completion of the Project.

Reports	Number of Hard Copies	Time Schedule
project implementation and operation, as well as improvements in related ADB procedures.		
Any other reports	As required	As and when required by the PMU/PIU/ADB.
PART B – DETAILED DESIGN PREPARATION		
Draft Detailed design and Drawings cost estimate and specification of the remaining subprojects	3	Starting from 2 months (and no longer than 4 months) from the date of issuance of Notice to Proceed (unless agreed otherwise during the Contract negotiation).
Detailed design and Drawings of the remaining subprojects	5	Starting from 3 months (and no longer than 6 months) from the date of issuance of Notice to Proceed (unless agreed otherwise during the Contract negotiation).
Maintenance manual	5	Within 9 months from the date of issuance of Notice to Proceed (unless agreed otherwise during the Contract negotiation).
Draft Bidding documents for the balance civil works contracts as per Detailed Report and for the works required for community-based disaster risk management (CBDRM): As per approved Master bidding document - based on ADB's SBD works (small) for Single-stage Two-envelope bidding procedure.	5	Starting from 6 months (and no longer than 9 months) from the date of issuance of Notice to Proceed (unless agreed otherwise during the Contract negotiation).
Final Bidding documents for the balance Civil works contracts as per Detailed design and for the works required for community-based disaster risk management (CBDRM): Covering the Comments of PMU and ADB.	5	Within 9 months from the date of issuance of Notice to Proceed (unless agreed otherwise during the Contract negotiation).

101. Since the Services consist of and include the supervision of civil works, the following actions require prior approval by the Client:

M. Client's Input and Counterpart Personnel

(iii) Services, facilities and properties to be made available to the Consultant by the Client:

(f) The documents related to the ongoing works (already awarded) and those in the procurement stage shall be made available to the Consultant for performance of its obligations;

(g) Office premises including its maintenance, electricity and water shall be provided by the Client free of cost;

(h) Cost of necessary office furniture and office equipment shall be covered under Provisional Sums that shall be spent with prior approval of the PMU;

(i) Cost of surveys and studies required to be conducted for resettlement activities shall be covered under the Provisional Sums (unallocated) and shall be spent only on the PMU's prior approval; and

(j) Two 4WD vehicles will be provided by PMU/DWRI for national transport needs between project office, construction sites, and for meetings in Kathmandu. Six motorcycles will be supplied to support construction supervision activities between the project site office and construction sites.

102. The consulting firm shall price all cost direct or indirect that Consulting firm envisages to incurred for the performance of its services (except those stated above) in its Financial proposal. No additional payments shall be made for such expenses and the cost of shall be deemed covered in out of pocket expenses.

(iv) Professional and support counterpart personnel to be assigned by the Client to the Consultant's team: The Client shall provide the counterpart staff for supervision of works in the field as available; it will be discussed, agreed, and finalized during contract negotiations.

N. The client will provide the following project data and reports to facilitate preparation of the Proposals:

(v) Copy of Procurement Plan (latest available);

(vi) Copy of Feasibility Study (FS) Reports (as available);

(vii) Copy of Detailed Design Reports of CW1 and CW2; and

(viii) Copy of Project Administration Manual (PAM), if finalized between the Government of Nepal and ADB.

ATTACHMENT G: OUTLINE OF SOCIAL SAFEGUARDS MONITORING REPORT

Following requirements of the ADB Safeguard Policy Statement (2009) and the *Operations Manual* section on safeguard policy (OM F1), borrowers/clients are required to establish and maintain procedures to monitor the status of implementation of safeguard plans and ensure progress is made toward the desired outcomes. For projects categorized as B in Involuntary Resettlement and/or Indigenous People, the Borrowers/clients are required to submit semiannual monitoring reports for ADB review. The level of detail and comprehensiveness of a monitoring report is commensurate with the complexity and significance of social safeguards impacts (IR and IP) and with the current status of project implementation phase.

This outline can be used for semiannual monitoring report and resettlement plan completion report to start the civil works in the impacted areas. A safeguard monitoring report may include the following elements:

A. Executive Summary

This section provides a concise statement of project scope and impacts, key findings and recommended actions.

B. Background of the Report and Project Description

This section provides a general description of the project, including:

- Background/context of the monitoring report which includes the information on the project, project components, safeguards categorizations and general scope of the social safeguards impacts.
- Information on the implementation progress of the project activities, scope of monitoring report and requirements, reporting period, including frequency of submission and changes in project scope and adjusted safeguard measures, if applicable
- Summary table of identified impacts and the mitigation actions.

C. Scope of Impacts

This section outlines the detail of

- Scale and scopes of the project's safeguards impacts,
- Vulnerability status of the affected people/communities,
- Entitlements matrix and other rehabilitation measures, as applicable, as described in the approved final Resettlement Plans.

D. Compensation and Rehabilitation[46]

This section describes the process and progress of the implementation of the safeguards plan and other required activities as determined in the plan. This includes:

- Payment of the affected assets compensation, allowances, loss of incomes, etc. to the entitled persons;
- Provisions of other types of entitlement as described in the matrix and implementation of livelihood rehabilitation activities as determined in the plan.

Quantitative as well as qualitative results of the monitoring parameters, as agreed in the plan, should be provided.

[46] Depending on the status of the final detail design during the submission of the report this activity might not yet started. Provide the information on the expected date the activity to be conducted instead.

E. Public participation and consultation

This section describes public participation and consultations activities during the project implementation as agreed in the plan. This includes final consultations with APs during RP finalization after the completion of detail design; the numbers of activities conducted; issues raised during consultations and responses provided by the project team, implementing NGOs, project supervision consultants, contractors, etc.

F. Grievance Redress Mechanism (GRM)

This section described the implementation of project GRM as design in the approved RP. This includes evaluations of its effectiveness, procedures, complaints receive, timeliness to resolve issues/ complaints and resources provided to solve the complaints. Special attentions should be given if there are complaints received from the affected people or communities.

G. Institutional Arrangement

This section describes the actual implementation, or any adjustment made to the institutional arrangement for managing the social safeguards issues in the projects. This includes the establishment of safeguards unit/ team and appointment of staff in the EA/IA; implementation of the GRM and its committee; supervision and coordination between institutions involved in the management and monitoring of safeguards issues, the roles of NGO and women's groups in the monitoring and implementation of the plan, if any.

H. Monitoring Results - Findings

This section describes the summary and key findings of the monitoring activities. The results are compared against previously established benchmarks and compliance status (e.g., adequacy of IR compensation rates and timeliness of payments, budget for implementing EMP and RP timeliness and adequacy of capacity building, etc.). It also compared against the objectives of safeguards or desired outcomes documented (e.g. IR impacts avoided or minimized; livelihood restored or enhanced; IP's identity, human right, livelihood systems and cultural uniqueness fully respected; IP not suffer adverse impacts, environmental impacts avoided or minimized, etc.). If noncompliance or any major gaps identified, include the recommendation of corrective action plan.

I. Compliance Status

This section will summarize the compliance status of the project activities with the loan covenants, ADB SPS on SR 2 and the approved final RP(s).

J. Follow up Actions, Recommendation and Disclosure

This section describes recommendations and further actions or items to focus on for the remaining monitoring period. It also includes lesson learned for improvement for future safeguards monitoring activities. Disclosure dates of the monitoring report to the affected communities should also be included. A time-bound summary table for required actions should be included.

Appendix 1

i. List of Affected Persons and Entitlements
ii. Summary of RP with entitlement matrix

Appendix 2

i. Copies of AP's certification of payment (signed by the APs)
ii. Summary of minutes of meetings during public consultations
Summary of complaints received and solution status

ATTACHMENT H: OUTLINE SEMI-ANNUAL ENVIRONMENT MONITORING REPORT

Environmental Monitoring Report

Reporting Period {From Month, Year to Month, Year}
Date {Month, Year}

NEP: Priority River Basins Flood Risk Management Project

Subproject X – X Basin

Prepared by Department of Water Resources and Irrigation, and the Department of Hydrology and Meteorology, Ministry of Energy, Water Resources and Irrigation for the Asian Development Bank.

CURRENCY EQUIVALENTS
(as of Day Month Year)

Currency unit	–	Nepalese rupee/s (NRe/NRs)
NRe1.00	=	$0
$1.00		NRs114.03000

{The date of the currency equivalents must be within 2 months from the date on the cover.}

ABBREVIATIONS

{AAA} – {spell out (capitalize only proper names)}
{BBB} – {spell out}

WEIGHTS AND MEASURES

{symbol 1 (full name 1)} – {Definition 1}

{symbol 2 (full name 2)} – {Definition 2}

{symbol 3 (full name 3)} – {Definition 3}

GLOSSARY

{Term 1} – {Definition 1}

{Term 2} – {Definition 2}

NOTES

In this report, "$" refers to United States dollars.

This environmental monitoring report is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

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ATTACHMENT I: OUTLINE QUARTERLY PROGRESS REPORT

A. Introduction and Basic Data

Provide the following:

a. ADB loan number, project title, borrower, executing agency(ies), implementing agency(ies);
b. total estimated project cost and financing plan;
c. status of project financing including availability of counterpart funds and cofinancing;
d. dates of approval, signing, and effectiveness of ADB loan;
e. original and revised (if applicable) ADB loan closing date and elapsed loan period based on original and revised (if applicable) loan closing dates; and
f. date of last ADB review mission.

B. Utilization of Funds (ADB Loan, Cofinancing, and Counterpart Funds)

Provide the following:

(i) cumulative contract awards financed by the ADB loan, cofinancing, and counterpart funds (commitment of funds to date), and comparison with time-bound projections (targets);
(ii) cumulative disbursements from the ADB loan, cofinancing, and counterpart funds (expenditure to date), and comparison with time-bound projections (targets); and
(iii) re-estimated costs to completion, need for reallocation within ADB loan categories, and whether an overall project cost overrun is likely.

(sample Project Data Sheet and Loan/Grant Utilization table available at ADB Nepal Resident Mission [NRM])

C. Project Purpose

Provide the following:

(i) status of project scope/implementation arrangements compared with those in the report and recommendation of the President, and whether major changes have occurred or will need to be made;
(ii) an assessment of the likelihood that the immediate development objectives (project purpose) will be met in part or in full, and whether remedial measures are required based on the current project scope and implementation arrangements;
(iii) an assessment of changes to the key assumptions and risks that affect attainment of the development objectives; and
(iv) other project developments, including monitoring and reporting on environmental and social requirements that might adversely affect the project's viability or accomplishment of immediate objectives.

(sample project results profile, safeguard matrix available at NRM))

D. Implementation Progress

Provide the following:

(i) assessment of project implementation arrangements such as establishment, staffing, and funding of the PMO or PIU;

(ii) information relating to other aspects of the EA's internal operations that may impact on the implementation arrangements or project progress;
(iii) progress or achievements in implementation since the last progress report;
(iv) assessment of the progress of each project component, such as,
  a) Recruitment of consultants and their performance;
  b) procurement of goods and works (from preparation of detailed designs and bidding documents to contract awards); and
  c) the performance of suppliers, manufacturers, and contractors for goods and works contracts;
(v) assessment of progress in implementing the overall project to date in comparison with the original implementation schedule—quantifiable and monitorable target, (include simple charts such as bar or milestone to illustrate progress, a chart showing actual versus planned expenditure, S-curve graph showing the relationship between physical and financial performance, and actual progress in comparison with the original schedules and budgets); and
(vi) an assessment of the validity of key assumptions and risks in achieving the quantifiable implementation targets.

(sample procurement plan, physical/financial monitoring matrix table available at NRM)
(Status on agreed action plan of last review mission)

E. Compliance with Covenants

Provide the following:
(i) the borrower's compliance with policy loan covenants such as sector reform initiatives and EA reforms, and the reasons for any noncompliance or delay in compliance;
(ii) the borrower's and EA's compliance with financial loan covenants including the EA's financial management, and the provision of audited project accounts or audited agency financial statements; and
(iii) the borrower's and EA's compliance with project-specific loan covenants associated with implementation, environment, and social dimensions (including GESI action plan).
  (a) Status on the compliance of audit observation for FY audited project account

(sample covenant matrix available at NRM)

F. Major Project Issues and Problems

Summarize the major problems and issues affecting or likely to affect implementation progress, compliance with covenants, safeguard and GESI compliance, and achievement of immediate development objectives. Recommend actions to overcome these problems and issues (e.g., changes in scope, changes in implementation arrangements, and reallocation of loan proceeds).

(sample matrix table available at NRM)