Initial Environmental Examination

Project Number: 52195-001
June 2020

Nepal: Priority River Basins Flood Risk Management Project
(Mohana–Khutiya River)

Prepared by Water Resources Project Preparatory Facility, Department of Water Resources and Irrigation for the Asian Development Bank.

ABBREVIATIONS

ADB	–	Asian Development Bank
AP	–	Affected Person
CAMC	–	Conservation Area Management Committee
CBDRM	–	Community Based Disaster Risk Management
CFUG	–	Community Forestry User's Group
CITES	–	Convention on the International Trade in Endangered Species
CO	–	Carbon Monoxide
COVID-19	–	coronavirus disease
DFO	–	District Forest Office
DWIDM	–	Department of Water Induced Disaster Management
DWRI	–	Department of Water Resources and Irrigation
EIA	–	Environmental Impact Assessment
EMP	–	Environmental Management Plan
EPA	–	Environmental Protection Act
EPR	–	Environmental Protection Regulation
FFEWS	–	Flood Forecasting and Early Warning System
FGD	–	Focus Group Discussion
FHRMP	–	Flood Hazard Mapping and Risk Management Project
GHG	–	Green House Gas
GRC	–	Grievance Redress Committee
GRM	–	Grievance Redress Mechanism
IEE	–	Initial Environmental Examination
ILO	–	International Labour Organization
LPG	–	Liquefied Petroleum Gas
MEA	–	Multilateral Environmental Agreements
MOFE	–	Ministry of Forest and Environment
MEWRI	–	Ministry of Energy, Water Resources and Irrigation
NAPA	–	National Adaptation Plan of Action
NAP	–	National Adaptation Plan
NDC	–	Nationally Determined Contribution
OHS	–	Occupational Health and Safety
RCP	–	Representative Concentration Pathways
REDD	–	Reducing Emissions from Deforestation and Forest Degradation
SEA	–	Strategic Environmental Assessment
SEMP	–	site-specific environmental management plan
SNC	–	Second National Communication
SRES	–	Special Report on Emission Scenarios
TOR	–	Terms of Reference
TSP	–	Total Suspended Particulates
UNFCCC	–	United Nations' Framework Convention on Climate Change
UNCBD	–	United Nations Convention on Biological Diversity
WRPPF	–	Water Resources Project Preparatory Facility
WUA	–	Water User's Association

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Description of Project

1. The Priority River Basins Flood Risk Management Project funded by the Asian Development Bank (ADB) and implemented by the Ministry of Energy, Water Resources and Irrigation aims to manage the flows through rivers to reduce the incidence of severe floods and provide protection to people, houses, public infrastructure and agricultural land in selected river basins in the southern Nepal, the Terai region. The project has prioritized seven priority river basins in the Terai region, divided into six sub-projects. One of the priority river basins is Mohana–Khutiya basin, located in the Terai of Western Nepal in Kailali and Kanchanpur districts of State 7. Directly impacted municipalities and rural municipalities are Dhangadi Sub-Metropolitan City, Godabari and Gauriganj municipalities in Kailali district and Krishanapur municipality in Kanchanpur district. For designing the flood protection structures, a 1 in 50 years return period including the impact of climate change scenario RCP4.5 is used. The selection of priority works was done in close cooperation with the WRPPF and DWRI field office, following a three-step approach: identifying tentative priority areas; verifying priority areas; and defining the priority areas. As such the basin will have 10,280 meter (m) of embankments, 2,150 m of additional revetments and 146 spurs for flood protection. CBDRM is implemented in 20 communities, which includes the construction of 13 flood shelters. This Sub-Project is categorized as an Environmental Category *B* project as per ADB categorization criteria and requires IEE. Similarly, as per the Environmental Protection Regulation of Nepal, this sub-project with more than 10 km of flood protection works in Mohana–Khutiya basin, also requires IEE report to be prepared and approved by the Government (Ministry of Energy, Water Resources and Irrigation).

Description of Environment

2. ***Physical Environment***: The basin has two distinct characteristic land use patterns: the upper catchment covering more than 90 % of the total area with non-agricultural land use types such as forest, shrub and grass, and the ecology is least disturbed. The lower catchment has dominant agricultural land use and built-up areas comprising 55% of the total area, whereas forest, shrub and grass cover account only 38%. Of the 38% forest cover, the largest portion lies in the Khutiya basin, as Mohana basin has less forest cover. There are some brick kilns as stationary sources (operating only in winter and dry season) deteriorating the ambient air quality in the area in addition to the movement of vehicles and trucks in the muddy and poorly maintained roads generate dusts and smokes in the area. Movement of vehicles and trucks also are the sources for occasional high level of noise along the roads. Excavation of sand and stones from the river body and direct sewage discharge from the Dhangadi Sub-metropolitan City in the river pollutes the river water quality.

3. ***Biological Environment***: There are no protected areas such as national parks, wildlife reserves, hunting reserves, conservation area and their buffer zones in the project site. However, as mentioned above in land-use pattern, the surrounding environment of the sub-project area contains sparse vegetation to thick forested area having common tree species like Sal (*Shorea robusta*), Bamboo (Bambusoideae), Sissoo (*Dalbergia sissoo*), Mango (*Mangifera indica*), Khayer (*Acacia catechu*), Guava (*Psidium guajava*) and Axle Wood (*Anogeissus latifolius*), Cotton tree (*Bombax ceiba*), Jack Fruit (*Artocarpus heterophyllus*), and Haldu (*Adina cordifolia*). It also has a few common wild species- Rhesus Monkey (*Macaca mulata*) and Golden jackal (*Canis aureus*), Rabbit (*Oryctolagus cuniculus*) and Leopard (*Panthera pardus*). The commonly found birds in the sub-project area are House Sparrow *(Passer domesticus)* Barn Owl *(Tyto alba),* Crow *(Corvus splendens),* Jungle Fowl *(Gallus gallus),* Black Stork(*Ciconia nigra),* White Stork(*Ciconia*

ciconia), Giant Hornbill *(Buceros bicornis),* Laughing Dove *(Streptopelia senegalensis), and* Cattle egret *(Bubulcus ibis).* The surrounding area also has a few common wild animal species: Bandar (Macaca mulata) and Shyal (Canisaureus), Rabbit (Oryctolagus cuniculus) and occasionally leopard (Panthera pardus). Wild animals like elephants are seen crossing the roads in the area coming from the nearby forest in India. Mohana river and its tributaries have some fish species like carps, catla (*Catla catla*) and Rohu (*Labeo rohita*) and Water Eel (*Anguilla bengalensis*), Puffer Fish (*Tetradon cutcutia*). According to local people, Dolphins (*Platanista gangetica)* were introduced in the Karnali river about half decade back, and dolphins can be occasionally seen in the downstream of Mohana–Khutiya basin. Commonly found Herpetofauna in the area are Lizard (*Hemidactylus frenatus)*, Frog (*Rana tigrina)*, Toad (*Bufo melanosticus)*, Land tortoise (*Testudinidae* species), Cobra (*Naja naja)*, King Cobra (*Ophiophagus hannah)*, common rat snake (*Ptyas mucosus)*, Bamboo pit viper (*Trimeresurus gramineus)* and the arboreal rear-fanged Brown Catsnake (*Boiga irregularis)*. The sub-project implementation is not expected to cause any adverse impact on the habitat and movement corridors of the wildlife.

4. ***Socio-Economic and Cultural Environment:*** According to the 2011 census, the total population in the municipalities and rural municipalities within the project influence area was 337,716 with female population of 51.6% and male 48.4%. In Kailali district alone, the population of IP (indigenous people) is about 45.27% (Tharu 41.53% and Magar 3.75%) while in Kanchanpur district the IP population is 21.4% (Tharu 20.36%, Raji 0.03% and Raute about 0.01%). There is no industrial area within the periphery of the project influence area, however small and cottage type of industries are in Dhangadi sub-metropolitan city, and some brick kilns in other local bodies as well. As Terai is regarded as the granary of Nepal, majority of people in the area also depend on agriculture. Major crops are rice, wheat, pulses, sugarcane, and maize. Project area is highly vulnerable to floods, and over the years the flood has resulted in the loss of human life, damage to housing and other structures, public infrastructures and loss of agriculture land and crops. The affected area in the Mohana–Khutiya basin considering 1 in 50 years return period is estimated around 4,297 hectares (ha). For the same return period, the flood affected people in the basin is estimated about 11,732 or 2,246 households.

Beneficial Impacts

5. As the sub-project is labour-intensive with the majority of tasks (such as gabion mattress laying and bio-engineering) requiring nonskilled workers, it will provide good opportunities for employment to local people during the construction phase. Implementation of the sub-project will result in significant reduction in the loss of human life, damage to houses, loss of agricultural lands and products, loss of livestock, and damages to public facilities. It aims for the protection of the riverbank from erosion and thus averts loss of land due to riverbank erosion whilst villages and farmlands will be protected. It will also help to convert barren land into arable. It will also help to make the area attractive for investments increasing economic activities and creating income generating opportunities for stabilizing livelihoods of poor and vulnerable. This will further add to community development programs under the Peoples Embankment Program initiated in the area by the government. The sub-project will result in protecting 1,146 ha of area in the basin benefitting directly to 8,325 people or 1,568 households.

Summary of Adverse Environmental Impacts

Physical Environment

(i) Dust pollution is expected near the construction and quarry operation areas due to excavation, material transportation, operation of heavy equipment and movement of vehicles;

(ii) Sedimentation in the river water may increase due to coffer dam and embankment construction, quarry operation, and spoil disposal, particularly during the lean flow period; and
(iii) Blockage of natural drainage may occur due to construction of embankment and quarry operation.

Biological Environment

(i) No significant impact on biological environment is expected from the sub-project implementation. There will be no loss of vegetation and impact on wildlife habitat; and
(ii) Sedimentation in river may impact fish, however this will be negligible, temporary and for a short period.

Socio-Economic and Cultural Environment

(i) About 21.3 ha of degraded land (barren flood plain) needs to be acquired for the construction of subproject structures;
(ii) Loss of crops and damage to village roads due to movement of heavy equipment and trucks may result during the construction period;
(iii) The construction activity, spoil deposition, quarry operation and construction material stockpiling may result in temporary and short-term loss of crops and damage to village roads;
(iv) Occupational health and safety of workers and community is of concern;
(v) Management of 3,000 m^2 land is needed for construction of flood shelters.
(vi) The construction activity, spoil deposition, quarry operation and construction material stockpiling may result in temporary and short-term loss of crops and damage to village roads; and
(vii) Occupational health and safety at labor camps and work area, and community health and safety will be of prime concern.

Summary of Mitigation Measures

Physical Environment

(i) Dust nuisance will be minimized by spraying of water in the construction area and roads near sensitive receptors in required frequency, limit vehicle speed to less than 20 km/hour, proper maintenance of vehicles and heavy equipment;
(ii) Use of sediment fence and coffer dam, and restriction in discharging wastewater from camps and work area in waterbodies and washing vehicles in the river could minimize sedimentation and river water pollution;
(iii) Select flood shelter location based on environmental screening criteria; and
(iv) Embankment design will include gated openings to avoid blockage of natural drainage.

Biological Environment

(i) Restriction to workers on wildlife harassing, hunting or buying;
(ii) Restriction to workers on destructive fishing in the river; and
(iii) Awareness program to workers and community on importance of saving wildlife.

Socio-Economic and Cultural Environment

(i) Department of Water Resources and Irrigation is promoting Peoples Embankment Program to rehabilitate the degraded land near riverbanks as well as protect the land from flooding and erosion in the future. As per this, people provide voluntarily

their land for constructing the flood protection structures like embankments and revetments. During the consultation meeting with local affected people in the presence with local bodies, people expressed happiness about the project and expressed willingness to extend all needed support for the implementation of the project. Social due diligence reports have been prepared for each subproject. The project will satisfy land use requirements through a combination of government land, negotiated settlement and voluntary land contributions from project beneficiaries or affected people;

(ii) Required frequency and timing of water spraying on construction site and village roads near sensitive receptors;

(iii) Contractor will submit a Site-specific EMP (SEMP) with OHS Plan for Employer's approval before field mobilization. Contractor will mandatorily comply with the SEMP and OHS provisions. The contract agreement will clearly mention the action to be taken for any case of noncompliance, including financial action;

(iv) The labor camps will be of modular structure or proper canvass tents on impervious floor, as approved by the Engineer. No camps made of CGI sheet, plastic and tarpaulin will be accepted unless it is coloured new GI sheets fixed on iron frame manufactured for the purpose of preparation of camp. The camp area will be fenced, and rooms have proper window for ventilation, fan, lighting, and separate kitchen and toilets constructed using similar material. The camp area will be paved with removable concrete blocks or bricks, and have drinking water supply, drainage and solid waste management system; and

(v) A Grievance Redress Mechanism (GRM) will be established as suggested in PAM.

Environmental Monitoring and Management Plan

6. A detailed environmental management and monitoring plan (EMP) is developed for both construction phase and operation phase of the project. Complying with all EMP requirements, the contractor will submit a site-specific EMP including OHS Plan (SEMP) as their commitment document on safeguards and safety implementation within 15 days of signing of contract and seek Employer's approval before field mobilization. Implementation of the above-mentioned mitigation measures excluding the spraying of water on village roads are part of best practices in construction management and the contract document will state that it will be the contractor's responsibility. Additional cost of NRe 3,600,000.00 is allocated for spraying water in village roads at required frequency and NRe 600,000.00 for SEMP compliance monitoring during construction.

Institutional Arrangement

7. In order to ensure the full compliance to the EMP and also national standards, institutional arrangement for monitoring and reporting as well as addressing the complaints related problems of communities is proposed. The project will be facilitated and managed by a project management unit (PMU) at the center supported by a project implementation consultant (PIC). Environment expert of PIC will support PMU in establishing overall safeguard monitoring and reporting mechanism. The DWRI Field Offices (implementing agencies) will be supported by safeguard monitors of PIC, who will be duly trained by PIC Environment Expert. Contractor will mobilize a safeguards assurance staff and a safety steward at each work site. They will work under overall guidance of a senior environment and safety superintendent who will be an accredited OHS expert.

Grievance Redress Mechanism

8. A grievance redress mechanism will be constituted to address the grievances of communities for both social and environmental complaints.

Conclusion and Recommendation

9. The environmental impacts envisaged from the proposed sub-project are general, short-term, temporary and reversible in nature. The sub-project will provide significant benefits to people and economy by preventing floods in the area resulting in the loss of human life, damage to houses, loss of agricultural lands and products, loss of livestock, and damage to public facilities. Hence it does not need to go further environmental assessment and recommended for the sub-project implementation in compliance with the proposed EMP.

I. INTRODUCTION

A. Background and Purpose of the Report

1. The Priority River Basins Flood Risk Management Project funded by the Asian Development Bank (ADB) and implemented by the Ministry of Energy, Water Resources and Irrigation aims to manage the flows through rivers to reduce the incidence of severe floods and provide protection to people, houses, public infrastructure, and agricultural land in selected river basins in the southern Nepal, the Terai region. The project includes seven priority river basins in the Terai region, divided into six sub-projects. The six sub-projects are:

(i) Mohana–Khutiya basin;
(ii) Mawa–Ratuwa basin;
(iii) West Rapti basin;
(iv) Lakhandei basin;
(v) Bakraha basin; and
(vi) East Rapti basin.

2. Each sub-project, when required, will have investments in (i) hydraulic structures to mitigate the impact of flooding; (ii) flood forecasting and early warning system capable of alerting people in the basin to a pending flood; and (iii) training of people and local government officials in community-based disaster risk management (CBDRM) – so that people can prepare for a floods in advance, and thus minimize losses from a flood.

3. This Mohana–Khutiya basin Sub-Project, as per the Rapid Environmental Assessment (Annex 1), is categorized as Category B project and thus requires for Initiation Environmental Examination (IEE) study to comply with the ADB Environmental Safeguard requirements. As per the Environmental Protection Regulation of Government of Nepal, flood protection works covering 10 km or more along the river in total also requires an IEE study and get approved by the concerned ministry prior to start of any construction activities. As this Sub-Project in total will construct 10,280 m of embankments, an additional 2,150 m of revetments and 146 spurs in the riverbanks. In addition, rain and hydrometric gauges will be installed and 13 flood shelters will also be constructed in the area. This IEE report is prepared to comply with national as well as ADB environmental safeguard requirements and is based on the Mohana–Khutiya feasibility studies prepared in July 2019.[1]

B. Objective

4. The overall objectives of the IEE report are to:

(i) Describe the existing natural and socio-economical resources in and surrounding project areas;
(ii) Identify and assess potential significant impacts based on existing environmental condition during project preconstruction, construction, and operation-maintenance stages;
(iii) Identify and recommend mitigation measures to minimize any potential impacts caused by project activities;
(iv) Identify the local concerns on environmental and social issues and address them;

[1] ADB. 2019. Water *Resources Project Preparatory Facility – Preparation of priority river basins flood risk management project. Mohana–Khutiya.* Manila.

(v) Develop environmental management plan and monitoring plan including cost;
(vi) Ascertain if further environmental assessment / investigation is required or not; and
(vii) Recommend institutional arrangement including capacity building to ensure the proper environmental and social safeguards implementation during construction and operation phases.

C. Methodology for the Initial Environmental Examination Study

5. The methodology that was followed while conducting the IEE study is as follows:

(i) ***Literature Review***: Published literatures with priority to publications of government institutions as well as international organization are reviewed to generate information on project surroundings. Also, district and village profiles were also used to add information on project sites. National policy and legislative frameworks were reviewed to understand the national priorities and also legally binding requirements that should be complied with while implementing the project;
(ii) ***Field Survey and Investigation:*** Field survey was conducted to generate information on the physical, biological and socio-economic environment of the project area. Maximum focus was provided on consultation with local communities to have historical information and deterioration taken over time. All the local bodies within the project area were consulted for their suggestions;
(iii) ***Data Analysis:*** In an integrated manner all potential sub-project impacts on physical, biological, socio-economic and cultural resources were assessed using the ADB and other agencies good practice guidelines as well as compliance to the national requirements. They are grouped for pre-construction, construction and operation and maintenance phases of the project;
(iv) ***Impact Evaluation:*** Significance of impacts are evaluated on the basis of the reversible or irreversible, nature, magnitude, extent and duration of the impact. While evaluating the impacts, prescribing mitigation and doing alternative analysis, maximum efforts were made to get expert opinions and inputs of the design team, social safeguard Team, morphology assessment team, and hydrology assessment team;
(v) ***Public Consultation****:* As per the EPR of Nepal, a public notice in national daily newspaper was published requesting all the concerned stakeholders and affected communities to provide written suggestions within 15 days. The same notice was placed in the concerned Rural Municipalities or Municipalities and other places of easy access to general public like schools, hospitals etc. Focus was provided for the maximum involvement of the prevailing users' communities formed and working at different municipalities and rural municipalities; and
(vi) ***Report Format:*** IEE report is prepared as per the Annex 10.1 of Environmental Safeguards 2071 for Irrigation and Water Induced Disaster Prevention Sectors as well as Schedule 3 of Environmental Protection Rule 1997. All the comments and suggestions written as well as verbal during consultation are incorporated in the report. It also follows the ADB format for IEE reports.

D. IEE Study Team

6. This report was prepared by DWRI with supported by a multi-disciplinary consultant team of Mott MacDonald Limited (UK). The team included one international environment expert and national experts in various areas of expertise including ecology, socio-economy, river morphology, geology and hydrology.

II. REVIEW OF POLICY AND LEGISLATIVE FRAMEWORK

7. This Chapter summarizes existing policies, plans, laws, and guidelines of Nepal and safeguards policy and principles of ADB those were referred while preparing this IEE. This is intended to inform the decision maker and stakeholders about the national priorities and legal requirements for environmental safeguards plan preparation and environmental management plan implementation.

A. ADB's Safeguard Policy Statement, 2009

8. ADB's Safeguard Policy Statement 2009 aims to ensure the environmental soundness and sustainability of projects and to support the integration of environmental considerations into the project decision-making process. The Policy requires that (i) impacts are identified and assessed early in the project cycle, (ii) plans are prepared and implemented to avoid, minimize, mitigate or compensate potential adverse impacts, and (iii) affected people are informed and consulted during project preparation and implementation. The objectives of ADB's safeguards are to:

(i) Avoid adverse impacts of projects on the environment and affected people, where possible;
(ii) Minimize, mitigate, and/or compensate for adverse project impacts on the environment and affected people when avoidance is not possible; and
(iii) Help borrowers / clients to strengthen their safeguards systems and develop the capacity to manage environmental and social risks.

9. ADB requires environmental assessment of all projects and programs as defined by the environmental screening checklist (REA) that considers the type, size, and location of the proposed project. Accordingly, the projects are classified into Category A (with potentially significant environmental impacts most of which are irreversible); Category B (with potentially less significant environmental impacts with only a few irreversible); Category C (unlikely to have significant environmental impacts). Initial Environmental Examination (IEE) is required for Category B projects. No environmental assessment is required for Category C projects although their environmental implications need to be reviewed by preparing an environmental due diligence report. ADB will not finance projects that do not comply with its safeguard policy statement, nor will it finance projects that do not comply with the host country obligations under international law.

10. The proposed sub-project is classified as environment Category B as per the ADB policy and hence requires preparing the Initial Environmental Examination (IEE). While undertaking the IEE process, ADB policies on pollution prevention and abatement, biodiversity protection and natural resources management, OHS and community health and safety, physical and cultural resources are also considered. Other relevant guidelines and policies of ADB referred include:

(i) Environmental Safeguards: A Good Practice Source Book, Draft Working Document, 2012;
(ii) Environment Operational Directions 2013–2020;
(iii) Social Protection Operational Plan 2014–2020;
(iv) Operation Manual Bank Policies (BP) and Safeguard Policy Statement, ADB, 2009; and
(v) Handbook on Resettlement: A Guide to Good Practice.

B. National Laws, Policies, Acts and Rules

11. The Constitution of Nepal defines the right of people to live in clean environment as one of the fundamental rights of its citizens (Article 30). It guides state to make legal provisions for a proper balance between environment and development and making structures environment friendly and sustainable. Country have to protect, promote and make sustainable use of natural resources and to adopt appropriate measures to abolish or mitigate existing or possible adverse environmental impacts on the nature, environment or biological diversity.

12. In accordance to the guiding principle of the constitution, Government of Nepal has brought many national and sectoral policies and legislations for the environmental friendly development and conservation and protection of natural resources. The policy and legislative framework of Nepal most relevant to this project are summed up in Table II-1.

Table II-1: Policy and Legislative Frameworks of Government of Nepal

SN	Policies, Acts, Regulations, Guidelines	Environmental Provisions
A. National Plan and Policy		
1	Fifteenth Five Years Plan, 2020−2024, Nepal	• Requires all projects to be formulated and constructed based on methods that optimally utilize local skills and resources and generate employment opportunities. • Attention is paid towards minimizing the impacts of climate change and protecting environment. It aims to minimize adverse impacts on people, property, culture, environment and economy by disasters. • The policy aims to integrate disaster risk management in all development activities in order to reduce loss of people and property. 1.
2	Nature Conservation: National Strategic Framework for Sustainable Development 2015–2030	National strategic framework on sustainable development with focus on the nature conservation. In order to achieve the purpose, this framework has set four strategic pillars: • Mainstreaming nature conservation in development efforts • Harmonization amongst sectoral strategies • Coordination amongst related agencies • Valuing and accounting ecosystem goods and services
3	Water Induced Disaster Management Policy 2015 (2072)	• The latest policy of Government of Nepal which recognizes the climate change as one of the main cause for the water induced disaster in Nepal. • This policy is introduced to achieve the objectives of the National Water Resources Strategy and National Water Plan on water induced disaster management sector through participation and coordination of public, cooperatives and private sector institutions. It encourages people to participate with voluntary contribution of land for flood protection works. • It has the main objective of making the infrastructures sustainable and has the policy on involving communities, cooperatives and private sector. It stresses the need for medium and long-term disaster prevention and control programs and make them climate resilient and environment friendly.

SN	Policies, Acts, Regulations, Guidelines	Environmental Provisions
4	Climate Change Policy, 2011, Nepal	The policy includes: • Climate adaptation and disaster risk reduction; • Low carbon development and climate resilience; • Access to financial resources and utilization; • Capacity building, peoples' participation and empowerment; • Study, research, technology transfer, climate friendly natural resources management; and • Institutional set up with legal provisions and monitoring and evaluation.
5	National Water Plan, 2005, Nepal	• Recognizes environmental management plan to be a strategic document. • Stress the need of strategic environmental assessment (SEA) for the preparation of mitigation measures and implementation plan to be applied at strategic and project levels. • Monitoring and auditing of programs to be implemented, and institutional and procedural arrangements.
6	Irrigation Policy, 2013, Nepal	• Emphasizes minimizing adverse environmental impacts during construction and operation of irrigation systems through timely environmental assessment and implementing mitigation measures. • Focuses on public awareness on safeguards to be increased at the governmental, non-governmental and local level. • Use only remaining water in rivers for irrigation upon maintaining minimum required water flow in the river/rivulet. • Encourages participatory irrigation management, conservation of local lakes, ponds, wetlands and springs.
7	Water Resource Strategy, 2002	• Provides a systematic framework for water resource development and identifies action plans to avoid and resolve conflicts to achieve water related development objectives. • Identifies the need to integrate and coordinate all the uses of natural resources within the catchment gives emphasis on integrated water resources management.
8	Water Resources Act, 1992	• Exempts the permission for the utilization of the water resources in irrigating the land individually or collectively. • Empowers water users association for the utilization of water resources. • Use of water resources for irrigation purposes is second priority. • Requires any loss of land or property while utilizing water resources shall be compensated. • Empowers the government to fix the standard of water resource and issue permissible levels of pollution to maintain the water quality. • Mandates to avoid and/or minimize impacts of soil erosion, landslide, flood or other significant adverse environmental impacts during the utilization of water resources.

SN	Policies, Acts, Regulations, Guidelines	Environmental Provisions
	Water Resources Rules, 1993	• Provision for Water Resources Committee in each district for granting the license for water resources utilization. • Oblige the proponent to, inter alia, analyses environmental impacts of the proposed action and include environment protection measures including arrangements for the settlement of displaced people. • Provision and procedures for conflict resolution in water use. • Provision of a compensation fixation committee.
9	Irrigation Regulation, 2000, Nepal	• Details on formation and administration of water users' associations (WUAs). • Promotes plantation of trees in right of way of canal. • WUA could also function as the CFUG with the permission from the respective DFO. • Authorizes the selling of the felled trees along the canal alignment.
10	Environmental Protection Act, 2019, Nepal	Umbrella act on environmental management in Nepal and has mandatory provisions on: • Need of EIA or IEE prior to start of any development project as per location, type and size of the projects; • Provision for dealing with pollution control, and conservation of national heritage; • Defines procedures for EIA/IEE and approval procedures; • Mandates public consultation in EIA/IEE; • Mandates that any person/party affected by pollution or adverse environmental impact caused by anybody may apply to the prescribed authority for compensation to be recovered from the polluter/pollution generator; and • Requires review of climate change impacts.
11	Environmental Protection Rule (EPR) 1997 (amendment, 2007), Nepal updated time to time	• The EPR and its schedules clearly provide various stepwise requirements to be followed while conducting the EIA/IEE study. • It also obliges the Proponent to timely consult and inform the public on the contents of the proposal. • Provision for dealing with pollution control, and conservation of national heritage is also present. • Schedule 1 listed projects require IEE and Schedule 2 listed projects require EIA study.
12	Forest Act, 1993 (amendment, 2007), Nepal	• Requires decision makers to take account of all forest values, including environmental services and biodiversity, not just the production of timber and other commodities. Includes several provisions to ensure development, conservation, management, and sustainable use of forest resources based on appropriate planning.
13	Forest Rules, 1995, Nepal	• Elaborates legal measures for the conservation of forests and wildlife. Guides that tree cutting clearance is required from Department of Forest. Advises that the expenses incurred for

SN	Policies, Acts, Regulations, Guidelines	Environmental Provisions
		cutting trees and transportation to be borne by the infrastructure developer.
14	National Park and Wildlife Conservation Act, 1973, Nepal	• Contains provisions for the mobilization of Conservation Area Management Committee (CAMC) and the local user groups in natural resources management. • It calls for the formulation and implementation of the management plan(s) by detailing activities for natural resources management, wildlife conservation and their sustainable utilization. • Prohibits activities such as wildlife hunting and damage to flora and fauna, fishing etc. within the conservation area. • Lists 26 species of mammals, 9 species of birds, and 3 species of reptile as protected species of wildlife.
15	The Land Act, 2021 (1964)	• The Land Act, 2021 (1964) also contains provisions related to compensation issues, particularly on the maximum size of individual landholdings. • According to the Act, a landowner may not be compensated for more than he/she is entitled to hold the land. • The Land Act also specifies the compensation entitlements of registered tenants on land sold by the owner or acquired for development purposes.
16	Land Acquisition Act, 1977 and Land Acquisition Rules, 1969, Nepal	• This Act empowers the government to acquire land for public purposes, by providing compensation for the private land and properties, as determined by the Compensation Fixation Committee. • Specifies procedural details on land acquisition and compensation with an aim to minimize hardships on project affected persons/families.
17	Land Acquisition, Rehabilitation and Resettlement Policy for Infrastructure Development Project, 2071 (2014)	This facilitates the land acquisition process for infrastructure project. The key highlights of newly introduced policy are: • Creation of scientific standard for land valuation • Extension of compensation equivalent to minimum market value of land; • Provision for action against those who try to disrupt land acquisition process • Categorization of projects based on economic and social impact assessment; • Relocation and rehabilitation of people affected by the project; and • Special consideration for vulnerable people, if affected by the project.
18	Local Government Operation Act, 2017	• Grants the local level units' legislative, executive and judicial rights. • The local legislature has the power to formulate local laws in line with the Act drafts provided by the Centre, while the local judiciary can decide cases related to irrigation, daily wages and pastures, among others.

SN	Policies, Acts, Regulations, Guidelines	Environmental Provisions
		• The smallest units among three tiers of the government can set up their own city police force, issue land ownership certificates and collect revenue on property, besides registering births, deaths and marriages. • They are also allowed to levy the taxes on house rent, entertainment, property, tourism, among others, in compliance with the tax laws of the Central and Provincial governments.
19	Labor Act, 2017	• Labor Act has set out the duties of employer towards workers which include making appropriate safety and health arrangement, arrangements ensuring no adverse effect on workers from use, operation, storage or transport of chemical, physical or biological liquids, disseminating necessary notice, information and training related to safety and health arrangements, etc. • It also sets out the general obligation of employer towards non-workers such as putting the signs to indicate the safety or health hazards, to manage the gas, chemicals waste of the entity so as not to cause adverse effect on local animals, people or environment, etc.
20	Child Labor Prohibition and Regulation Act, 2001	• Prohibits a child from engaging in work. • States nobody will engage in work a child who has not completed fourteen years of age as a labor. • States that nobody will engage a child in a risk full occupation or work set forth in the Act. • States that a child not to be engaged in work against his will by temptation or fear or pressure or by any other means.
21	Explosive Material Act, 1962, Nepal	• It requires prior approval of Chief District Officer to purchase and use explosives.
22	Solid Waste (Management and Resources Mobilization) Rules, 2013	• Provides authority to local bodies for the segregation, transportation and disposal of solid waste as well as operation of sanitary landfill site. • Authorizes local bodies to involve private sector in waste management. • Authority to local body to determine service charge for solid waste management.
23	Ancient Monument Prevention Act 1956	• Digging of ground for building, water supply pipes or sewerage in an area declared as preserved monument areas shall have prior approval/permit from the Department of Archaeology (Clause 5, Article 3).
24	Aquatic Life Protection Act, 1961	• The Act obliges the proponent to construct fish ladder at the dam site to ensure the movement of the aquatic animal, particularly the fish. If it is not possible, the proponent should establish a fish hatchery or a nursery, close to the dam site of the water resources projects, for artificial reproduction and ex situ conservation.

SN	Policies, Acts, Regulations, Guidelines	Environmental Provisions
25	National Environmental Impact Assessment Guidelines, 1993, Nepal	• Provides guidance to project proponent on integrating environmental mitigation measures, particularly on the management of quarries, borrow pits, stockpiling of materials and spoil disposal, operation of the work camps, earthworks and slope stabilization, location of stone crushing plants, etc.
26	Environmental Safeguards Guidelines for Irrigation and Water Induced Disaster Prevention Sector, 2015	• It provides detailed guideline for environmental assessment for the irrigation and water induced disaster prevention sector. • Provides detailed format for the TOR, Scoping, IEE and EIA study reports. • It also highlights the donor requirements on environmental safeguards.
27	Guideline on Forest Land Clearance, 2017	• Introduced for making it easier for developers of large infrastructure projects to acquire wooded areas at their proposed construction sites. It offers two options to acquire forest land for development projects. • A developer can acquire forest land by buying an equivalent area of forest land in a similar ecosystem elsewhere and creating a similar forest on it and handing it over to the government. • Alternately, a developer can acquire wooded areas by paying a fee determined by the Forest Ministry. The payment made by the developer will be used to create a similar forest. • It will come into effect after the Ministry of Forest and Environment fixes the rates for different ecosystems.
28	National Drinking Water Supply Standard, 2006	The Nepal Drinking Water Quality Standards and Guidelines (including standard limits, guidelines for the required frequency for water quality monitoring, and the process and schedule for measuring the standards in active use in the country).
29	Nepal Ambient Air Quality Standards 2012 (2069B.S)	Limits of the ambient air quality parameters around the construction sites
30	Nepal Noise Standards 2012 (2069 B.S.)	Noise levels for different land use categories and noise generating equipment.

C. Multilateral Environmental Agreements

13. Nepal is party to many multilateral environmental agreements (MEAs) and because of this, the provisions of those conventions, protocols and treaties also requires to be complied with while designing and implementing the development projects. Most relevant MEAs to this project are briefly discussed here.

(i) ***United Nation's Framework Convention on Climate Change (UNFCCC) and Kyoto Protocol***.

(ii) ***United Nation's Convention on Biodiversity (UNCBD)***: As per the requirement of convention, Nepal has developed National Biodiversity Strategy and Action Plan and implementing it. This strategy is updated as per the Aichi Targets.

(iii) ***Convention on the International Trade in Endangered Species (CITES):*** Based on this Nepal has already put many plant, animal, bird and aquatic species into the list of protected species in the country.

(iv) ***Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention)***: As part of the convention Nepal is working in many wetland ecosystems for rehabilitation, conservation and protection.

(v) ***World Heritage Convention under*** which many historical and archaeological sites are included under the world heritage sites.

(vi) ***ILO Convention No. 169*** is a legally-binding international instrument open to ratification, which deals specifically with the rights of indigenous and tribal peoples.

14. Nepal is also party to pollution related conventions like Basel Convention on Transboundary Boundary Movement of Hazardous Wastes, Stockholm Convention on Persistent Organic Pollutants, and Rotterdam Convention.

III. DESCRIPTION OF PROJECT PROPOSAL

A. Project Location and Study Area

1. Project Location

15. The catchment of the Mohana–Khutiya basin lies between Northing 3,168,000m to 3,208,000m (latitude 28°38′1.76″N and 28°58′59.15″N), and between Easting 448,000m to 478,000m (longitude 80°31′36.73″E and 80°45′24.74″E) in WGS 84, UTM Zone 44 N (Figure 3-1).

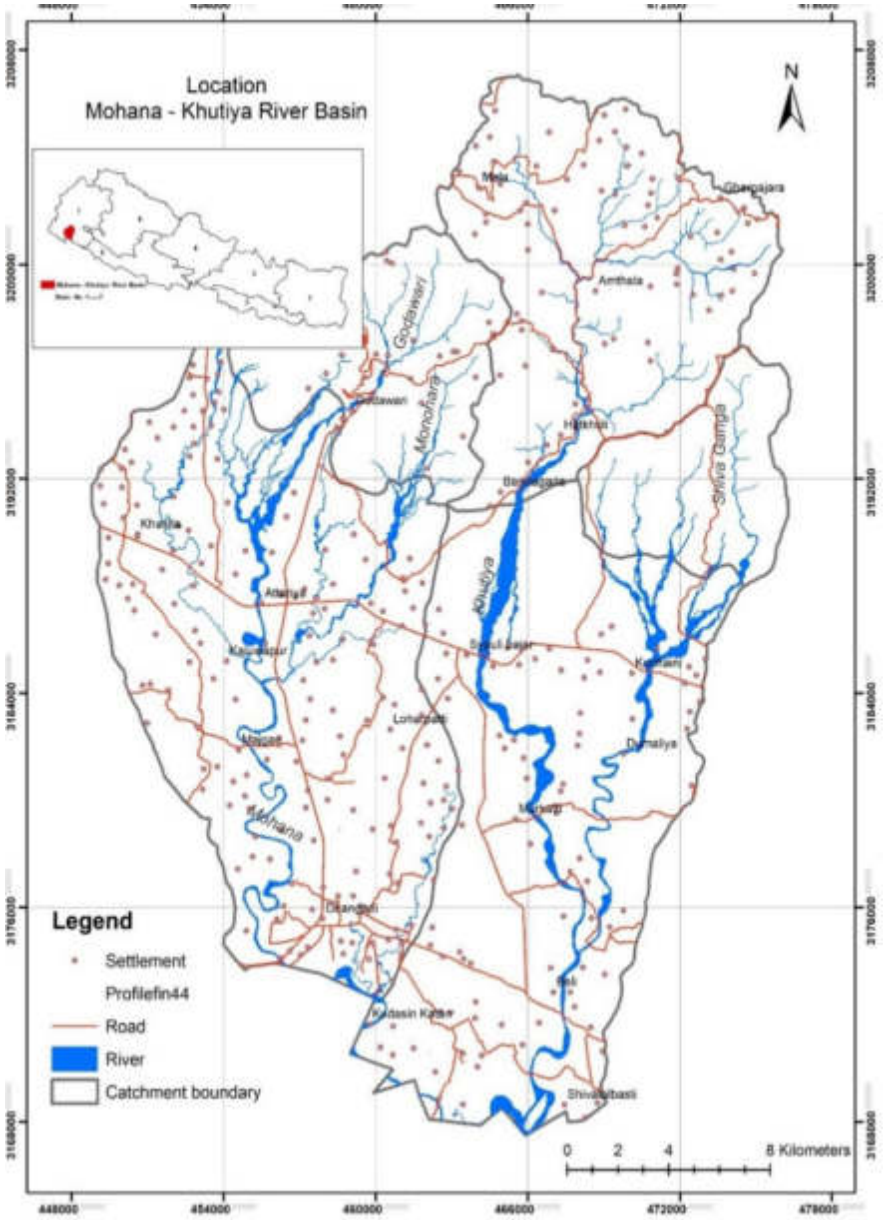


Figure 3-1: Mohana–Khutiya basin Location Map
(source: WRPPF: Morphological Assessment of Mohana–Khutiya Basin, July 2018)

16. The basin extends from Chure Hills (Siwalik Hills, also known as sub-Himalayan hills, at low altitude) in the north and in the Terai up to the Nepal - India border in the south. The catchment covers an area of 702.4 km2 and is located in the far west of Nepal in the Kailali and Kanchanpur districts of Province 7 (Figure 3-1).

2. Study Area

17. Originating in the Mahabharat range, Mohana flows west of Dhangadi and Khutiya flows east of the Dhangadi, the provisional capital of Sudur Paschhim Province. In the above mentioned two districts, the directly impacted municipalities and rural municipalities are Dhangadi Sub-Metropolitan City, Godabari and Gauriganj municipalities in Kailali district and Krishanapur municipality in Kanchanpur district. A separate project with ADB loan on "Regional Urban Development Project" (RUDP) is also being implemented in the Dhangadi sub-metropolitan city with mainly developing the drainage system and while preparing the IEE report, the RUDP project activities and their linkages to this project and possible environmental impacts are within the scope of this IEE.

B. Description of Site and Surroundings

18. Flooding has a particular impact on communities residing in the Terai region including in the Kailali and Kanchanpur districts. Agriculture is the basis of the economy in whole Terai region with major crops such as rice, wheat, pulses, sugarcane, jute, and maize. The topography is generally flat with a gentle slope in southward direction. Rivers originating from the mountain and hill areas run through the Terai region in southwards direction and eventually into neighbouring India. These rivers are the tributaries of the Karnali river. As Dhangadi sub-metropolitan city is in within the basin, being the commercial centre in the far-western Nepal, it has all those urban problems like poorly maintained roads, poor drainage system, inadequate facilities for proper waste management, and practices of dumping wastes in river banks and discharge of sewage into water bodies. This Mohana–Khutiya basin, is severely affected by floods causing damage to communities, agriculture, and public infrastructure. The more detailed description of the area and the physical, biological and socio-economic-cultural environment is presented in Chapter 4.

C. Priority River Protection Works

19. This project will not only provide flood control and river training infrastructures and Flood Forecasting and Early Warning Systems (FFEWS), it also has the component on training programme for Community Based Disaster Risk Management (CBDRM). For the design of flood protection structures, 1 in 50 years return period with the impact of climate change (scenario RCP4.5) is used. The selection of priority works was done in close cooperation with the WRPPF and DWIDM field office, following a three-step approach: identifying tentative priority areas; verifying priority areas; and defining the priority areas. The location of priority flood protection works is presented in

20. and details of each works in Table 3.2. In total, 11,420 m of embankments, 13,075 m of revetments and 168 spurs are planned for construction. Section of embankments and spurs are presented in Annex II.

Table 3-1: Salient Features of the Proposal

1	Name of the Project	Water Resources Project Preparatory Facility (WRPPF) Preparation of Priority River Basins Flood Risk Management Project

2	Sub-Project classification	Mohana–Khutiya River Basin Flood Risk Management Sub-Project
3	State	7
4	District	Kailali and Kanchanpur
5	Municipalities	Dhangadi Sub-Metropolitan City, Godabari, Gauriganj municipalities and Krishanapur municipality
6	Rural Municipalities	none
7	**Flood protection works in Mohana River**	
	i. Total Length	5,045 km
	ii. No. of structures	7
6	**Flood protection Works in Khutiya River**	
	i. Length	5,235 km
	ii. No. of structures	5

Figure 3-2: Priority Flood Protection Works Locations in the River Stretch
(source: WRPPF: Feasibility Report of Mohana–Khutiya Basin, August 2018, Note that PRTW.4 and PRTW.05 are not under the ADB funded project)

Table 3-2: Proposed River Training Works

Symbol	Location / Purpose	Latitude	Longitude	Length [m]
PRTW.01	Municipality: Krishnapur-07, Kanchanpur Tole / village: Near Santipur River: Mohana Requirement: Right bank, protection against erosion and flooding	28°47'11.18N	80°32'28.31"E	1,245
PRTW.02	Municipality: Krishnapur-08, Kanchanpur Tole / village: Upstream of Majgaun bridge River: Mohana Requirement: Right bank, protection against erosion	28°45'54.95"N	80°32'14.38"E	1,085
PRTW.03	Municipality: Dhangadhi-13, Kailali Tole / village: Downstream of Majgaun Bridge River: Mohana Requirement: Left bank, protection against erosion and flooding	28°45'49.99"N	80°32'26.12"E	330
PRTW.06	Municipality: Godhawari-9, Kailali Tole / village: Arjun River: Khutiya Requirement: Right bank, protection against erosion and flooding	28°45'50.41"N	80°39'29.65"E	1,045
PRTW.07	Municipality: Godhawari-9, Kailali Tole / village: Murkatti River: Khutiya Requirement: Right bank, protection against erosion and flooding	28°45'32.81"N	80°39'13.90"E	1,030
PRTW.08	Municipality: Dhangadi-17, Kailali Tole / village: Uttar Khaireni, Sukumbasi Tole River: Khutiya Requirement: Left bank, protection against erosion and flooding.	28°45'22.27"N	80°39'42.82"E	520
PRTW.09	Municipality: Dhangadi -15, Kailali Tole / village: Tarbariya River: Khutiya Requirement: Left bank, protection against erosion and flooding	28°41'28.94"N	80°40'19.82"E	520
PRTW.10	Municipality: Krishnapur-09, Kanchanpur Tole / village: Rajghat River: Mohana Requirement: Right bank, protection against erosion and flooding	28°45'02.29"N	80°32'36.81"E	500
PRTW.11	Municipality: Krishnapur-09, Kanchanpur Tole / village: Sanagaun River: Mohana Requirement: Right bank, protection against erosion and flooding	28°43'05.59"N	80°32'46.45"E	1,500

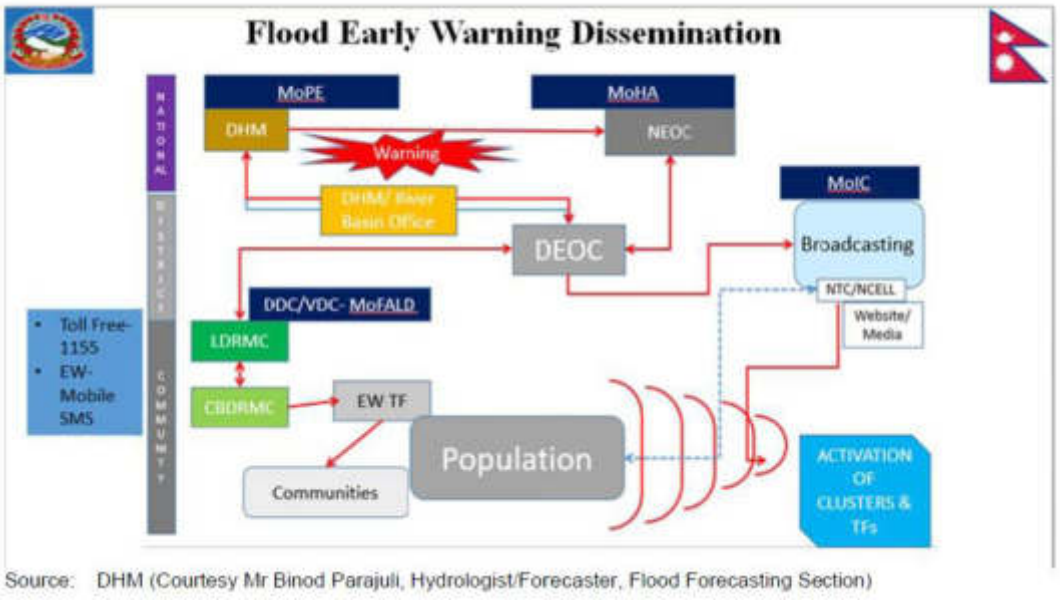
Symbol	Location / Purpose	Latitude	Longitude	Length [m]
PRTW.12	Municipality: Dhangadhi-03, Kailali Tole / village: Chatakpur River: Mohana Requirement: Left bank, protection against erosion	28°43'08.97"N	80°33'21.94"E	1,000
PRTW.13	Municipality: Godawari-9, Kailali Tole / village: Dhanchauri River: Khutiya Requirement: Right bank, protection against erosion	28°44'29.04"N	80°39'15.03"E	1,000

D. Flood Forecasting and Early Warning Systems (FFEWS) and Flood Shelters

21. The FFEWS will include installations of 11 rain gauges, 9 hydrometric gauge network, and construction of 11 flood shelters. Community-based disaster risk management (CBDRM) are the non-structural measures included in the project while FFEWS will have some associated civil works. Project interventions will be designed to reduce the loss of life and injuries, and economic displacement from flood events.

1. FFEWS

22. The proposed FFEWS will be compatible with the existing system of DHM by adopting similar equipment specifications and hydraulic modelling software already in use by the department. The key element to this approach is to engage both the local authorities and communities to determine the best means of communicating risk information and triggering appropriate action. Figure 3.3 shows the flood forecasting dissemination system in DHM.



Source: DHM (Courtesy Mr Binod Parajuli, Hydrologist/Forecaster, Flood Forecasting Section)

Figure 3-3: Existing Flood Early Warning System, DHM

23. The FFEWS model will consist of the following components:

No.	Component	Description
1	Rain gauge network	Consists of (i) auto telemetry rain-gauge, and (ii) rain gauge network. An automated telemetry rain gauge system will have a rain gauge unit, e.g. tipping bucket rain gauge, an in-built data logger, and a Modem (GSM) for connecting to internet and transferring data to the server. six new auto telemetry rain gauge stations will cover the 437 km^2 catchment area.
2	Discharge measurement equipment, water level and discharge gauge network	Six discharge measurement stations capable of measuring low to moderate flows while the water remains in the channel. The hydrometric gauging stations will be installed in easily accessible location in the neighborhood of a settlement. Where feasible, new gauges will be installed at bridge locations, for ease of access.
3	Survey	Current river cross-section and topographic data will be required to develop the hydrodynamic model for the river basin. Topographic survey will include river section, extended into the flood plain, any existing structures and flood embankment profile. Topographic survey will include river section, any existing structures and flood embankment profile.
4	Forecasting model development	Will include hydrological modeling and other relevant modeling needed for flood forecasting. This will include the modeling software.

24. Telemetry rain gauge and hydrometric stations will be installed in the project subbasins from which the data will be used in the hydrological and hydrodynamic flood inundation models developed under the project. The models will then provide the information for DHM to provide the early warnings by mass short message service through existing agreements with local telecommunications providers.

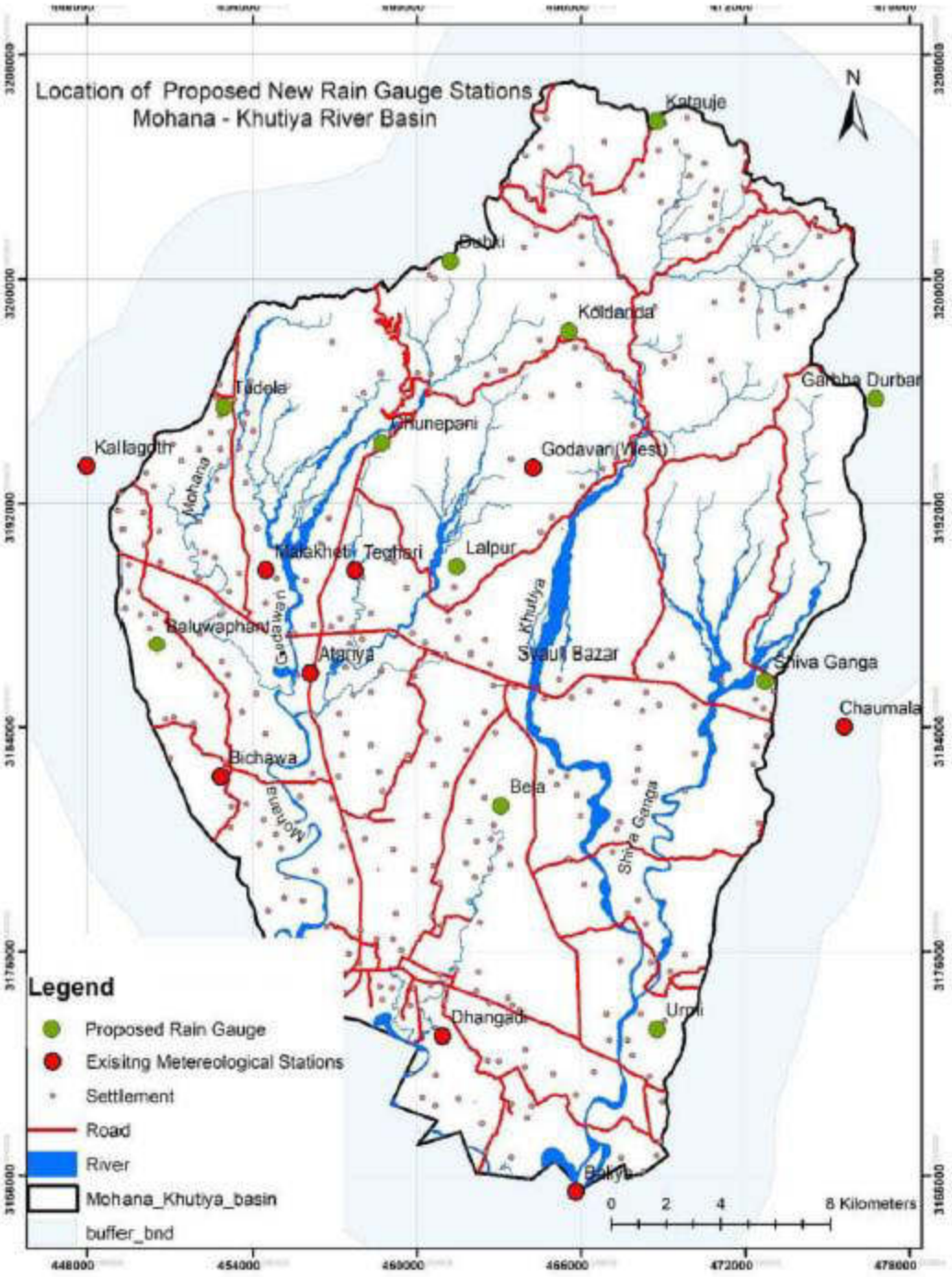


Figure 3-4: Locations of existing and proposed equipment of rain gauges in the Mohana–Khutiya Basin

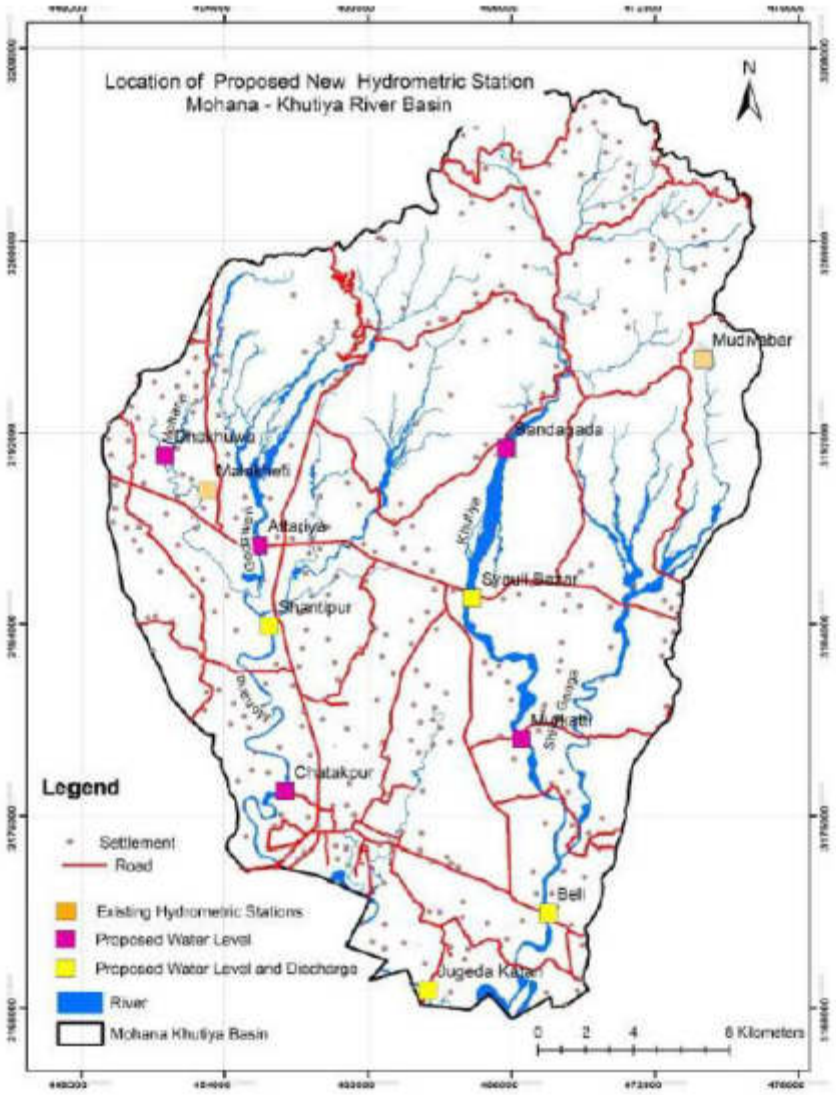


Figure 3-5: Locations of existing and proposed equipment of water level and discharge equipment in the Mohana–Khutiya Basin

2. Flood Shelters

25. The United Nations Environment-DHI Centre on Water and Environment defines flood shelters as "strong elevated structures that can be used by local residents for refuge during an extreme weather event generally made of concrete because they are easy to construct, strong and cost efficient, elevated on strong pillars with a deep foundation designed to withstand high winds, water levels, and potentially scour, in high flow environments."[2]

26. FFEWS complements flood shelters in order to inform the affected communities of possible adverse conditions in due time. Site selection for flood shelter will consider proximity of

[2] UNEP-DHI Centre for Water and Environment is a United Nations Environment Programme centre of expertise established in 2001 dedicated to improving the management of freshwater resources from the local to the global level.

the communities to be evacuated. Practical Action uses a rule of thumb of a 15-minute walk to the flood shelters, which is about 1 km in distance.[3]

27. Given the nature and purpose of flood shelters, there are no standard designs for flood shelters as the local conditions (e.g. available land and number of people) will influence the designs. These shelters are mainly for emergency support and are not to be used for longer periods. The flood shelters will be used for a maximum of 3 days, but more often only a few hours. One flood shelter will be about 300 m^2 and can be used by 150–160 people or a maximum of 200 people. Basic requirements for a flood shelter will include the following:

(i) The ground floor will be constructed above the measured highest flood level. In practise, Practical Action designs the flood shelters about 1.2 m (4 ft) above the ground level. A ramp will be constructed to allow disabled and elderly to access the ground floor easily.
(ii) Safety is important as the shelter is an emergency evacuation. As such, the shelter will be earthquake-resistant, with strong handrails along the stairs and wider staircases so that elderly and disabled can receive support from others when going to the first floor.
(iii) There will be an open common area, the first floor of the shelter will have at least 4 rooms: one room with toilets for women, one room with toilets for men, one room as changing room, and one room for storage room.

28. Since flood shelters will be used only in emergencies, during the dry season, these shelters can be used for other community activities such as training or community meetings. Figure 3.6 shows an example of a flood shelter while Figure 3.7 presents the indicative location of the flood shelters in Bakraha.

Source: MEWRI and DWRI, Government of Nepal. WRPPF: Preparation of Priority River Basins Flood Risk Management Project, Feasibility Report. East Rapti Basin. 10 October 2019

Figure 3-6: Example of Flood Shelter

[3] Practical Action is an innovative international development organisation putting ingenious ideas to work so people in poverty can change their world. https://practicalaction.org/.

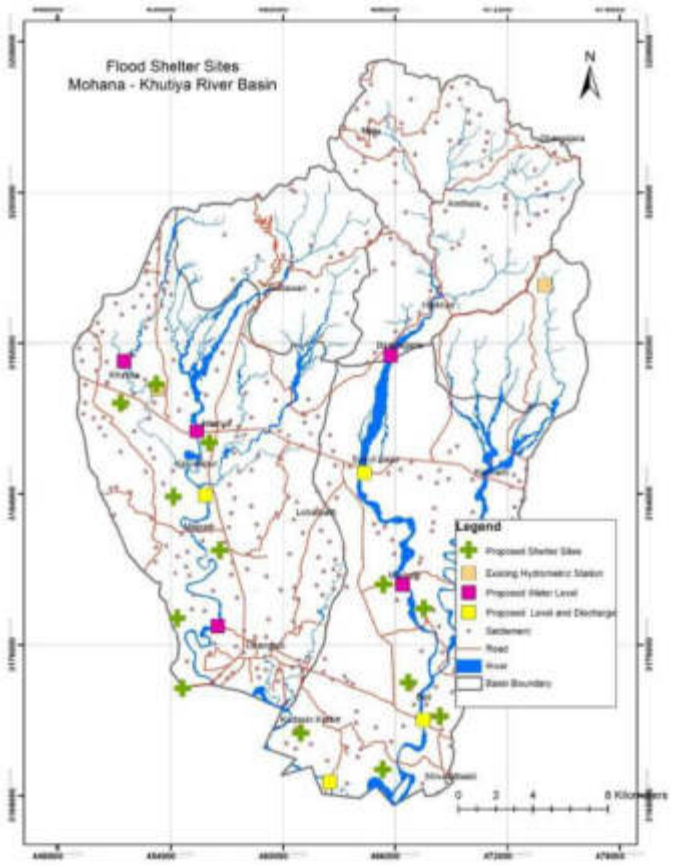


Figure 3-7: Indicative Location of Flood Shelters in Mohana–Khutiya

3. Selection Criteria for FFEWS and Flood Shelters

29. **Equipment for FFEWS.** To prepare the FFEWS, rain and hydrometric gauges will be required, and the location of the equipment depends on the following:

(i) In each basin auto telemetry rain gauges stations shall be designed. One rain gauge in every 68 km^2 over the basin
(ii) The locations for hydrometric stations will be chosen carefully to allow for good calibration of run-off from the hydrological model and river levels in the hydrodynamic model.
(iii) The equipment have a footprint of no more than 5 m2 each. Government land to be used for installation.
(iv) Locations to be finalized in consultation with Department of Hydrology and Meteorology

30. **Flood Shelters.** Site selection will require a participatory approach with the local communities who will be the beneficiaries. The location will depend on:

(i) Flood maps and identification of vulnerable communities.
(ii) Reliable inventory of the different houses and buildings within the communities to identify the vulnerable from the non-vulnerable places

(iii) Non-vulnerable places such as schools or government buildings, which are generally in higher and stronger structures, can be used as temporary shelter during flood events.
(iv) In case there are no structures that are non-vulnerable and cannot be used for shelter, consultations with local communities will be conducted in deciding the location for the flood shelter.
(v) Availability and accessibility of government land.
(vi) The location shall not be inside environmentally sensitive areas such as forest, national park, wildlife habitat or movement corridor, heritage sites, and landslide prone areas.
(vii) Local bodies need to take ownership of shelters.

4. Community-Based Disaster Risk Management (CBDRM)

31. The CBDRM planning will follow the frameworks set out in the Disaster Risk Reduction and Management Act (2017) of the government utilizing the local disaster management committees. The CBDRM will complement the structural and FFEWS measures in the project through a participatory, community-based approach that aims to reduce the loss of life, household and community assets, property and livelihoods from flood-related and other disasters; and to strengthen community resilience creating a safer environment for economic and social development.

32. Selecting the target communities in the sub-project will be based on the following criteria:

(i) Located in the highest flood-prone areas and/or are among the most affected by previous flood disasters
(ii) Areas benefitting from the FFEWS to demonstrate its importance and to quantify its direct effect on the communities
(iii) High dependence on agriculture and/or other livelihoods vulnerable to flooding.
(iv) Presence of a higher than average proportion of people with special needs: women/child-headed households, people with disabilities, a mix of caste/ethnic groups, and people from low socio-economic backgrounds.
(v) Have not been the beneficiaries of ongoing or recent CBDRM projects.
(vi) Are located in administrative areas where there is a functioning municipality and elected Mayor.

33. The process for identifying the target communities will be based on the following:

(i) Feasibility studies - information on flood mapping, priority areas of intervention for structural works and settlement density (completed)
(ii) Social surveys: Key findings from social surveys undertaken in the target river basins (completed)
(iii) Current hazard mapping, administration maps and population data (available from other sources)
(iv) Stakeholder consultations
(v) Additional household surveying to fill in any knowledge gaps, if resources allow.

34. The CBDRM will have the following components:

(i) Institutional DRM capacity building - establishment of Local DM Committees, Development of Local Disaster Risk Management Plans, and FFEWS.

(ii) Community-based DRM capacity building - establishment of community disaster risk management committees, development of Community Disaster Risk Management Plans, establishment of Community Disaster Response Teams, and small-scale mitigation measures and livelihood support.

E. Clearance of Vegetation

35. There is vegetation along the riverbanks in some stretches, either wild, privately grown or community grown trees. As the vegetation along the banks are protecting the erosions, the prioritized locations for embankments and revetments are not included in such areas. Thus, there will be substantially no clearance of vegetation required due to the construction activities and the sub-project will have minimal impact on vegetation and biodiversity of the area.

F. Machines to be used

36. The major machines that will be used during the construction phase of the project are excavators and loaders. Tripper and trucks will be used in transporting the source materials like boulder/stone, riverbed materials or soils from different locations identified to 8 different sites where the river protection works will be carried out.

G. Energy to be used

37. Fossil fuel (diesel) will be used during construction to power construction equipment and transport vehicles, which emit greenhouse gases. The estimated quantity of diesel to be used by construction equipment's and transport vehicles is 273,000 litres (10 km average for supply of stone/boulders; 70 km for gabion wire; diesel consumption 5 km/l; 50 litres per day for heavy equipment in one location). Contractor shall supply LPG in their camps and use of fuelwood will be restricted.

H. Area of Land Required

38. Minor land acquisition in the subproject throughout construction is anticipated. At a minimum, temporary land use will be required for storing construction materials and equipment during the construction period. At a maximum, permanent land acquisition will be for a swath of land that runs parallel to the riverbanks. The type of land that will be required is privately owned land, mainly flood plain (bagar) and agricultural land. Using an indicative width of 17 m and the length of 11.42 km, the maximum permanent land loss will be no more than 1.94 km^2 (equivalent to 19.4 hectares). There will be no houses or other structures that need to be removed for the prioritized flood protection works. The area required for flood shelter is about 3,900 m^2.

I. Public Infrastructure to be Affected

39. No existing structures will be affected due to the implementation of the river embankments in both Mohana and Khutiya Rivers. Rather. The project will protect the existing public structures, houses, land, roads and bridges along the river section.

J. Source and Quantity of Construction Materials

40. The Bakraha basin is the main source for construction materials like boulders, stones, riverbed materials, gravel and sand, etc. in the area particularly in the dry period, which are collected with permission from the concerned local governments. As the design has considered the use of local materials, and after observing the basin during the field survey, the potential

locations for the supply of construction materials (boulders/stones) are shown in Figure 3-8 and the estimated quantity of construction materials are shown in Table 3-3.

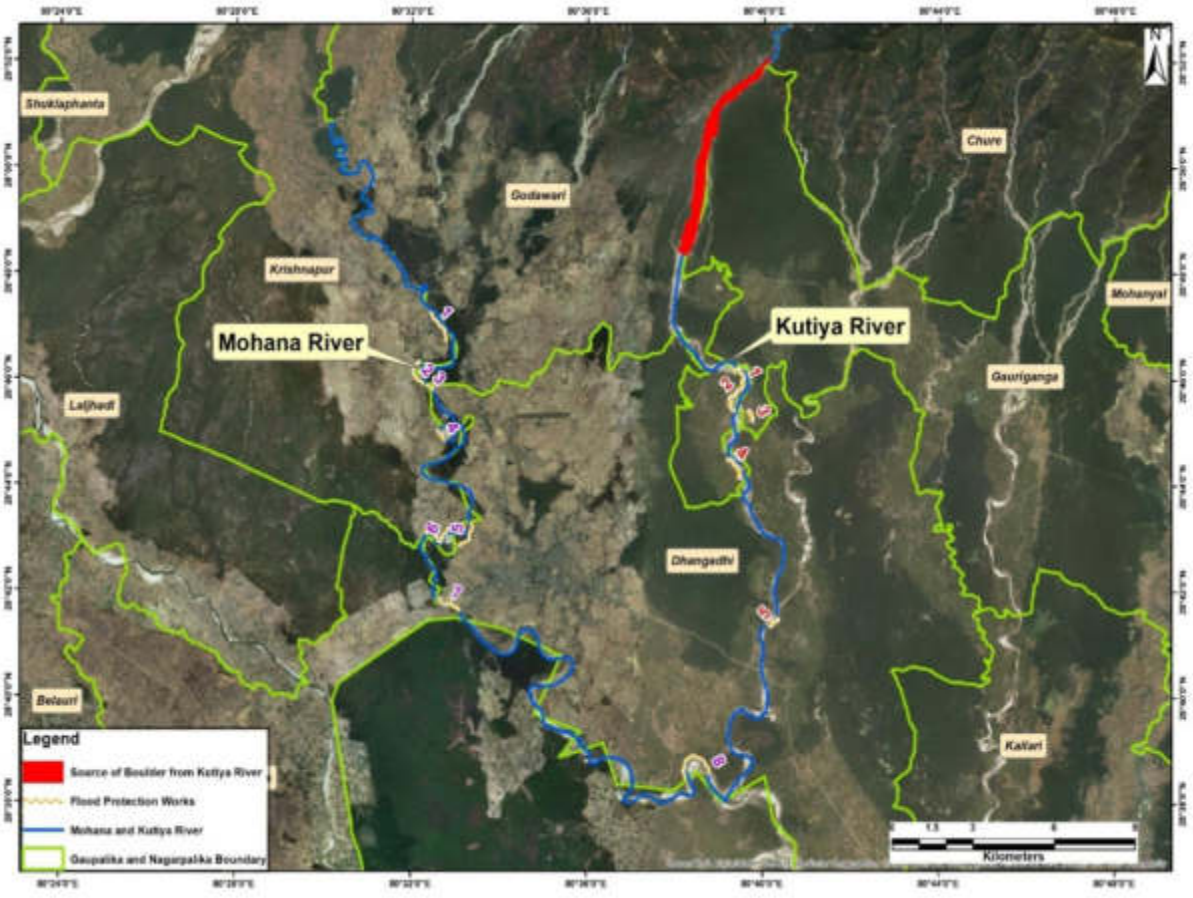


Figure 3-8: Locations of Construction Materials in the Area (Field Survey, October 2018)

Table 3-3: Estimated Quantity of Construction Materials

S. No.	Description of Materials	Unit	Quantity (estimated)	Remarks
1	Boulders/stones	Cubic Meter	145800	All structures
2	Soil	Cubic Meter	171500	For embankments
3	Gabion Wire (M/C netted)	Square Meter	537000	All structures
4	Geotextile	Square Meter	104000	Revetments

Source: Detailed Design of Sub-Project, November 2018.

K. Human Resources Required

41. During the focus group discussions (FGDs) held at different locations along the proposed sub-project alignment, people confirmed that over the years they have built experience of working in flood protection works and recommended hiring the local people. According to the interaction with the ward chairmen of the impacted local bodies, up to 100 people including women from each ward can be available for working in river training works. According to the design of the sub-project, the estimated number of person-days for collection of boulders/stone, loading/unloading, filling of gabion wires, laying of geotextile, and excavation works are about 766,000 person-days

of unskilled workers and 48,000 person-days of skilled workers. Of the total unskilled workforce required, nearly 60% are estimated for collection of stone/boulders and their loading and unloading. The other 40%, i.e. 306,400 workers (730 in average per day) will be required for the construction of flood protection works in 13 locations within 2 years (14 months' dry period). As such nearly 65 (unskilled +skilled) people will be required in each location every day.

IV. DESCRIPTION OF ENVIRONMENT (BASELINE DATA)

A. Physical Environment

1. Land Use and Settlement

42. Mohana–Khutiya basin has two distinct characteristic land use patterns in the upper and in the lower catchment in Figure 4-1.

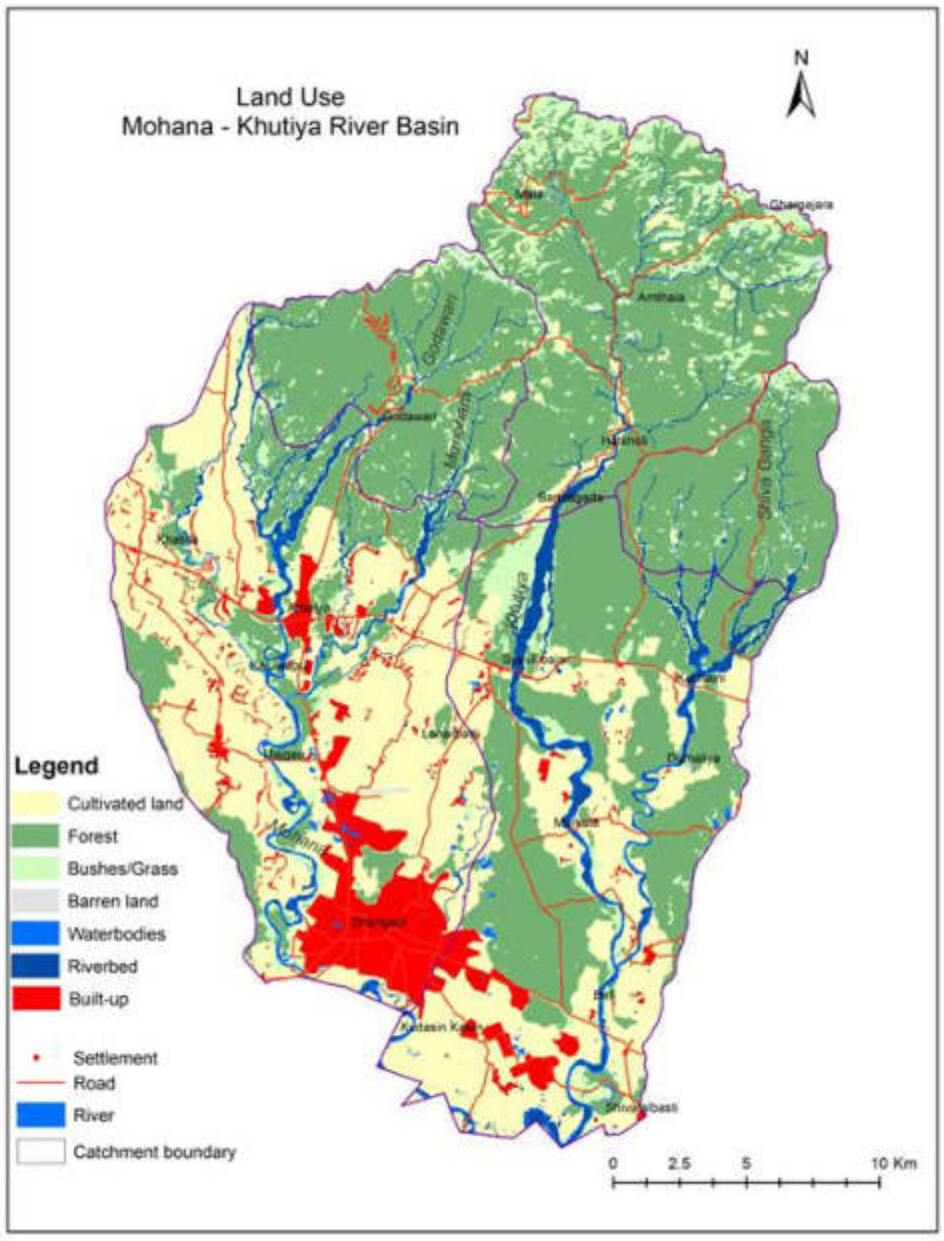


Figure 4-1: Land use in the Mohana–Khutiya Basin
(source: WRPPF: Morphological Assessment of Mohana–Khutiya Basin, July 2018)

43. While the upper catchment has the dominant non-agricultural land use types such as forest, shrub and grass, covering more than 90 % of the total area in the upper catchment, the

lower catchment has dominant agricultural land use and built-up areas comprising 55% of the total area, and the forest, shrub and grass cover accounting only 38%. Of the 38% forest cover in the lower catchment, the largest portion lies in the Khutiya basin. The lower catchment of the Mohana river has dominant agricultural land use and built-up areas comprising 69.5% of the total area, whereas forest, shrub and grass cover account only 25.4 %. Built-up area comprises about 14.3 %. The corridor of the Mohana river from Attrariya to Majgau is mainly under forest or grass, which is an important land use feature to control flood and bank erosion. The lower catchment of the Khutiya river has a relatively higher forested cover than agriculture. Forest land use cover is 51.3% of the area of lower catchment of the Khutiya, whereas agricultural land use is 41.1%. (Source: Mott MacDonald derived this map from Chure Terai Madhesh Protection and Management Master Plan (2016))

2. Topography

44. Mohana–Khutiya basin extends from Chure Hills (Siwalik Hills, also known as sub-Himalayan hills) in the north and in Terai (means low flat land) up to Indo-Nepal border in the south. The catchment covers an area of 702.4 km^2 in the far west of Nepal. The relief of the basin varies from 170m at Indo-Nepal border to 1940 at the northern ridge of the Siwaliks. Physiographically, based on the geomorphic properties, the basin can be divided into two units, i.e., Chure Hills and Terai. Chure Hills comprises the upper catchment area is developed on the Siwalik rocks. The topography is rugged and steep (most area above 25-degree slope) with narrow river valleys. Large part of the area is covered with forest and shrubs (>90%). Landslides and erosion events are active, which contributes to huge amount of sediment delivery in the rivers causing flood downstream. Due to very rugged terrain the settlements are scattered and have low population.

45. Terai region is a depositional zone, which an extension of the Indo-Gangetic Plain is a low flat land with a very gentle slope, i.e., < 5 %. Depending on the topography and sediment characteristics Terai can be divided into Bhabar and Terai. Bhabar extends up to 9 km downstream from the foothill. Topography, compared to Lower Terai is steeper and is composed of boulder, gravel and sand. Riverbeds are wide, swallow and braided and unstable. Lower Terai is comprised of sand and silt and the topography is very gentle, rivers are meandered which causes erosion at outer bends. Frequent river shifts and course change is common. This region is highly fertile and more than 50 % of the land is under cultivation.

3. Geology and soils

46. According to the Morphological Assessment of Mohana–Khutiya basin, it is underlain by the Siwaliks, the youngest parallel mountain chain in the Himalayan orogen (Gansser, 1964) in the north, and Terai made of Quaternary deposits in the south. The Siwalik Ranges from the most tectonically active Himalayan belts, which has resulted in active deformation, dislocation and uplift of rocks along this belt, giving rise to a complex geologic structure and unstable and erodible landscape. Based on lithological characteristics (DMG 2007), two broad categories of the Siwalik rocks, i.e., the Lower Siwaliks (LS) and Middle Siwaliks (MS) are found (Figure 4.2). The LS consists of an inter-bedding of mudstone and sandstone. The mudstone is variated in colour with a wide occurrence of green and purple shales. The sandstone beds are thin to thickly bedded, fine to coarse grained. The proportion of mudstone is greater than that of sandstone in aggregate. The LS occupy the southern part of the catchment, and entirely covers catchment of the Mohana, Godavari and Shivaganga rivers. The MS is comprised of a higher proportion of sandstone in a sequence of interbedded sandstone-mudstone. The proportion and coarseness of the sandstone increases towards the upper formation of the MS. Figure 4-2 presents the geology of the basin.

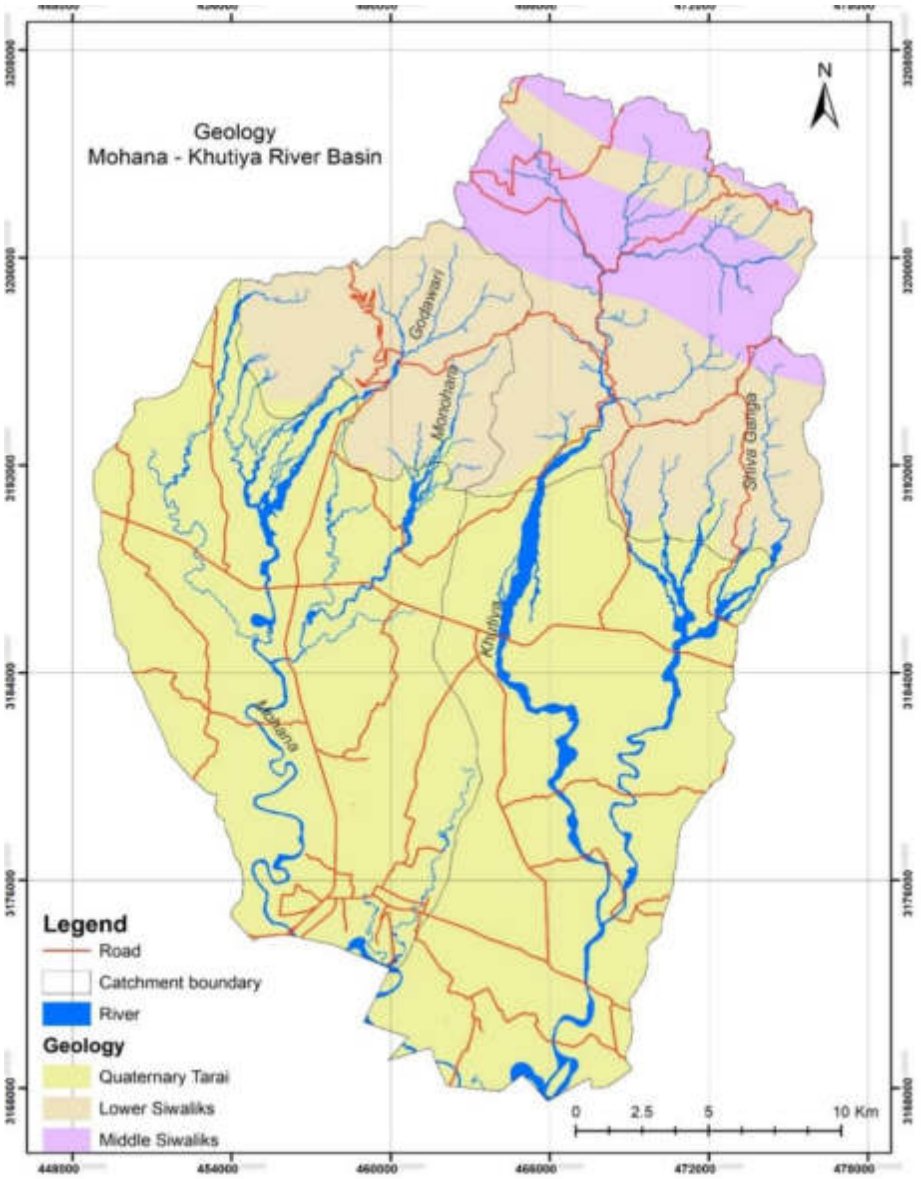


Figure 4-2: Geology and structure of hill slope catchment in Mohana–Khutiya basin
(source: WRPPF: Morphological Assessment of Mohana–Khutiya basin, July 2018)

4. Climate and Climate Change

47. The basin has the tropical types of climate. These types of climate are found mostly in between sea level 85 m to 800-meter elevation in the Terai of Nepal. In general, the rainy season in the project area starts from June and ends in September. During the rainy season, monsoon blows across the Bay of Bengal and delivers about 80% of the annual rainfall. The historical climatic data and the projected changes in the climate are taken from the World Bank: Climate Change Knowledge Portal, Nepal. Figure 4-3 presents the average monthly temperature and precipitation at Dhangadi (location *28.67,80.63)* from 1901-2015. Figure 4-4 presents the projected change in maximum daily temperature in 2050 as compared to observed temperature from 1986 to 2005 for Nepal. And projected change in number of days with very heavy

precipitation and mean monthly precipitation are presented in Figure 4-3 and Figure 4-6 respectively.

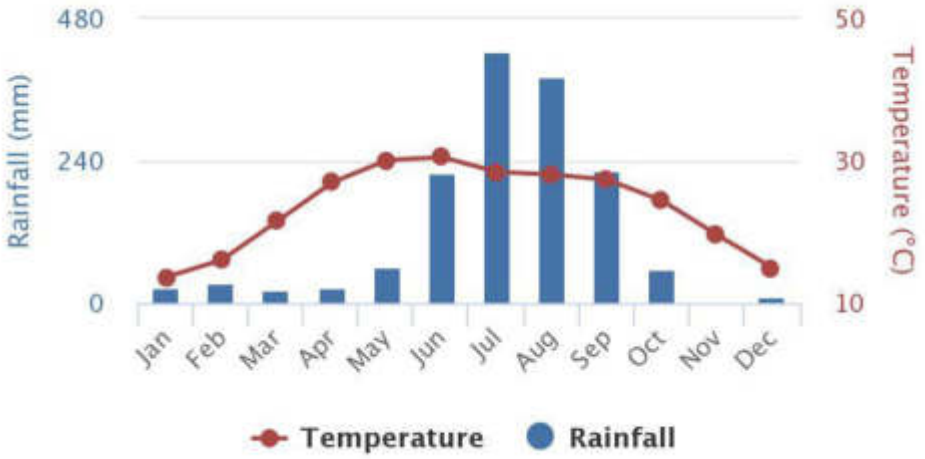


Figure 4-3: Average Monthly Temperature and Precipitation at Dhangadi (Location: 28.67,80.63) from 1901 to 2015.

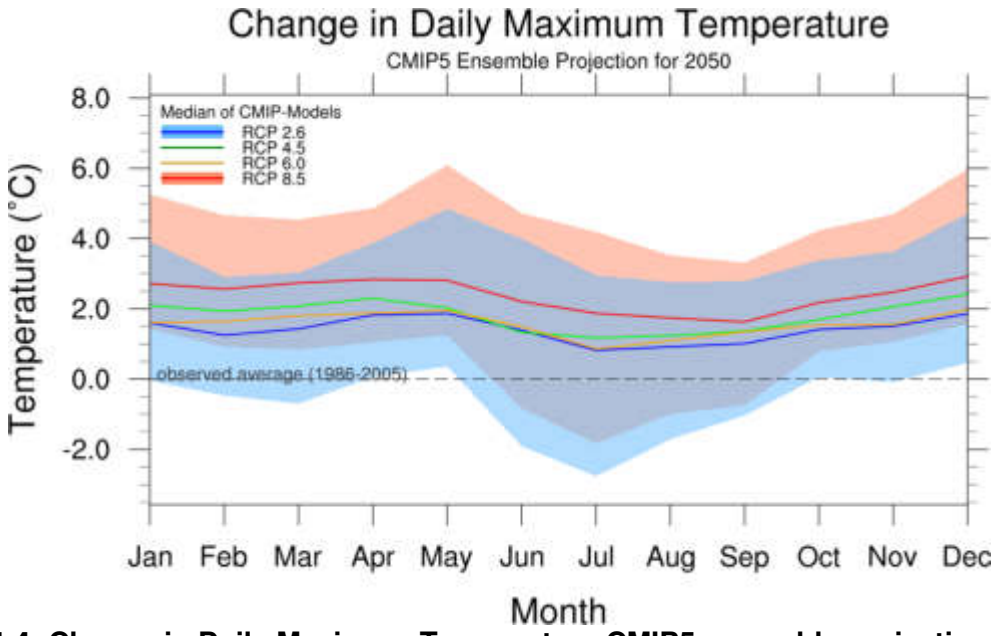


Figure 4-4: Change in Daily Maximum Temperature CMIP5 ensemble projection for 2050

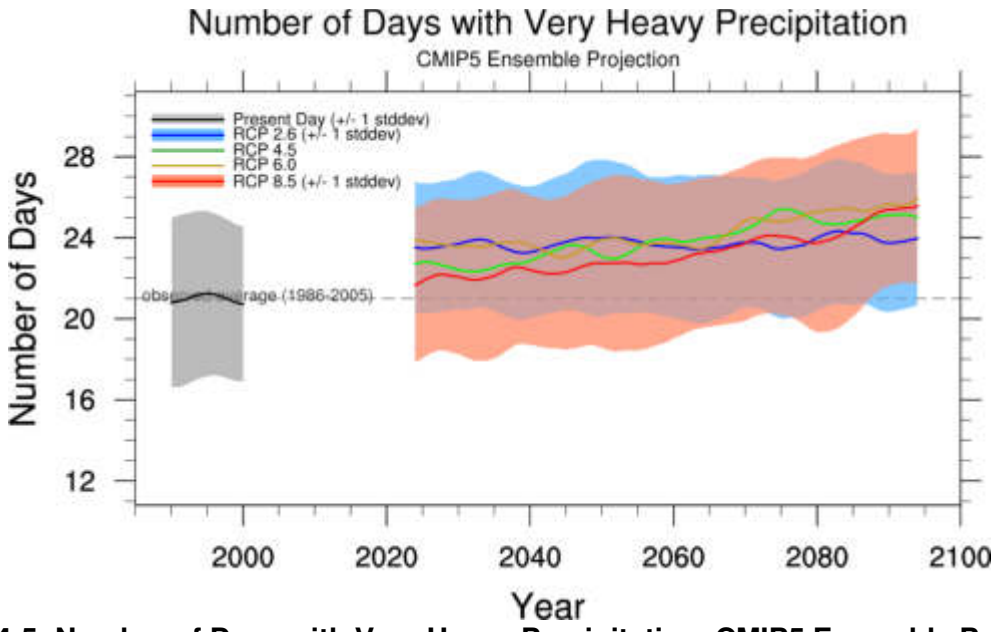


Figure 4-5: Number of Days with Very Heavy Precipitation, CMIP5 Ensemble Projection

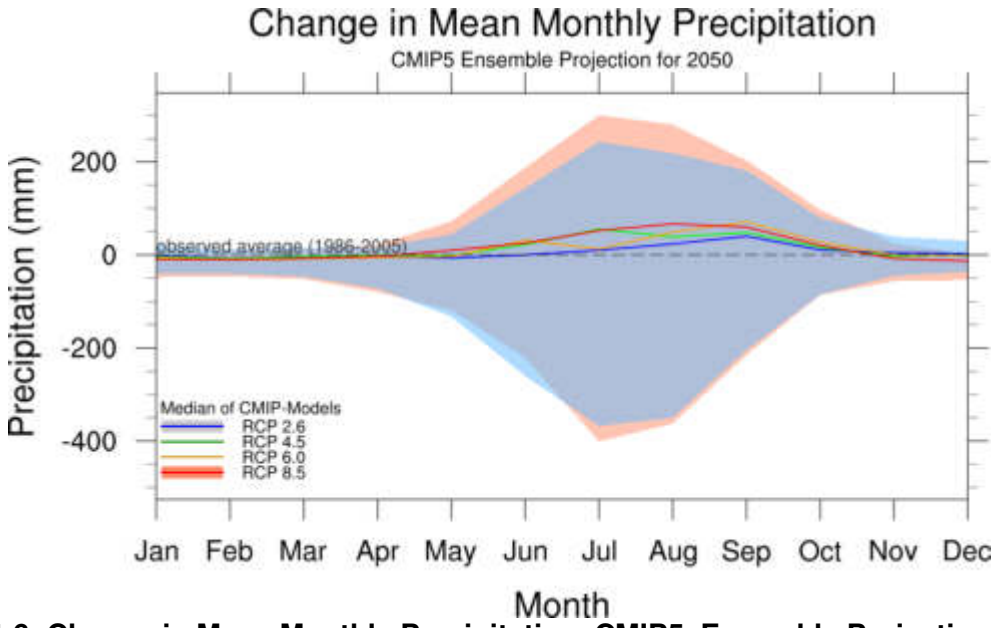


Figure 4-6: Change in Mean Monthly Precipitation, CMIP5, Ensemble Projection for 2050

48. As per the Figure 4-4, the positive values indicate that warmest daily maximum temperatures will likely to increase compared to the baseline. Similarly, Figure 4-5 shows the recorded number of Days with Very Heavy Rainfall (20mm/day) each year for 1986–2005, and projected values for 2020–2100 under all RCPs of CIMP5 ensemble modelling. Positive values indicate that there will be more days with very heavy precipitation for 2020–2100. Figure 4-6 shows projected change in Monthly Mean Precipitation per month by 2050 compared to the reference period (1986–2005) under all RCPs of CIMP5 ensemble modelling. Positive values indicate that monthly rainfall will likely increase compared to the baseline, and vice versa. The shaded area represents the range between the 10th and 90th percentile of all climate projections.

5. Hydrology, Flooding and Sedimentation

There are no operating hydrometric stations in both the rivers and because of this the hydrology assessment is based on running models (HEC-RAS models). According to the hydraulic modelling results for Mohana river the total discharge for 1 in 100 years return period at about 44.36 km upstream from the downstream point is 1,216.64 m^3/s while it is 2,175.82 m^3/s at 5.917 km from the downstream point. Similarly, for Khutiya river, the volume is 947.03 m^3/s at channel length 15.1706 km from the downstream point while it is 1,516.16 m^3/s at 6.427 km from downstream point. In regard to velocity for the same return period estimated from models show that the velocity at the upstream at 2.28 m/s goes down to 0.66 m/s in the flat areas for Mohana river and it ranges from 2.61 m/s to 0.62 m/s for Ratuwa river. Significant reduction in velocity in the flat plains despite increased volume results lots of sedimentation is deposited in the area resulting in floods. Figure 4.7 shows the flood maps for a return period of 50 years with and without the proposed structures in the Mohana–Khutiya basin starting as mentioned above and ending to the Nepal-India border.

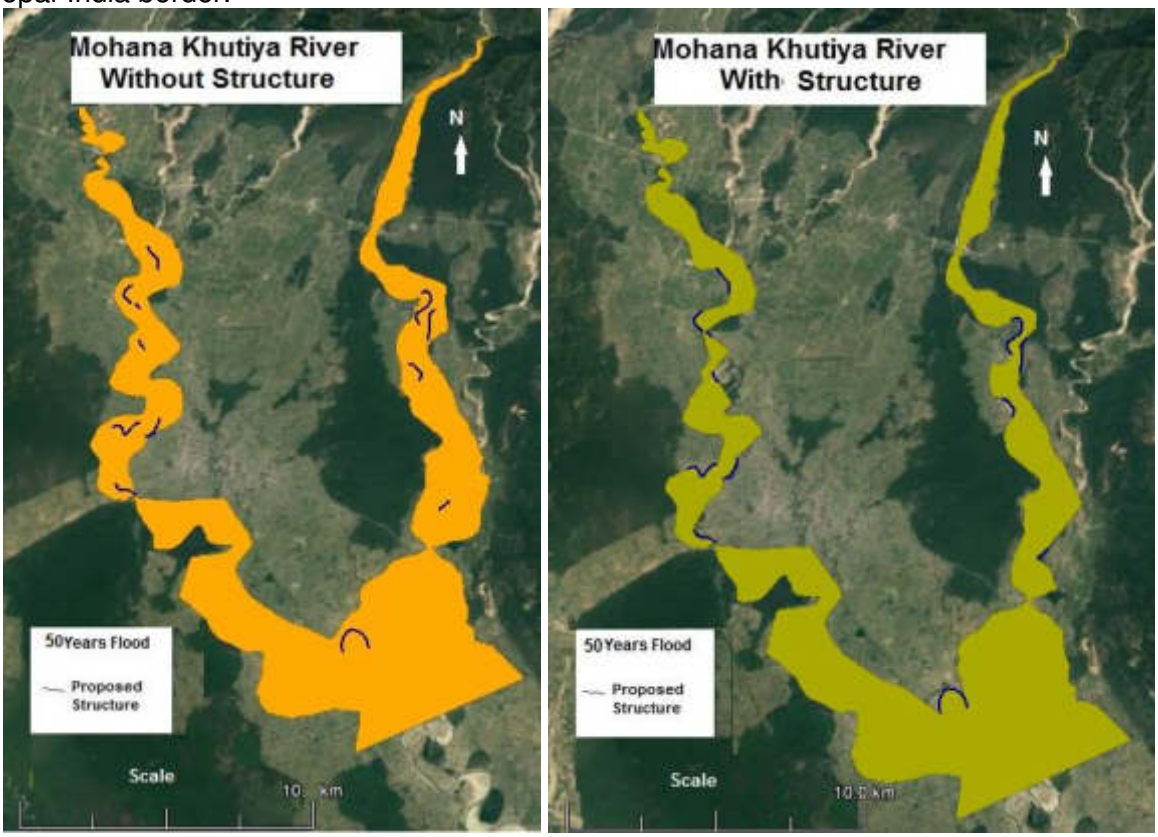


Figure 4-7: Return period of 50 years without (left) and with structures
(Source: WRPPF: Feasibility Study of Mohana–Khutiya basin, August 2018)

6. Air and Noise Quality

49. Dhangadi city which lies in between the Mohana and Khutiya rivers is the provincial headquarter of Sudur Paschhim Province of Nepal. East-West national highway passes from this city and quite a number of heavy trucks and busses emitting black smokes are seen in the highway. There are some brick kiln industries in the area in operation from December / January to June / July which are regarded as one of the main sources of air pollution in the area. Being the commercial centre in the western Nepal, there are few agro-based industries with industrial boilers. There are some stone crushers industries as well. The road network in the city is not good

and resuspension of dust is one of the main sources for Total Suspended Solids in the area. As other urban centres in Nepal, Dhangadi is also polluted with particulate pollutants during the winter and dry months. Government of Nepal has the national ambient air quality standard but monitoring of air quality is only limited in Kathmandu Valley. Khutiya river bed (Figure 4-8) is used as the quarry for stone and sand and is regarded as one of the main source of construction materials in the area. Movement of heavy vehicles will be the source of noise in the area.

Figure 4-8: Khutiya riverbed used as quarry and brick kiln in command area
(Source: Field Survey, July-August 2018)

7. Water Quality

50. There is no water quality analysis report available for both Mohana and Khutiya rivers. During the field survey, which was carried out during the rainy season, the river quality is of high turbidity. It is observed that some domestic wastes are dumped in the riverbanks and also public sewages are drained to these river bodies. Because of this the river quality downstream must be polluted and may be observed during the dry months. There are no industrial units in the area directly discharging their effluents in these river bodies. As mentioned above, Khutiya riverbed is one of source of construction materials (stone, gravel and sand) and during the dry period dredging and movement of trucks can pollute the river quality. The river water quality of both the Mohana and Khutiya rivers upstream to the settlement areas is expected to be very good.

B. Biological Environment

51. There are no protected areas such as national parks, wildlife reserves, hunting reserves, conservation area and their buffer zones in the project site. But there are few community forests in the area, namely, Khutiya Community Forest at Dhangadhi-12, Kalika Community Forest at Dhangadhi-15, Siddhababa Community Forest at Dhangadhi-17, and Khatauti Maya Community Forest at Dhangadhi-17. The priority works are not planned in these communities' forest. Details on biological environment compared with CITES Appendixes, IUCN Red-lists, and protected by Forest Act and National Park and Wildlife Conservation Act of Nepal and Forest Act and National Parks and Wild Life Conservation Act of Nepal protected species are presented in Table 4-1,

52. Table 4-2, Table 4-3,

53. Table 4-4, and Table 4-5 respectively.

Table 4-1: Type of Vegetation in the Area

Local Name	Scientific Name	Family	CITES	IUCN	Forest Act
Aanp	*Mangifera indica*	Anacardiaceae	-	-	-
Bamboo	*Bambusoideae*	Poaceae	-	-	-
Narival	*Cocos nucifera*	Palmae	-	-	-
Dabdabe	*Garuga Pinanata*	Burseraceae	-	-	-
Dhaiyaro	*Woodfordia fruticosa*	Lythraceae	-	-	-
Katahar	*Artocarpus heterophyllus*	Moraceae	-	-	-
Koiralo	*Bauhinia variegata*	Fabaceae	-	-	-
Jamun	*Syzigium cumini*	Myrtaceae	-	-	-
Karma	*Adina cordifolia*	Rubiaceae	-	-	-
Kadam	*Neolamarckia cadamba*	Rubiaceae	-	-	-
Kumbi	*Cochlospermum religiosum*	Bixaceae	-	-	-
Kusum	*Schleichera oleosa*	Sapindaceae	-	-	-
Pipal	*Ficus religiosa*	Moraceae	-	-	-
Sal	*Shorea robusta*	Dipterocarpaceae	-	-	banned for felling, transportation and export for commercial purposes
Saaj	*Terminalia alata*	Combretaceae	-	-	-
Simal	*Bombax ceiba*	Malvaceae	-	-	-
Sissoo	*Dalbergia sissoo*	Fabaceae	-	-	-

Source: Field Survey, 2018

Table 4-2: Commonly found Bird Species in the Area

Name			CITES	IUCN	NPWC Act
Local	English	Scientific			
Bhangera	Sparrow	*Passer domesticus*	-	-	-
Kag	Crow	*Corvus splendens*	-	-	-
Suga	Parrot	*Psittacula kramen*	-	Least Concern (LC)	-
Huchil	eagle-owl	*Bubo bubo*			
Luinche	Jungle Fowl	*Gallus gallus*	-	-	-
Khar Mujur	Bengal Florican	*Eupodotis bengalensis*	I	Endangered (EN)	Protected
Kalo Sarus	Black Stork	*Ciconia nigra*	II	Least Concern (LC)	
Seto Sarus	White Stork	*Ciconia ciconia*	II	-	-
Thulo Dhanesh	Giant Hornbill	*Buceros bicornis*	I		
Dhukur (Dove)	Laughing Dove	*Streptopelia senegalensis*	III	-	-

Name			CITES	IUCN	NPWC Act
Local	English	Scientific			
Bakulla	Cattle egret	*Bubulcus ibis*	III	-	-
Panihans	Pink-headed Duck	Rhodonessa caryophyllacea	I	Critically Endangered (CR)	

Table 4-3: Commonly found mammal species in the Area

Name			CITES*	IUCN	NPWC Act
Local	English	Scientific			
Ratuwa	Barking Deer	*Muntiacus muntjak*	-	-	-
Jungali Bandel	Wild Boar	*Sus scrofa*	-	-	-
Bandar	Monkey	*Macaca Assamensis*			
Hatti	Elephant	*Loxodonta Africana*	I	Endangered (EN)	Protected
Chituwa	Common Leopard	*Panthera Pardus*	I	Lower Risk/Near Threatened (LR/nt)	-
Syal	Indian Fox	*Vulpes bengalensis*	III	-	-
Kharayo	Hare	*Caprolagus hispidus*			
Nyauri Musa	Common Mongoose	*Herpestes edwardsi*	III	-	-
Nil gai	Blue Bull	*Boselaphus tragocamelus*	-	Least concern (LC)	-

Table 4-4: Commonly found Herpetofauna in the Area

Name			CITES	IUCN	NPWC Act
Local	English	Scientific			
Sun Gohoro	Golden monitor lizard	*Varanus flavescens*	I	Indeterminate (I)	Protected
Kachhuwa	Land tortoise	*Testudinidae* species	I	-	-
Goman	Cobra	*Naja naja*	II	-	-
Raj Goman	King Cobra	*Ophiophagus Hannah*	II	-	-
Dhaman	Common Rat Snake	*Ptyas mucosus*	II	-	-

Table 4-5: Commonly found Fishes in the Area

Name		CITES	IUCN	NPWC Act
Local	Scientific			
Tite	*Psilorhynchus pseudecheneis*	-	-	-
Buduna	*Gerra aunandalei*	-	-	-
Pothia	*Pontius sarana*	-	-	-

Source: Field Survey, July–August 2018.

C. Socio-economic Environment

1. Population

54. The proposed project lies in one sub-metropolitan city, and three other municipalities of Kailali and Kanchanpur districts. According to Nepal Population and Housing Census 2011

(updated for new local bodies), total population of the affected ward numbers of these municipalities is 69640 with the average household size of 5.5. The percentage of male population (48.18%) is lower than that of the female population (51.82%). The demographic characteristics of the project district for the affected wards of local bodies are given in Table 4-. As the flood affected area in the Mohana–Khutiya basin considering 1 in 50 years return period, including the impact of climate change, is estimated around 8,376 ha because of this, for the same return period, the flood affected people in the basin is estimated about 57,340 (Pre-feasibility study report). Nearly 82% of the people of these wards of the local bodies are living within the flood affected area.

Table 4-6: Demography of Sub Project Area

S.N.	District	Municipalities (Ward Numbers)	Household No.	Total Population	Male Population	Female Population
1	Kailali	Dhangadi Sub Metropolitan City (3, 10, 12, 13, 15)	7610	40487	19853	20634
2	Kailali	Godawari Municipality (9)	1098	6359	2967	3392
3	Kailali	Gauriganga Municipality (6)	1152	5983	2746	3237
4	Kanchanpur	Krishnapur Municipality (7, 8, 9)	2784	16821	7988	8833
Total			**12664**	**69640**	**33554**	**36086**
Average HH size and Male Female %			**5.5**	**100**	**48.18%**	**51.82%**

2. Indigenous Population, Caste, Dialect and Religion

55. In Kailali district alone, the population of IP (indigenous people) is about 45.27% (Tharu 41.53% and Magar 3.75%) while in Kanchanpur district the IP population is 21.4% (Tharu 20.36%, Raji 0.03% and Raute about 0.01%). Other castes in Kailali are Chhetri (Thakuri) 25.08%, Braman 12.41%, Dalit 11.72%, others 5.52%. In Kanchanpur district, the other castes population are Chhetri (Thakuri) 34.74%, Braman 16.88%, Dalit 14.40%, others 13.46%. In Kailali that Tharu speaking population is 41.10%, Magar 1.41%, Nepali is 27.84, Doteli 18.64%, Aachhami 6.4%, Maithali 0.88% and Bajuri 0.47%. In Kanchanpur district, majority of population 73.81% of people speak Nepali/Doteli, and Tharu dialect speaking population is almost 24%. (*Source: District Profile; District Development Committee, Kailali, 2015).*

3. Educational Facilities

56. According to Census of 2011, the literacy rate of Kanchanpur and Kailali district is 63.7% and 66%, respectively. Kailali and Kanchanpur are the districts with maximum ***educational*** facilities in the State 7 of Nepal. Almost all the municipality and rural municipalities have campus level educational facilities. As per the government plan, in near future there will be a new university in the area which will further enhance the opportunities for higher education in the region. Three types of educational institution-primary education, lower secondary and higher secondary level of educational facilities are also available within the project influence area.

4. Health Care Services

57. All the Municipalities of project area have health care facilities. Dhangadi has a Hospital with modern facilities quite popular in the region. The district Public Health Offices are primarily focused on public health and District Hospitals on curative cure. The major diseases that prevailed in the districts include intestinal worms, headache (migraine), ARI/lower respiratory tract ***infection***, gastritis, presumed non-infectious diarrhoea (persistent), upper respiratory tract infection, amoebic dysentery, tonsillitis, pneumonia and scabies. Movement of WASH is going in the area as a preventive approach for many water, sanitation and hygiene related dieses.

5. Drinking Water

58. Tube-well and tap/piped water is the main source of drinking water. About 70% of the people living in the plain ***area*** along the river has Tube-well and the side area is facilitated by the tap water system. Spout uncovered well/kuwa and covered well/kuwa are also used as sources of water in foothills of Chure areas. Over the years there is the competition amongst the local bodies to declare their local bodies as open defection free area, and because of this initiative, almost all the houses in the area have some sort of toilet facilities.

6. Availability of Human Resources

59. People with skill in construction activities are very few but they can be trained organizing ***short*** term courses like in gabion wire netting. As area is vulnerable for floods and river training works are ongoing in the area, many people have gained skills in such fields. Many women have also gained skills in stone crushing activities.

7. Historical, Cultural, Religious, Aesthetic Sites and Value

60. People of the project area celebrate more than two dozen of festivals. Main festivals are Dashain, Tihar, Maghi, Gaura, Holi, Teej, Aitbari, Shreepanchami, Shree Krishna Janma Astami

(God Krishna's Birthday), Shivaratri (God Shiva's Birthday), Devijat, Jesta Purnima (Full Moon of Raji Caste), Charai (Festival of ***Rana*** Tharu Caste), Dhuriya Pooja, Bhutuwa Pooja, Ran Putla (Brahmin Kshetri), Annantya, Bhuwa (Demonstrating Fighting Skills in War), Pouse 15 Dashi Ram Nawami etc. There are a lot of religious, mythological and historical places in this area. The Ghodaghodi Lake located in near to the site Sukhada VDC which is registered in World Ramsar list. "Goswara Addha" of the Rana period in Godawari-9 Taragadi, Dhangadi. In Godawari there is "Goumukha waterfalls". In the same area there is temple of Godawari and Shiv Ganga, Triveni etc which are of religious importance.

8. Communication Facilities

61. The people of the project districts have access with communication facilities mainly through mobile telephone services provided by both government and private sector. In the project districts, people have access with local and national FM Radio networks *and* local newspaper facilities.

9. Public Institutions

62. Community based organization such as NGOs, and some community run saving and credit groups, farmer's groups, community forestry user group, and cooperatives plays a key role in delivering livelihood enhancement services in the rural area. Membership of these community-based organizations highlights the access of household to such services. Far western region is famous for NGO activities even in the national context. Significant numbers of NGOs are registered and working for the social, environmental and other activities resulting in enhancing public awareness in these fields.

10. Transportation

63. The project sites are accessible through roads linked with the East-West Highway from Dhangadi area. All the proposed sites are well linked with the Roads majority of them earthen / gravelled and few blacktopped. Although all the municipalities and rural municipalities are connected with roads, it is difficult to reach rural areas during rainy season.

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Anticipated Beneficial Impacts

64. The likely beneficial impacts from the construction and operation of the river embankments and FFEWS and the proposed measures to maximize them are presented in the following paragraphs:

1. Socio-Economic Benefits

65. Implementation of the sub-project will result in significant reduction in the loss of human life, damages to houses, loss of agricultural lands and products, loss of livestock, and damages to public facilities. It aims for the protection of riverbank from erosion and thus preventing the loss of land due to riverbank erosion is averted and villages and farmlands will be protected. It will also help to convert the barren land into the arable lands. It will help to make the area attractive for investments and increasing economic activities in the area and creating income generating opportunities as well as stabilizing the livelihoods. This will further add to community development programs under the Peoples Embankment Program initiated in the area by the ministry. The sub-project will result in protecting 808 ha of land directly benefiting 2,869 people or 639 households in a 1 in 50 years return period.

66. The FFEWS, flood shelters, and CBDRM activities are expected to have beneficial impacts of saving lives and properties from water-induced natural disasters. The strengthening of integrated disaster risk management approaches and mainstreaming of CBDRM within the project area will improve the flood risk management capacity of both the institutions involved and the affected communities.

2. Employment and income generation opportunity

67. **Impact.** The construction work will require a large number of skilled, semi-skilled and unskilled workers. Employment generation for the local people will minimize seasonal migration to other parts of the country or in India in search of job. Money due to employment will be injected in the local economy during the construction. The amount that is earned in wages will directly enhance the operation of various economic activities in the villages. *This impact will be direct, of high significance, regional but short-term in nature.*

68. **Benefit Maximization Measure.** Maximize work opportunity to the local people.

3. Increased Business Opportunities

69. **Impact.** The project requires certain quantities of different type of construction materials such as cement, sand, aggregate, boulders, wood, steel reinforcement, electrical fittings, sanitary fittings, paints etc. These materials shall be brought from the local or regional markets. The worker shall also buy their daily consumable goods from the local grocery and may take meal and snacks. Thus, the local businessman and suppliers shall be benefited from implementation of the project. *The magnitude of the impact shall be medium, local, short term and of high significance.*

70. **Benefit Maximization Measure.** The benefit maximization measure shall be (i) recommend the contractor to employ local people by giving emphasis on women and vulnerable groups; (ii) ensure equal wages to male and female; (iii) promote use of local products and facilities, particularly consumables items.

4. Skills Enhancement

71. **Impact.** Employment in the construction work is likely to enhance skills of the workers, and large number of local semi-skilled and unskilled workers will get practical hands-on training. This will enhance their technical skills in various areas of construction industry which could get them good job in future. They will also be trained for future repair and maintenance of the embankments and shelters. *This impact is indirect, of high significance, regional and long-term in nature.*

72. **Benefit augmentation measures.** The benefit augmentation measures will be (i) workers will be encouraged to develop skill while working with international contractors through hands-on-training; (ii) EA may organize certified skill development training for workers, increasing opportunity to get employment in semi or skilled job earning higher wage in future; (iii) Project may prepare manual in Nepali with illustrative steps on construction procedure of embankments, bioengineering, filling boulders in gabion boxes and quality control.

5. Appreciation of Land Value

73. The land value will increase significantly after permanent protection from flood. *The impact is indirect, medium, local and long term in nature*.

74. **Benefit augmentation measures.** Encourage local government in planned development.

B. Anticipated Adverse Environmental Impacts

1. Pre-construction phase Impacts and Mitigation Measures

75. **Impact**. Minor land acquisition in the subproject throughout construction is anticipated. Embankment construction is estimated to take up to two years working mainly in the dry seasons, based on using mainly manual labour. At a minimum, temporary land use will be required for storing construction materials and equipment during the construction period. At a *maximum*, permanent land acquisition will be for a swath of land that runs parallel to the riverbanks. This swath of land will be the width of the embankment times the total length of the subproject embankments (10.280 km, total from 12 structure locations). Using an indicative width of 17 m and the length of 10.28 km, the maximum permanent land loss will be no more than than to 17.5 hectares). Within the maximum loss scenario, there can be land that is owned by the state or land that private land owners already leave unused to act as a buffer to protect against erosion and loss of crops such that the direct impacts related to the 17.5 ha will have effect for people. As per the social due diligence reports, only 5.13 ha of land belonging to 22 displaced people (DPs) is identified and the rest of the land ownership is not claimed which is the barren land (bagar). There will be no houses or other structures that need to be removed for the prioritized flood protection works. *It is a long-term localized but high magnitude impact*.

76. The activities that will be involved in this stage will be the identification of location and design of the FFEWS and flood shelters, desktop review of documents, plan, maps, and other relevant documents, site selection, surveys, and consultations. The environmental screening criteria for these components have been identified. The design of the shelter will match with local architecture. These activities will have minimal physical disturbances to the environment.

77. **Mitigation Measures.** Department of Water Resources and Irrigation is promoting Peoples Embankment Program to rehabilitate the degraded land (flood plain or bagar) near riverbanks as well as protect the land from flooding and erosion in the future. As per this, in similar projects already implemented by the program, people had provided voluntarily their land for constructing the flood protection structures like embankments and revetments. In this basin also the People's Embankment Program (Kanchanpur Field Office) organized a consultation meeting on 4 to 5 January 2019 with affected people and local elected representative for their willingness to participate in the project implementation. People requested to start the works immediately but did not mention any thing about voluntary contribution of land. Further consultations were held during March to November 2019 and social due diligence reports prepared for each subproject. The reports find 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 private landowners were found eligible to voluntarily donate land to the project; and Memorandums of Understanding (MoU) for land use were signed by landowners and third party witnessed during the screening exercise. The safeguard screening exercise found 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. The due diligence reports and memorandums of understanding will be verified by the project implementation consultants prior to start of construction.

2. Construction Phase Impacts and Mitigation Measure

78. Activities in this phase will involve the recruitment of workers and staff, mobilization of contractors, equipment and machineries, site preparation, delivery and storage of construction materials; civil, mechanical, and electrical works; landscaping and clean-up of construction debris. Installation of FFEWS will not require heavy equipment and machineries. The construction of five flood shelters will require small-scale construction works. Locally available construction materials and resources will be used.

a. Physical Environment

i. Field Mobilization Preparations

79. Prior to construction works, the PMU in MEWRI and the PIU in DWRI and DHM will ensure that the Contractor will include the responsibility of compensating for any temporary damage, loss or inconvenience as a result of accident or failure to comply with regulations while doing the required work. The Contractor will be required to conduct baseline environmental quality measurements for air, noise, and source of drinking water to be provided to construction workers before the start of construction. Relevant environmental codes of practice are given in Annex IIV 1 while Annex IX presents the standard construction contract environmental safeguard clauses.

80. **Recruitment of workers**. Although construction works can be considered small-scale, there will be potential job opportunities for both skilled and unskilled workers during the construction phase. However, these job opportunities may result to conflict over lack of transparency in hiring and local information about recruitment. Local hiring for non-skilled jobs will be given priority as well as available qualified skilled jobs. The Contractor will be required to comply with the relevant provisions set forth in the Labour Act 2017, and Child Labour Prohibition and Regulation Act 2001 on recruitment and working conditions.

81. The Contractor will be required to ensure that their workers will strictly observe the local rules and regulations, cultural practices and social norms within the sub project area including occupational health and safety (OHS) rules that will be imposed on them by the Contractor.

82. **Construction material**. Attention will be given to select construction material those are locally available, and match with local architecture.

83. **Orientation to staff and workers**. Prior to any construction works, the PIU and PMU together with the environment specialist in PIC will conduct an orientation to the workers and staff of Contractor on OHS, and environmental requirements of Nepal and ADB. The objectives of the contractors and workers' orientation are to create awareness on their obligation to comply with the EMP, effective record keeping, and environmental reporting. The briefing will include emergency procedures, awareness on communicable diseases like tuberculosis and about HIV/AIDS to prevent potential incidence in the workplace. Workers will be informed of the penalty if caught buying wildlife from poaching or if caught poaching wildlife themselves during non-working hours in these national parks.

84. **Emergency response**. A staff will be designated by the Contractor as Safeguards and Safety Superintendent to guide their Safety Stewards and workers in case of an emergency. The Contractor will organize routine mock emergency drills and daily toolbox talk for staff and workers.

85. **Site preparation and construction works for flood shelters and FFEWS**. Prior to any site preparation, relevant government agencies will be coordinated by the Contractor to check connections of utilities such as water pipes, sewers, telecommunications, electricity, and other services that may be affected.

86. Annex VII provides measures in case the FFEWS location has physical cultural resource.[4]

ii. Permanent and Temporary Land Use Changes

87. **Impact.** Land of project site, which is now flooded or have some embankment structure, will be occupied with permanent structures (embankment, flood shelters) and other temporary construction activities and stockpiling of construction materials. Although, some sort of river training structure or flood plan was already there, minimal change in the existing pattern of land use is expected. *The magnitude of the impact shall be direct, low, site specific, long term and significance is predicted to be low.*

88. **Mitigation Measures.** Mitigation measures will be (i) Do not dump spoil on surrounding agriculture land or open area; (ii) Landscape the quarry and construction area; (iii) plant trees in open areas and bioengineering in the embankments.

iii. Impact on Soil and Conservation of Topsoil

89. **Impact.** Spoil will be generated from construction work. Fertile topsoil may become lost if not properly collected, stored and reused. *The impact will be direct, of medium significance, site specific and long-term.*

[4] PCR as defined in SPS 2009 are movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings and may be above or below ground or under water. Their cultural interest may be at the local, provincial, national, or international level.

90. **Mitigation Measures.** (i) The topsoil from the areas of cutting and areas to be permanently covered will be stripped to a specified depth and stored in stockpile storage area located away from water course and drainage areas. The stockpile will be designed such that the slope does not exceed 1:2 (vertical to horizontal), and the height of the pile is to be restricted to 2m. Stockpiles will not be surcharged or otherwise loaded and multiple handling will be kept to a minimum to ensure that no compaction will occur. The stockpiles will be covered with gunny bags or tarpaulin. Such stockpiled topsoil will be returned to cover the disturbed area; (ii) Leakage of fuel, lubricants and chemicals on soil will be avoided by storing them on impervious surface with proper peripheral drainage; (iii) Grit chamber and oil sump will be provided in the chemical storage area to collect and remove waste material and oil before discharging water into natural drainages. The existing retention pond could also be utilized for sediment control; (iv) Spoil generated during construction will be used in reclaiming low lying areas.

iv. Impact on Water Quality

91. **Impact.** There will be construction activities and movement and operation of heavy construction machineries in the water bodies resulting in high turbidity of river quality. High turbidity significantly affects the microbiological quality of drinking water. Risk of leakage of petroleum products into water bodies can contaminate the river water. Also, during the construction period along the riverbanks, increased turbidity in the streams as well as contamination with toxic substances due to leakages from poorly maintained machineries and equipment may occur. Poor storage of petroleum and chemicals during the construction can lead to ground water contamination which is the main source of drinking water in the area. River water is also used for livestock, children often swim in such rivers, and local people also use the water for washing. Contamination of water will have adverse impacts on people and livestock using the water. *It is short-term, localized and low magnitude impact.*

92. **Mitigation measures.** While constructing the flood protection structures along the riverbanks, use coffer dams to ensure that no construction activity takes place on water bodies. Schedule the construction activities during the months when the flow in the river is low. Use sedimentation fence or coffer dam to prevent sediments reaching river. Ensure that vehicles are not washed in the river and drainage is provided around material storage area to ensure no leakage of chemicals and petroleum products finds way to water bodies. Provide temporary and prefabricated mobile toilet to workers at work sites and proper toilet with septic tank at contractor's and labor camp to avoid polluting the surface and groundwater. Measure water quality prior to start of work and bi-annually at work sites as approved by the Engineer.

v. Impact on Air Quality

93. **Impact.** Construction activities and movement of heavy equipment and trucks in the unpaved rural roads will generate significant amount of dust/particulate emissions in the roadside for short duration of time. Dusts/particulate emissions will also result in the construction site. Further, the winds on site could lead to dust/particulate emissions if the construction materials and spoils are not properly stored and contained. High concentration of particulates will directly impact the health of the people living nearby to the dusty roads and construction sites causing respiratory diseases, eye irritation, and throat irritation. High level of particulates/dust will corrode metals and masonry, soil structures and motor vehicles; incurs huge costs for cleaning of clothes, windows, floors, repainting, etc.; create pressure on other resources like water and soaps for cleaning; and dust the leaf surfaces of crops, trees and shrubs, which may injure or inhibit the growth of these valuable plants. Heavy equipment and trucks and vehicles will also emit some toxic gaseous pollutants like CO (carbon monoxide), oxides of nitrogen, oxides of sulphur, and

very fine particles like PM2.5 of great health concern. As Khutiya riverbed will be the main source for raw materials, the movement of trucks will be limited in the area. However, the needed materials for structures along Mohana river will be taken from Khutiya riverbed, the movement of trucks in the cities will add dust and smokes in urban areas also. Slight increase in the sources of particulates will add air pollution problem during the construction period of nearly six months to 12 months in two years (dry period only). *It is short-term, localized and low magnitude impact.*

94. **Mitigation Measures.** Following are the mitigation measures recommended for the prevention and control of Particulate Pollution during the construction phase of the project:

(i) Measure water quality prior to start of work and bi-annually at work sites near sensitive receptors and as approved by the Engineer.
(ii) Use of Water Sprays. Regularly spray the water on the construction site and also on dusty village roads to minimize the impact on workforce and local communities living in the area;
(iii) Limit the truck and other vehicle speed below 20 km/hour to minimize the resuspension of dust in the unpaved road. Speed bumps are commonly used to ensure speed reduction;
(iv) Care will be taken to keep all material storages (spoil, aggregates, sands, etc) adequately covered and contained to prevent the emission of dusts due to winds on site. Also, loose materials or other construction materials transported to construction sites will be sprayed with water or covered properly;
(v) Allocate space at the construction site for the required materials to reduce delivery of construction materials and minimize vehicular emissions;
(vi) Ensure that the heavy machineries and construction equipment comply with the national standard and fully maintained as per the manufacturer's specifications;
(vii) Stone crushers who supply the material, must comply with the guideline for dust emission control; and
(viii) Burning of garbage, liquid waste and other combustible materials within the construction site will not be allowed.

vi. Impact on Noise Quality

95. **Impact.** The PIU will ensure that ambient air quality limits set by the IFC-WB EHS General Guidelines 2007 and Nepal will not be exceeded during construction phase. The ambient air quality standards of Nepal are less stringent compared to the IFC-WB EHS General Guidelines 2007. The SPS 2009 requires that should host country regulations differ from the levels and measures set by the IFC-WB EHS General Guidelines 2007, the host country will achieve whichever is more stringent. In this case, the IFC-WB EHS General Guidelines 2007 will be the relevant limits that the Contractor needs to comply.

96. The main noise generating activities during the construction phase movement of trucks and heavy equipment, and operation of heavy machineries and construction activities. Nepal has set the national ambient noise quality standard and these activities; the noise level will be much higher than the current background level and will go above the prescribed national standards for the daytime. If the heavy machineries and trucks move during the night-time, it's impact will be much higher. It is a short term localized and moderate magnitude impact. *It is a short term localized and low magnitude impact*.

97. **Mitigation Measures.** Ensure that all equipment and vehicles are maintained as per the manufacture's requirement and fitted with mufflers. Make mandatory to use the earmuffs to workers working in high decibel equipment and nearby. Make aware the drivers that they do not

use pressure horn. Do not schedule the works during the night time that generates noise and disturb the people living in the area. Schedule high-level noise generating activities during daytime only (but will be adjusted contingent to weather and season). Drivers of construction vehicles will be required to observe low speed and blowing of horns or whistle will be prohibited unless absolutely necessary. Require regular tune-up of construction vehicles and proper maintenance of machinery. Mark the sensitive areas (like school, health post, etc.) as no horn areas. Schedule of operation of heavy machineries near sensitive receptors will be planned in consultation with the affected party. Measure noise prior to start of work and bi-annually at work sites near sensitive receptors and as approved by the Engineer.

vii. Impact due to Waste Generation and Stockpiling of Construction Material

98. **Impact.** During the construction period, waste is generated in the administration/residential buildings and labour camps, in the form of food leftovers, vegetable peels, plastic, house sweepings, clothes, ash, waste paper, cardboard, plastic, used batteries, bulbs, tube lights etc., and which are classified as domestic waste. Most portion of this type of wastes if followed the proper segregation and good management practices can be reused/recycled and small portion only need for disposal. Also, in the construction sites defecation in the area can pollute the water bodies and also make the area polluted with bad smells. The impact can be adverse in case of haphazard dumping in the public area and riverbanks. Otherwise it can easily be mitigated with simply following the good management practices. *It is site specific, short-term and low magnitude impact*.

99. **Mitigation Measures.** Following mitigation measures will be adopted (i) Haphazard disposal of construction materials will be strictly prohibited; (ii) Reuse the spoil and other materials. Maintain proper material storage system and ensure to control littering of construction materials outside the designated places; (iii) Stockpiling site of construction materials will be designated at demarcated place; (iv) Provide solid waste container inside the construction site; (v) Ensure that the labour camps have proper facilities for waste segregation and even for composting of the biodegradable waste (vi) Give health, hygiene and sanitation training to workers; (vii) provide temporary prefabricated mobile toilets in the construction sites; (viii) Separate provision for collection and disposal of hazardous waste, if any, as prescribed by government rule and regulations.

viii. Emission of Green House Gases

100. **Impact.** During the construction period, use of heavy construction equipment and transport of construction materials at the site, fuelwood and LPG used in the construction camps, and vehicles used for project services are the source that will emit greenhouse gases. It is estimated that around 273,000 litres of diesel will be used by machineries and vehicles resulting in the emission of 720 tons of Carbon Dioxide, a GHG, during the construction period. *The impact is expected to be negligible with respect to national or global emissions.*

101. **Mitigation Measures.** The mitigation measures recommended in the impact on air pollution regarding the heavy construction equipment and transport vehicles, like maintenance as per the manufacturers' specification will reduce the volume of burning of fuel quantity as well as GHG emissions. Vegetation along the embankments (towards the agriculture and other land) can add to the protection as well as offset the GHG emissions due to burning of fuelwood and other fuel.

ix. Closure of Construction Camps

102. **Impact.** The contractor is required to properly remove all temporary structures built for operation of construction and workers camps. While doing so, the land will be brought back to original state. *The impact is predicted to be direct, of low significance, confined to construction area, and long-term.*

103. **Mitigation Measures.** (i) Contractor will prepare site restoration plans for approval by the Engineer. The plan will be implemented by the contractor prior to demobilization; (ii) On completion of the works, all temporary structures will be cleared away, all rubbish burnt, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the contractor's expense, to the entire satisfaction of the Engineer; (iii) Residual topsoil will be distributed on spoil disposal area, barren areas as identified by the Engineer in a layer of thickness of 75mm–150mm with proper turf and vegetation.

x. Quarry Operation

104. In the event the Contractor will operate a quarry to meet the requirements of the construction works, the required permits from concerned government agency will be obtained prior to start of operation. The Contractor will assure PMU/PIU that the quarry to be used is maintained in a stable condition, appropriately and adequately landscaped, and when taken from the river, it will not affect the river flow or damage the riverbanks. The warehouse for construction materials, if needed will be temporarily and properly enclosed with designated security personnel to prevent entry of unauthorized persons. The quarry will be properly closed, landscaped and vegetated with drainage facility. The trench excavated in the rivers for material extraction shall be controlled, of dimension and location as approved by Engineer. All measures to avoid river sedimentation shall be adopted by using coffer dam.

b. Biological Environment

i. Impact on Vegetation

105. **Impact.** There is vegetation along the riverbanks in some stretches either privately grown or community grown. As the vegetation along the banks are protecting the land erosions, the prioritized locations for embankments and revetments are not included in such areas. Because of this, the project will have no or minimal impact on the vegetation and biodiversity in the area. Project will have no impact on the protected areas and buffer zones as project activities will not be within the areas. Some of the protected species or endangered/threatened species generally roam around the surrounding of the project area, but project activities will not disturb any habitat or movement corridors of such species in the area and because of this there will be no impact on any protected species or other biodiversity. *It is identified as negligible impact in the subproject*.

Figure V-1: Vegetation along the riverbanks (Field Survey, July–August 2018)

106. **Mitigation measures.** Bioengineering is an important scope of the subproject. Hence, the project will be establishing a nursery or making arrangement with private nursery to supply different vegetations and plants required for bioengineering of the embankments. Hence, the implementing agency will make arrangement with the nursery to produce saplings of various tree species (fruit, fodder, timber or aesthetic) identified in consultation with local community and district forest office. The saplings shall be used as compensatory plantation at a ratio of 1:1 for cutting of any private trees. In addition, the community will be encouraged to scale-up plantation for greenery as well as protection from soil erosion. The workers will be instructed not to harm, disturb or kill any wildlife, birds and do fishing in waterbodies. A record of wildlife sighting shall be kept. Any purchase of wildlife parts or cutting of trees and use of fuelwood for cooking and heating will be strictly restricted.

Table V-1: Government Restrictions on the Harvest and Sale of Plant and Tree Species

Government restrictions	Medicinal and aromatic plants and tree species
Banned for collection, use, sale, distribution, transportation, and export	Kutki (*Picrorhiza scrophulariiflora*), Okhar bark (*Juglans regia*), and Panch Oule (*Dactylorhiza hatagirea*)
Banned for export outside the country without processing	Jatamansi (*Nardstachys grandiflora*), Jhyau (*Lichean spp.*), Loth salla (*Taxus spp.*), Sarpagandha (*Rauwolfia serpentine*), Shilajeet (*Rock exudat*), Sugandhawala (*Valeriana wallichii*), Talispatra (*Abies spectabilis*), and Yarsagumba (*Cordyceps sinensis*)
Banned for felling, transportation, or export for business purpose (tree species)	Chanp (*Michelia champaka m. kisopa*), Bijayasal (*Pterocarpus marsupium*), Khayar (*Acacia catechu*), Okhar (*Juglans regia*) in National Forests only, Sal (*Shorea robusta*), Satisal (*Dalbergia latifolia*), and Simal (*Bombax ceiba*)

Source: Government of Nepal, Ministry of Forest and Soil Conservation. 2001. Nepal Rajpatra. 51 (36). Kathmandu.

ii. Impact on Wildlife

107. **Impact.** Project will have no impact on the protected areas and buffer zones as project activities will outside of such areas. Some of the common and protected wildlife or endangered/threatened species may pass from surrounding subproject area. However, project activities will not disturb any habitat or movement corridors of such species in the area. Because of this there will be no impact on protected species or wildlife. *It is identified as negligible impact in the subproject*.

108. **Mitigation measures.** The workers will be instructed not to harm, disturb or kill any wildlife, birds and do not resort to fishing, particularly using destructive methods in the river. A record of wildlife sighting shall be kept. Any purchase of wildlife parts for eating or as a souvenir will be restricted.

iii. Impact on Aquatic Life

109. **Impact.** Mohana river has some fish species and during the construction period with influx of people from outside, there is the possibility of illegal fishing like use of electric wires, use of gelatine with detonator, which can result in loss of small fishes as well. High turbidity water during construction at waterbodies may also have impact on reduced oxygen and aquatic resources supportive to fishes for a short time. The Dolphins occasionally seen in the rivers will not be directly or indirectly affected by the implementation of the sub-project. *Hence, the impact is predicted to be local, short-term and of low magnitude.*

110. **Mitigation measures.** In order to prevent the illegal fishing in the river bodies, all the persons employed during the construction phase must be made aware that the use of destructive fishing is illegal and can invite legal action. Further use of coffer dams to avoid works in river will reduce the problem of turbidity that may impact fish. Workers will be strictly restricted in harassing or disturbing any possible Dolphin sighting.

iv. Impact on Occupational Health and Safety of Workers and Community

111. **Impact.** During the construction, workforce will be exposed to high level of particulate or dust particles and noise pollution, risk of injury in the operation of heavy equipment, chances of accidents, poor quality of drinking water, and inadequate facilities are the main concerns for the occupational health and safety of workforces. Dusts and noise generated will also directly impact the health of people living in the surroundings of the project construction sites. It will also risk the people from accidents due to resuspension of dusts in the road resulting in poor visibility. *It is local, short term but high magnitude impact.*

112. **Mitigation measures.** Compliance to mitigation measures on air and noise quality as well as proper traffic management in the area will minimize the impacts on community health and safety as well as occupational health and safety. Further, ensure strict measures to prevent fires particularly in areas of storage of petroleum products and chemicals. OHS related guidelines of Ministry of Labour need to be complied with for the safety and health of workers and communities. In addition to these, follow the IFC Guideline on Environment, Health and Safety for the best practices in construction activities. The labor camps will be of modular structure or proper canvass tents on impervious floor, as approved by the Engineer. No camps made of CGI sheet will be accepted unless it is colored new GI sheets fixed on iron frame manufactured for the purpose of establishing camps. The camp area will be fenced, and rooms have proper window for ventilation, fan, lighting, and separate kitchen and toilets constructed using similar material. The camp area

will be paved with removable concrete blocks or bricks, and have drinking water supply, drainage and solid waste management system. Mosquito net will be provided, and routine anti-bacterial spraying will be done in the area. The work and camp area will be kept clean without water pools for controlling vector proliferation.

113. The Contractor will be required to implement the following measures to prevent occupational and community health and safety risks:

(i) Occupational health and safety risks

- Routine health check-up of workers before recruitment and every month;
- Provide workers with appropriate safety gear such as hard hats, safety belts, and earmuffs/plugs, etc., and orient workers on safe building construction practices and other issues on safety;
- Mandatory wearing of safety gears and the statutory age requirements for employment as provided for the Labour Act 2017, and Child Labour Prohibition and Regulation Act 2001 will be strictly enforced;
- Provide sanitary facilities and safe drinking water to workers;
- Appropriate scaffoldings, clear and visible warning signs and lighting will be installed;
- Establish a medical bay at contractor's camp with sick bed and required medicine served a full time assistant health worker;
- First aid kits will be made available at the construction sites including fire-fighting equipment will be provided onsite; and
- Prior to start of work daily, toolbox meetings that last for a few minutes, will be held to remind workers on the importance of compliance to safety rules and procedures.

(ii) Community safety risks

- Conduct awareness on safety to nearby settlements before the start of construction works,
- Inform the PIU and/or PMU and nearby settlements (if needed) on the schedule of construction activities that may pose risks to public safety;
- Install proper fencing and enclosure (at least 2 m-high) at the construction site to prevent unauthorized access;
- Assign and/or post security personnel at the construction site to discourage theft and unauthorized access;
- Provide clear and visible warning and danger signs at and around the construction site; and
- Provide temporary crosswalks (if needed) and assign worker to direct traffic and pedestrians accommodating pregnant women, elderly, children, and persons with disability.

c. Handling of Construction Material and Safety of Workers

114. **Impact.** Handling of construction materials, particularly chemicals will always possess risk to the workers handling them. Any leakage or spillage may enter soil and water body, thus contaminating water and damaging productivity of soil. *The impact on water quality is predicted to be direct, of low significance, confined to construction area, and short-term.*

115. **Mitigation Measures.** (i) All workers employed on mixing cement, concrete etc., will be provided with protective footwear and protective goggles. Workers, who are engaged in welding works, would be provided with welder's protective eye-shields; (ii) Workers engaged in stone breaking activities will be provided with protective goggles and clothing and will be seated at sufficiently safe intervals; (iii) The use of any toxic chemical will be strictly in accordance with the manufacturer's instructions; (iv) A register of all toxic chemicals delivered to the site will be kept and maintained up to date by the Contractor. The register will include the trade name, physical properties and characteristics, chemical ingredients, health and safety hazard information, safe handling and storage procedures, and emergency procedures for the product.

d. Damage to Community Property and Crops

116. **Impact.** Movement of heavy equipment and trucks in the village roads, construction of coffer dam, deposition of construction material or establishing camps might damage the land and crops.

117. **Mitigation measures.** The contractor will be responsible to compensate losses to the concerned landowner and keep the roads in a good pliable condition. There will be a special clause in the bid document for making contractor responsible for compensating such damages upon signing written agreement with the landowner. A copy of the agreement will be submitted to employer before starting work in or use the area. A grievance redress mechanism (GRM) will be established and all stakeholders shall be made aware of it. *It is a site-specific, short-term low magnitude impact.*

e. Socially Undesirable Activities

118. **Impact.** The workers may use alcohol and other forms of intoxication, gambling, quarrel with locals, disrespect local culture and religion, and may promote socially undesirable activities in and around the project area. *The impact is predicted to be direct, of medium significance, local, and short-term.*

119. **Mitigation Measures.** (i) Restrict movement of workers out of camp after certain hours in the night; (ii) restrict use of alcohol and gambling in the camp; (iii) supply water supply, daily consumable items, communication facility in the camp so as not to create additional pressure on the local services; (iv) orient workers to show respect to local tradition and culture; (v) prepare a code of conduct for all project staff, orient them and monitor that these are effectively followed by all; (vi) assign a public relation officer by the project to keep close and regular consultation and coordination with local communities; (vii) regular follow up and monitoring on workers behaviour and take appropriate measure on rule violators.

f. Employment and Business Opportunities

120. **Impact.** As the technology selected is based on the available local materials and the local people can be trained for semi-skilled jobs like wire netting, stone filling, construction of embankments, revetments, it will create some job opportunities for local people during the construction period. It can also create some business opportunities to local transport service providers.

121. **Mitigation measures.** Contractor will give preference to recruit local workers in the subproject work. This will give them skill development training by doing the work, and also inject economy through earnings from the work.

g. Child Labor and Gender Equality

122. **Impact.** Gender discrimination may occur as the contractor may not be sensitive towards gender equity. For sake of low wage, contractors may use women and sometimes child as labor. Construction area may not be gender friendly with required facilities. *The impact is predicted to be direct, of high significance, local, and short-term.*

123. **Mitigation Measures.** The Project will ensure to (i) provide equal wage to male and female for similar nature of work; (ii) restrict use of child below 16 years of age in labor work (or as per government and ILO standard); (iii) provide *female* friendly construction environment with separate cabins and toilet for women in the camp, and if possible, child care facility for women with young babies. Prepare suitable work categorization for women.

h. Infection of STDs and Other Communicable Diseases

124. **Impact.** Workers with increased income may get indulged in unsocial activities such as prostitution and unsafe sex, which may not be socially acceptable and harmful to local people and vice versa. Such undesirable activities may lead to possibilities of transmission of infectious diseases like STDs and HIV/AIDS. *The impact is predicted to be indirect, of high significance, local, and long-term.*

125. **Mitigation Measures.** (i) restrict alcohol, gambling and socially undesirable activities by workers living in labor camps, and instruct them not to indulge in such activities if they are living outside of labor camp; (ii) arrange awareness program to the workers and local communities on HIV/AIDS and STDs; (iii) erect posters on safety practices to prevent from STDs; (iv) distribute free contraceptives to workers as a part of educating them.

3. Operation Phase Impacts

a. Disturbances to Natural Drainage System and mitigation

126. **Impact.** While constructing the embankments and also the revetments, there is the possibility that the natural drainage system will be blocked which can even result in the damage to the structures. There are one or two such drainage that might be blocked. Construction of discharge sluices including valves or gates can mitigate this problem.

127. **Mitigation measures.** Making of the Discharge Sluice including valve or gates can mitigate this problem. Also include outlets provision to provide water for livestock. Flood shelters will have good drainage arrangement to quickly drain flood water and household discharge from the people taking shelter

b. Impact of Climate Change

128. The above-mentioned projected change in the temperature and the precipitation in Nepal that will have impacts in the country as well as in the sub-project area are:

(i) Floods and landslides are triggered by rapid snow and ice melt in the mountains as well as extreme, torrential rainfall episodes in the foothills during the monsoon season (June–September). Available research suggests that a significant increase in heavy rainfall events in future will result in an increased flood risk to society, physical infrastructure, and water quality. Increases in the frequency and severity

of floods and droughts are projected to have an adverse effect on sustainable development;

(ii) When monsoon rainfalls fall below normal, the following months of drier conditions will reduce rice cultivation in the project area;

(iii) Floods and droughts have the potential to reduce yields or destroy crops altogether. In some cases, these impacts are immediate, but they can also wreak havoc on the longer term by increasing topsoil erosion. This, in turn, aggravates issues of food security, including malnutrition, which increases people's vulnerability;

(iv) According to the UN's 2007 Common Country Assessment for Nepal, epidemics such as cholera and diarrhoea (diseases manifested from poor water quality) take the largest human toll in Nepal every year. These are compounded by a lack of health facilities and medicine, widespread poverty, and a common lack of hygiene awareness; and

(v) A warming climate will generally enhance the hydrological cycle resulting in higher rates of evaporation and a greater proportion of liquid precipitation (more rain and less snow). The potential changes in precipitation (amount and seasonality) will affect soil moisture, groundwater reserves, and the frequency of flood and drought episodes.

4. Climate Change Adaptation and Mitigation Measures

129. Nepal as a least developed country party to UNFCCC had prepared the NAPA (National Adaptation Plan of Action) in 2010 and is currently in the process of preparing the latest National Adaptation Plan (NAP) through nationally driven consultation process. Nepal, in its Nationally Determined Contribution (NDC) submitted to UNFCCC during the Paris Convention of UNFCCC has provided maximum priority for Adaptation measures and expects financial supports for the implementation of NAP through GCF (Green Climate Fund).

130. Nepal has made very good initiation in developing the LAPA (Local Adaptation Plan of Action) and many districts are participating in this program. Kailali and Kanchanpur districts also need to develop their own LAPA and be part of the national efforts in addressing the impacts of climate change. This priority flood protection structures planned in this sub-project consider the floods in 1 in every 50 years plus climate change scenario of RCP4.5. This sub-component will also establish the Early Warning System in the basin and will help communities to prepare for adaptation to the impact of climate change through trainings as part of the Community Based Disaster Risk Management activities of the sub-project.

131. The planned works are only the prioritized works within the allocated budget. Communities, local governments and the district offices of DWRI wants more protection activities along the banks of both the river, therefore it is recommended to explore funding from GCF and other climate related funds for having more flood protection structures in the basin with people's participation.

5. The Coronavirus Disease (COVID-19) Situation in the Project Area and Recommended Measures

132. The COVID-19 infection rate in Nepal is rapidly increasing. As of 4 June 2020, a total of 2,634 people were found to be infected, 290 have recovered, 10 died, and 2,334 are in isolation. As a precautionary measure to COVID-19, the Government of Nepal enforced lockdown starting from 24 March 2020. All Terai districts along the Indian border are sealed and movement across

the country and within districts has been prohibited. There are 9 districts in Terai region where the activities under Priority River Basins Flood Risks Management Project (PRBFRMP) is planned to be implemented. Following is a brief on the status of COVID-19 in the concerned districts.

a. Mohana–Khutiya Basin Sub-Project, Kailali and Kanchanpur Districts

133. There were 40 people infected in Kailali district. Out of these, 4 persons have recovered and 36 are under treatment in isolation. On the other hand, 10 people were infected in Kanchapur district, out of which 1 has recovered and 9 are under treatment in isolation. The district borders with Uttar Pradesh state of India.

134. On 2 April 2020, the Government issued specific circulars and guidelines about resuming work in on-going contracts and starting work in new projects following the prescribed protocol. Taking into account the prevailing pandemic situation and the guidance issued by Government of Nepal, the contractor will prepare Site-specific EMP (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 executing agency 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 proposed plan will be costed, and a robust monitoring and reporting mechanism will be detailed out to ensure full compliance with the plan.

135. The OHS plan and SOP, as a minimum, may look at the aspects of (i) record keeping and health screening of workers, and the note all required details for contact tracing in case needed, (ii) disinfecting/cleaning offices, yards, stores and labor camps, (iii) daily temperature checks and other health checks of staff and workers on site, (iv) social distancing measures in work areas and labor camps, (v) mandatory use of personal protective equipment including facemasks and gloves, (vi) provision of handwashing stations with soap and supply hand sanitizer at camps, kitchen, dining and work areas, (vii) keep a medical bay serviced by a fulltime assistant health worker oriented by an expert on communicable disease, (viii) information and education campaign for workers (and as required communities); and (ix) procedures to be adopted in the event any worker has COVID-19 symptoms. The executing agency will nominate a senior government officer in the project management office as a Nodal Officer to facilitate full compliance with the SEMP with OHS plan and SOP in overall project, a nodal staff in field office to monitor subproject level SEMP with OHS and SOP, and contractors will designate OHS supervisor and safety stewards for each contract package. The local communities will be regularly informed about the workplan and precautions the project has taken to mitigate the health and safety risks.

136. The proposed SEMP with OHS plan and SOP will be a dynamic document and will be updated as and when new government circular and guidelines are issued, and the best practices are advised time to time by the authorized agencies like WHO, ILO, IFC, World Bank and ADB.

VI. ANALYSIS OF ALTERNATIVES

137. The Sub-Project alternatives including the alternatives for “No Project” option and alternatives to project location, technology, and alternative to project scheduling are briefly discussed here.

A. No Project Alternative

138. Nepal is considered one of the most disaster-prone countries in the world. Alongside other natural hazards, such as earthquakes and landslides, flooding poses a recurrent risk to large sections of the population. Flooding has a particular impact on communities residing in the Terai region. The floods in the Terai region damage farmland and crops and kill livestock, which is of critical importance to affecting lives, livelihoods and property of poor communities as well as important infrastructure such as embankments, roads, communication infrastructure and power supply, and all significantly impacting the development of the region. With the Terai region being the granary of Nepal, the floods not only negatively impact on the Terai region but the country as a whole. Flood risks are likely to increase in the Terai region as a result of high population growth, increase in urban and infrastructure development as well as due to the impact of climate change in general and changing rainfall patterns in particular.

139. Local bodies and communities living along the riverbanks and within the basin catchment area, are very happy that Mohana–Khutiya basin has been selected as one of the priority projects in the Flood Risk Management in the River Basins of Nepal. After the completion of the project, it will significantly reduce the risk of damage to human life and properties from floods, make the area attractive for investments, and remove the fear from the mind of people during rainy days. It is estimated that 808 ha of area in the basin will be protected after the project implementation. This project also has the component on Flood Forecasting and Early Warning System which will strengthen the capacity in flood forecasting and warning people beforehand. To train the local officers and people, CBDRM will be implemented in 20 communities, including the construction of 11 flood shelters. This Sub-Project has huge benefits as compared to the damage to the environment which is very minimal.

B. Locational Alternatives

140. Ministry of Energy, Water Resources and Irrigation (MEWRI), is implementing the ‘**Priority River Basins Flood Risk Management Project**’ in the Southern Nepal Terai region to minimize the loss of life and damages to properties and agricultural lands and crops. The project is the continuation of the pre-feasibility study: **Package 3: Flood Hazard Mapping and Risk Management Project** (FHRMP). During the pre-feasibility study of the 102 flood prone rivers that flow into the Terai region, 25 river basins were studied.

141. Due to limited budget, flood protection works are prioritized within the basin based on the flood hazard map developed considering 1 in 50 years return period including climate change scenario based on RCP4.5. Prioritizing of subproject work area was done in close cooperation with the WRPPF and DWIDM field office. As per the DWIDM policy of the ranking of priorities which is on (i) protecting settlements; (ii) protecting infrastructure; and (iii) protecting agriculture.

C. Technology Alternatives

142. The proposed technologies for the embankments, revetments and spurs are selected considering the following aspects:

143. ***Sustainability.*** It is important that the structures are sustainable and should not fail after one flood season. In the selected technologies for embankments, in order to avoid the erosion/damage to the crest and/or inner slope, besides protecting the outer slopes, also the crest and the inner slopes are considered in the design. Sufficient freeboard is applied to compensate possible increasing bed levels due to aggradation and changes in climate change projections. Maximum priority is provided to make use of local available materials. One of the advantages of gabions is that it is easy to add another layer of gabions on top of the existing structure to comply with possible changing hydraulic conditions in the future. Skill required to repair gabion mattress and bio-engineering will be easier for the beneficiary community. All these will ensure timely repair & maintenance, and sustainability of the constructed structure.

144. ***Environmental friendly.*** The structures must have sufficient resistance and height to mitigate the impact of floods but should also become an integrated part of the surrounding landscape. Large areas of the Mohana–Khutiya basin have a rural character. To integrate the structures into the landscape, the design has included environmental friendly solutions (bio-engineering). An environment-friendly solution is the use of e.g. Vetiver or other grasses into the design. Grass such as Vetiver grass is implemented in different countries to protect the embankments (bank stabilization) against floods and is also available in the Terai region. The root system of Vetiver grass is finely structured and very strong and stabilizing the soil making them resistant against the flood waters. These environmental friendly solutions also have the advantage that decreases the quantities of required construction materials thus minimizing the environmental impacts in getting them as well as reducing the cost of the project. Examples of environmental friendly solutions already implemented in the Terai region are shown in **Error! Reference source not found.**.

145. ***Low cost solutions.*** Budgets are limited while many areas in the basin require protection against erosion and / or flooding. To minimize the costs, it is important to make use of local available materials. Materials such as (reinforced) concrete are more expensive compared to local available materials. This also benefits the maintenance works. Within the Mohana–Khutiya basin, construction materials like boulders, stones, sand, etc. and quarries are excavated from the riverbed during the dry period, with permission from local governments. Use of local material is vital not only for this basin but also in other basins in Terai. It is equally vital in mid hill region where flooding is major disaster. Use of vegetative method of slope and riverbank protection is also considered cost-effective solution which utilizes local material and skills.

Figure 6-1: Example of environmental friendly embankment (bio-engineering)

VII. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION

A. Methodology in Information Disclosure, Consultation and Participation

146. The following methodologies was followed for information disclosure, consultation and participation:

(i) Information on the project activities and intended benefits from the sub-project were published into the national newspaper requesting for suggestions and comments from stakeholders and communities. As national newspapers are not easily available in villages and because of this, the same notice was placed in the local government offices, schools, and health posts within the project influential area. Peoples there were explained about the notices and their views were noted and agreed as minute;

(ii) IEE study team members have visited all the local body offices within the project influence area. While consulting elected representative women representative in each local bodies were also consulted. All local bodies were handed over the letter from Project Director for their active support in the project design and implementation. Local bodies are requested to provide written suggestions as per the regulation of Nepal;

(iii) IEE study team members held consultation with local communities while going along the riverbanks in the proposed priority works area in the basin. All registered community organization like community forestry, community disaster risk reduction committees were consulted. People with lands along the river were specifically briefed about the project activities and likely benefits of the project. As women are represented in all community organizations, no separate meeting with women conducted. However, feasibility study carried out the gender assessment as well; and

(iv) During the project construction phase, booklets about the project activities, likely impacts and mitigation measures together with complaints handling mechanisms will be developed and distributed in the project area.

B. Summary of Comments and Suggestions Received from Local Governments and Communities

1. Comments and Suggestions from Local Governments

(i) All the local bodies are very happy that the Mohana–Khutiya basin has been selected for the priority projects on flood risk management;

(ii) All the local bodies want flood protection works to cover all the identified sensitive areas, and if the budget does not allow to cover it, they recommend to put in forthcoming fiscal year's budget;

(iii) Local people need to be given priority for jobs during the construction phase;

(iv) Any damage to public property like the damage of village roads due to movement of heavy vehicles need to be repaired by the contractors;

(v) Some areas after the embankments and revetments need to be planted for long term sustainability;

(vi) Local bodies will extend all support for the timely implementation of the project and also coordinate to resolve any conflicts while implementing the project.

2. Comments and Suggestions from Local Communities

(i) Local communities also expressed happiness about the Sub-Project and also recommended to cover all the identified flood sensitive areas;
(ii) They should be provided some short-term training on semi skill jobs and involved in the project;
(iii) Local people with transport trucks should be given in the transport of materials of the project;
(iv) Loss of crops and trees due to movement of heavy vehicles and excavation works need to be compensated;
(v) Village roads made by participation local people need to be gravelled and blacked topped; and
(vi) Happy that there will be flood shelters in the area.

147. The list of people contacted during the IEE study process (Annex III), notice published in national daily newspaper and placed in local bodies with minutes, and photographs of consultation during field survey and recommendation of local bodies are presented in Annex IV.

3. Comments and Suggestions from Stakeholders Meeting

148. The Peoples Embankment Program (Field Office Kanchanpur) organized the stakeholders' consultation meeting on 4–5 January 2019, and 171 people participated in the meeting (Attendance and Minute in Annex V) and the summery of comments and suggestions of the meeting is summed up in Table 7.1. The key issues raised by the villagers of the subproject area were related with land acquisition, location for embankment, and some environmental issues such as protection of trees, dust nuisance from work, and safety which will be addressed through the EMP.

Table 7-1: Recommendations and decisions made during consultation meeting

S.N.	Municipalities / Rural Municipalities	Recommendations	Consultation Date and Presence
1	Godawari Municipality ward No. 9	• No adverse impacts anticipated • Coordination will be done with office for the participation of skill and unskilled manpower from the locals in construction works.	4 January 2019 58 People Participated (Annex V)
2	Krishnapur Municipality ward No. 7	• Early implementation of the projects as it will benefit people. • Priority should be given to local for the skilled and unskilled manpower needed during construction. • Conservation area away from subproject area will be better protected. • No impact in roads, settlement area and community infrastructure. • Protection of public houses, land and community forests due to Embankment.	5 January 2019 26 People Participated (Annex V)
3	Krishnapur Municipality ward No. 9	• Initiate the implementation as early as possible with coordination with local bodies. • Employment opportunities due to construction activities can directly benefits the local.	5 January 2019

S.N.	Municipalities / Rural Municipalities	Recommendations	Consultation Date and Presence
			21 People Participated (Annex V)
4	Dhangadhi Sub metropolitan City Ward No.3	• Land erosion due to yearly flooding in the west Mohana River could be minimized and the work should be implemented as soon as possible. • Coordination will be done with office for the participation of skill and unskilled manpower from the locals in construction works.	5 January 2019 21 People Participated (Annex V)
5	Dhangadhi Sub metropolitan City Ward No.9	• Yearly land erosion due to flood in the west Khutiya River of northern side of Khaireni Sibir within ward no. 19 can be minimized due to Embankment, and hence the construction activities should be carried out as soon as possible. • Coordination will be done with office for the par9ticipation of skill and unskilled manpower from the locals in construction works.	5 January 2019 21 People Participated (Annex V)
6	Dhangadhi Sub metropolitan City Ward No.17	• AS it will have benefits to the people, it is suggested to start implementation as early as possible. • Coordination will be done with office for the participation of local skill and unskilled manpower in construction works. • It will protect Khareni and Milanpur Kamaya Sibir and hence the works should be done as soon as possible.	5 January 2019 24 People Participated (Annex V)

C. Consultations and Information Disclosure During Implementation

149. Consultations with affected persons and/or beneficiaries will continue during implementation. Important stages for consultations to be carried out are as follows:

(i) during the finalization of the site selection for the FFEWS and flood shelters to determine the suitability of the various locations;
(ii) prior to the detailed design of the FFEWS and flood shelters;
(iii) prior to any civil works for the FFEWS and flood shelters;
(iv) during the identification of target communities for CBDRM; and
(v) during the identification of priority small-scale risk reduction measures recommended in the Community Disaster Risk Management Plans and the Local Disaster Risk Management Plans.

150. Additional consultations could be on monitoring of the operation of the FFEWS and the outcome of CBDRM initiatives. A record and proper documentation of all the consultations done during implementation will be included in the environmental monitoring reports to be submitted to ADB.

151. To meet the information disclosure requirements of ADB as indicated in SPS 2009 and AIP 2018, the following documents will be posted to ADB website:

(i) IEE prepared before approval of the project;
(ii) Revised or updated IEE during implementation;
(iii) Environmental monitoring reports; and
(iv) Corrective action plan in the event of non-compliance to any of the environmental provisions in the Loan Agreement.

152. In addition, the GRM and details of the contact person will be posted in billboards at the construction sites. A one-page project brief-cum-Q&A flyer (both in Nepali and English) will be posted at the website of MEWRI, DWRI, and DHM. Hard copies will be made available also to interested individuals in their head offices in Kathmandu, in their local offices and in project site office. The one-page flyer or Q&A will include details on the GRM and designated contact person.

VIII. INSTITUTIONAL ARRANGEMENT AND GRIEVANCE REDRESS MECHANISM

A. Institutional Arrangement

153. The Ministry of Energy, Water Resources and Irrigation is the leading ministry of the Government of Nepal responsible for overall planning and execution of the plans for the overall development of water and energy sector in Nepal. MEWRI, which has a division on Environment within its organogram, is also the authority for approval of IEE reports. Department of Water Resources and Irrigation is the implementing arm of the ministry with field offices in each district for dealing with flood protection works. DWRI also has a section on Environment within its organogram. All the resources needed for the EMP implementation even for the operation phase will be provided by the ministry through DWRI and its field offices (People's Embankment Program Field Office) will ensure the EMP implementation. The PIU in the Field Office of DWRI in Kailali district will assign a technical officer as the liaison officer for environmental management, OHS implementation and compliance of SOP during the construction phase to ensure effective and safe subproject implementation.

154. The Project Management Unit (PMU) will be coordinating overall implementation of the sub-project. PMU and PIUs will be supported by the Project Implementation Consultant (PIC). PIC will have one Senior Environmental Specialist/OHS expert (national) to provide technical support to local and government counterparts and ensure that ADB and Nepal environmental safeguard principles are fully complied with. He/she will also provide technical support in preparing the monitoring report. The Field Offices (PIUs) will be supported by safeguards monitors mobilized under PIC and under overall supervision and guidance of the Senior Environmental Specialist/OHS Expert.

155. Local bodies particularly the municipalities also have the mandate of ensuring compliance with environmental requirements in any projects in their respective jurisdiction. These bodies will have an independent monitoring responsibilities.

156. Contractor shall have the main responsibility to ensure the compliance. The contractor will submit a site-specific EMP (SEMP) with OHS Plan and SOP seeking approval of Employer before field mobilization. They will strictly follow the SEMP/OHS/SOP requirements. Contractor shall urgently comply with corrective actions for any noncompliance as instructed by the Engineer. Action Plan for any noncompliance will be duly agreed in the SEMP, and procedure & provision of taking action including financial action will be clearly written in the contract agreement. The contractor will mobilize an environmental assurance officer to ensure full compliance with SEMP. The contractor will also mobilize a senior safety superintendent under whom a team of safety stewards will work at each work site. Contractor will also assign an Engineer with the responsibility of coordinating with environmental assurance officer. The Senior Environmental Specialist will provide safeguard and EMP compliance orientation to all environment monitors and safeguard team of contractor.

B. The Grievance Redress Mechanism

157. The grievance redress mechanism (GRM) shall be established to ensure:

(i) The basic rights and interests of every person affected by poor environmental performance of the project are protected; and
(ii) Concerns arising from the poor environmental performance of the project during the conduct of pre-construction, construction and operation activities are effectively and timely addressed.

158. 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 three-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.

159. As mentioned above in the institutional arrangement, 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.

160. DWRI through its Field Offices (FOs) 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 (IA) chief will be the member secretary. The grievance redress mechanism 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 (FOs 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 IPs) and (iv) the outcome of the grievance will be delivered in writing and in person by the responsible FO person, 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:

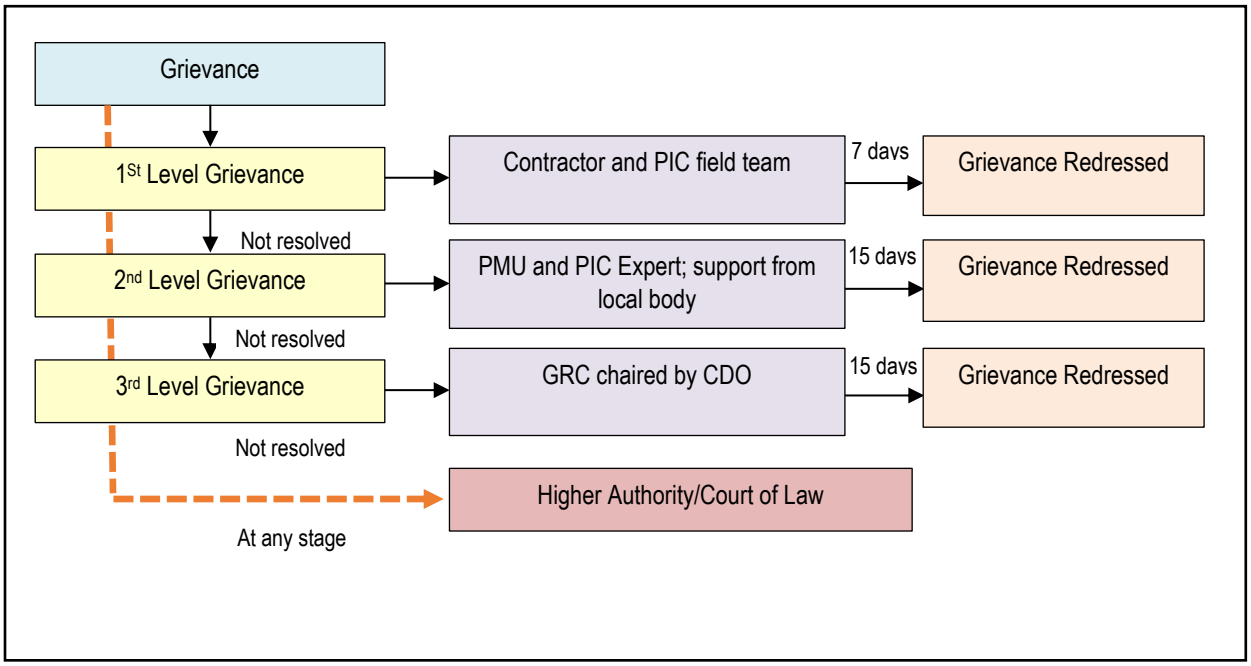
161. Level 1: Aggrieved person/household (AP) shall file the complaint at subproject level. The receiving agent will be obliged to provide immediate written confirmation of receiving the complaint, and document that in GRM register. The grievance will be discussed with the APs and SD in the FO supported by the environment monitors to reach an agreement to settle the issue locally (within 15 days). If after 7 days the aggrieved AP does not agree with grievance redressal proposal by the PIU, the complaint may be forwarded to PMU/PIU DHM seeking appropriate resolution.

162. Level 2: PMU/PIU DHM in consultation with AP 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.

163. Level 3: Project will form a GRC at district level chaired by the Chief District Officer, and representatives from FO/PIU, concerned municipality, and the ward chair will be the member, and the FO 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 8-1: Grievance Redress Mechanism



CDO= Chief District Officer, GRC = Grievance Redress Committee, PIC = Project Implementation Consultant, PMU = Project Management Unit.

C. Other Dispute Redress Mechanisms

164. 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.

165. 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.

IX. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

A. Environmental Monitoring Plan

166. This monitoring plan is developed to ensure the compliance with the national requirements or environmental quality standards of Government of Nepal. This is divided into two phases- the Construction Phase Monitoring Plan and Operational Phase Monitoring Plan.

1. Construction Phase Monitoring Plan

167. As there are no known sources of air pollution in the area, monitoring of ambient air quality parameters mentioned in the National Ambient Air Quality is generally not done in project areas in rural areas. The sub-project will conduct baseline monitoring of air, noise and river water quality prior to construction and continue throughout construction with bi-annual testing or as and when required to compare the ambient environmental quality with national prescribed standards:

(i) Monitoring of air quality particularly Particulate Pollutants (TSP, PM10 and PM2.5) near to the project site in Dhangadi sub-metropolitan city once prior to construction and once during construction and observe regularly the dust and smoke during the construction period.
(ii) Monitor Noise Quality (dB (A)) at the same site as air quality, same methodology as above and observe it during the construction phase.
(iii) Monitor Surface Water quality at Mohan and Khutiya river (as per the national standard for drinking water and irrigation water), once in the prior to construction and once during construction phase during the dry season
(iv) Inspection on the loss of property and crops nearby sites
(v) Inspection on solid waste and hazardous waste collection and management, regularly.

2. Operation Phase Monitoring Program (Impact Monitoring)

(i) Monitoring of the impact of the project preventing the damages of houses, properties, land and crops, once in a year; and
(ii) Evaluation of the effectiveness of the technologies in achieving the outcome of the project.

168. The monitoring plan is presented in

169. with parameters of monitoring, frequency of monitoring, responsibility and the estimated cost (Annex VI, cost estimate).

B. Environmental Management Plan

170. Environmental Management Plan is developed to ensure the compliance with the recommended mitigation measures to avoid, minimize or compensate the adverse environmental impacts of the project for all three phases (pre-construction, construction and operation) on physical, biological and socio-economic environments.

171. The environmental monitoring plan identifies the parameters to be monitored, frequency of monitoring, location, implementing responsibility, and supervision. The EMP will be included in the bidding and contract documents and the cost of its implementation will be part of the Contractor's budget.

172. The contractor shall prepare a Site-specific Environmental Management Plan (SEMP) which will also include Occupational Health and Safety (OHS) Plan. The SEMP and OHS Plan will be submitted by the contractor within 15 days of signing of contract and approved by Engineer before the contractor mobilizing in the field. The mitigation measures were prepared also referring to the measures provided in Annex VII and Annex IX. The project will comply with the mitigation measures provided in the following table and the two Annexes. The detailed EMP is presented in

173. Table .

174. Environmental monitoring reports will be prepared by the PMU as soon as the ADB loan becomes effective and will be submitted to ADB semi-annually during construction and annually during post-construction. The environmental monitoring reports will be reviewed by ADB and will be posted in the ADB website following the requirements of SPS 2009, and AIP 2018. Monitoring will continue until a PCR is issued. In the case of unanticipated impacts that require substantial revision of EMPs, revised EMP/IEE will be reviewed by ADB and disclosed in ADB website.

Table 9.1: Environment Monitoring Plan

Environmental Quality/ Issue	Methodology	Parameter	Location	Frequency	Responsibility		Cost (NPR)
					Implementing	Supervision	
Construction Phase							
Air Quality	Filtration method using portable dust monitoring equipment	TSP, PM10 and PM2.5	Construction site near sensitive receptors; quarry, and crusher plant.	• Prior to construction • Bi-annually during construction • As instructed by Engineer	Contractor	PIC Field Office of DWRI	250,000.00
Noise Quality	Hand-held decibel meter	dB(A)	Construction site near sensitive receptors; quarry, and crusher plant.	• Prior to construction • Annually once during construction	Contractor	PIC Field Office of DWRI	
Spoil and Waste Management	Volumetric analysis; and visual inspection	Volume management	Camp site and construction sites.	• Daily Weekly checklist	Contractor	PIC Field Office of DWRI	-
River Water Quality	Lab test for water quality	National standards for drinking and irrigation	Immediately D/S of construction site	• Once prior to construction • Bi-annually during construction.	Contractor	PIC Field Office of DWRI	150,000.00
OHS plan; Workers health	• Checklist monitoring • Safety protocol	• As per approved	• Construct ion site	• Before construction	Safety supervisor of contractor	PIC Field Office of DWRI	-

Environmental Quality/ Issue	Methodology	Parameter	Location	Frequency	Responsibility		Cost (NPR)
					Implementing	Supervision	
	• Orientation Spot check	SEMP and OHS Plan • Workers health check-up	• Labor camp • Quarry site • Flood shelters and FFEWS sites.	• Daily & weekly monitoring and recording • Daily tool box talk Monthly health camp	PIC for orientation	PMU	
Job for local beneficiaries	Registration	Check registration book of workers	• Contract or's office • Contractor's daily report	Monthly	Contractor	PIC Field Office of DWRI	-
Orientation of workers on HIV/AIDS,	Compliance Monitoring	Number of participants oriented	Project office	• Once before construction works • On-going activity time to time	PIU/PMU and Environmental Liaison Officer Contractor	PIC Field Office of DWRI	Included in project cost
Operation and Maintenance Phase							
Evaluation of the effectiveness of selected technologies	Impact monitoring	• Damage to structures Efficiency of structural performance	• Work sites in the river basin • Priority project sites	• Routine inspection during monsoon Once in winter	DWRI, central office		100,000.00
Impact of climate change	Impact monitoring	Effectiveness of adaption measures	River basin, priority project sites	• Once a year • After extreme climatic event	Field office	DWRI	100,000.00

Environmental Quality/ Issue		Methodology	Parameter	Location	Frequency	Responsibility		Cost (NPR)
						Implementing	Supervision	
Condition of flood shelters	• Inspection and recording	• Roof • Electrical wiring • Door handles, windows, hinges • Walls and ceiling • Stairways and fire exit/ escape • Storm water drains.		Flood shelters	Once a year	Field office	DWRI	Included in operating cost

DWRI= Department of Water Resources and Irrigation; PMU= Project Management Unit; PIU = Project Implementation Unit.

Table 9.2: Environmental Management Plan (EMP)

Project Activity	Potential Environmental and Social Impacts	Proposed Mitigation Measures	Implementation Responsibility	Supervision Responsibility	Cost (NPR)
Pre-Construction Phase					
Approvals, permits and clearances	• Regulatory and Statutory Requirement	• All permits/clearances should be secured prior to construction.	PMU/PIU/DWRI	DWRI	
Land Acquisition	• In the worst scenario, about 7.4 ha of land for flood protection works need for acquisition. • No one will loss more than 10% land and houses and structures	• As per the People's Embankment Program, a voluntary donation or negotiated approach will be followed to determine the benefit sharing from the program. A detailed survey on actual loss of property is ongoing and through negotiated approach a compensation plan will be agreed soon. If needed, LARP will be developed and implemented.	District Offices of DWRI	MEWRI	
Site survey and design of the new building	• Improper design may cause accidents or failure of flood shelters • Safety and health risks to flood evacuees	• Comply with relevant national regulations	PIU	DWRI field office PMU	Included in the project cost
Construction Phase					
Construction activities along the riverbanks-embankments, revetments, and spurs	• River water quality deterioration • Chances of ground water contamination due to leakage of petroleum products and chemicals	• Use coffer dams to ensure that no construction activities take place on water bodies. • Schedule the construction activities during the months when the flow in the river is low. • Ensure that all the equipment are properly maintained and no leakage of chemicals and petroleum products in the water bodies.	Contractor	Environmental Liaison Officer DWRI field office (PIU) PIC	No additional Included in civil works cost
	Deterioration of air quality in the area	• Use of Water Sprays on the construction site, dusty village roads • Limit the truck and other vehicle speed below 20 km/hour	Contractor	Environmental Liaison Officer DWRI field office (PIU) PIC	3,600,000 (spraying water in village roads, 360 days

Project Activity	Potential Environmental and Social Impacts	Proposed Mitigation Measures	Implementation Responsibility	Supervision Responsibility	Cost (NPR)
		• Adequately cover the material storages (spoil, aggregates, sands, etc.) • Cover trucks carrying the spoils or other construction materials. • Proper maintenance of equipment, vehicles as per the manufacturer's specifications. • Stone crushers supplying raw material comply with guideline for dust emission control.			@10,000 per day) (180 days in a year for 2 years construction period)
	Deterioration of noise quality in the area	• Inform workers before any construction work on the required noise limits • Ensure that all equipment and vehicles are maintained as per the manufacture's requirement and fitted with mufflers • Make mandatory to use the earmuffs to workers working in high decibel equipment and nearby • No pressure horns • Do not schedule the works during the night time. Schedule high-level noise generating activities during daytime only (but will be adjusted contingent to weather and season) • Drivers of construction vehicles will be required to observe low speed, and blowing of horns or whistle will be prohibited unless absolutely necessary • Require regular tune-up of construction vehicles and proper maintenance of machinery • Mark the sensitive areas (like school, health post, etc.) as no horn areas.	Contractor	PIU and PMU Environmental Liaison Officer DWRI field office (PIU) PIC	Included in the cost of contractor
Labour camps and Construction sites	Waste Management	• Strictly follow the Good Practices in construction management to deal with domestic and hazardous wastes • Labor camp shall be of proper canvass camp for mobile camps and central labor camp will be properly constructed with modular boards, impervious floor, light and ventilation as per the camp specification mentioned in SEMP and	Contractor	PIU and PMU Environmental Liaison Officer DWRI field office (PIU) PIC	Included in the cost of contractor

Project Activity	Potential Environmental and Social Impacts	Proposed Mitigation Measures	Implementation Responsibility	Supervision Responsibility	Cost (NPR)
		contract agreement, or as instructed by Engineer. In no case CGI sheet structure will be used for labor camp. • Adequate segregation facilities • No dumping in public places and riverbanks • Movable toilets in construction sites • Composting of organic wastes in camps • Proper collection of hazardous materials and disposal • Observe good housekeeping at the construction site at all times and monitor compliance of workers • Burning of solid waste at the construction site will not be allowed at any time • Identify disposal site prior to construction works and arrange for proper collection, handling, and disposal. • Fire extinguisher at camp and work area			
Operation of Quarry and Borrow Area	Erosion, land use change, changes in river regime, riverbank cutting, landslide, degradation of vegetation, water logging, natural drainage obstruction.	• Quarry site duly approved by Engineer • No blasting shall be resorted • Quarry will not damage forest and cause erosion and landslide • Quarry will not alter natural drainage • Negative slope cutting will be avoided • No watershed and habitat loss • No impact on water sources • No river flow obstruction • Air, noise and water pollution shall be minimized.	Contractor	DWRI field office (PIU) Municipality/Ward PIC	
Operation of heavy equipment, movement of trucks and vehicles	Emission of Green House Gases	• Maintenance of equipment, vehicles as per manufacturers requirements • Plan vegetation along the embankments and revetment sides	Contractor and community organizations	DWRI	No additional cost
Construction activities, movement and	OHS and Community Health	• As per SEMP with OHS plan included and approved by Engineer • Mitigation measures on air and noise quality	Contractor	Environmental Liaison Officer	No additional cost

Project Activity	Potential Environmental and Social Impacts	Proposed Mitigation Measures	Implementation Responsibility	Supervision Responsibility	Cost (NPR)
operation of equipment,		• Fire prevention and control measures in storage of petroleum products • Follow the best practices in construction activities		DWRI field office (PIU) PIC	
Construction activities along the river lines	Damage to community property and crops along the canal line	• Compensate the loss to farmers as per the commitment in contract agreement • Mitigation measures on dust pollution control	Contractor	Environmental Liaison Officer DWRI field office (PIU) PIC	Responsibility of contractor, no additional cost
Construction activities, labour camps and offices.	Employment and business opportunities.	• Train local people for semi-skilled jobs. • Hire transport facilities from local suppliers. • Use local products.	Contractor	Environmental Liaison Officer DWRI field office (PIU) PIC Local bodies.	No cost
Orientation of workers and staff	• Awareness of environmental requirements and their responsibility • Understanding the responsibility of Contractor in implementing the EMP, compliance to ADB requirements and the government. • Provide HIV-AIDS education and disease prevention awareness talks to the workers and staff.	• Identify areas to be monitored and the required mitigation measures. • Create awareness of sexually transmitted diseases such as HIV/AIDs to prevent potential incidence in the workplace. • Workers will be required to strictly follow the rules and regulations of avoiding any activities within the buffer zone of the Chitwan National Park and the Parsa National Park. • Workers will be informed of the penalty if caught buying wildlife from poaching or if caught poaching wildlife themselves during non-working hours in these national parks.	Contractor	DWRI field office (PIU and PMU) PIC	Included in the contractor cost.

Project Activity	Potential Environmental and Social Impacts	Proposed Mitigation Measures	Implementation Responsibility	Supervision Responsibility	Cost (NPR)
Recruitment workers	Conflict due to lack of transparency in hiring	• Priority of local hiring for non-skilled jobs • Contractor will be required to comply with the relevant provisions set forth in the Labour Act 2017, and Child Labour Prohibition and Regulation Act 2001 on recruitment and working conditions.	Contractor	DWRI field office (PIU and PMU) PIC	Included in the cost of contractor
Emergency response	• Awareness of procedures • Readiness in the event of emergency	• A staff will be designated by the Contractor as Emergency and Disaster Coordinator to guide the workers in case of an emergency or disaster. • A detailed emergency response plan will be prepared and emergency contact details will be posted in the vicinity • Contractor will inform their workers and staff that attendance to mock emergency drills to be conducted regularly will be required. • An ambulance will always remain standby • Medical bay with bed and medical supplies served by Asst. Health Worker at contractors camp.	Contractor	DWRI field office (PIU and PMU) PIC	Included in the cost of contractor
Lack of baseline environmental quality measurements within the locations of FFEWS and flood shelters.	No basis of comparison for environmental monitoring during implementation.	• Contractor to conduct baseline environmental quality measurements on air quality, noise and drinking water for construction sites.	Contractor	DWRI field office (PIU and PMU) PIC	Included in the cost of contractor
Site preparation and construction works.	Deterioration of air quality in the area due to potential increase in dust levels.	• Temporarily provide fencing and enclosures of the construction site (at least 2 m-high) • Spray water to areas and work sites causing dust generation, as and when needed particularly during the summer season • Use tarpaulin or any appropriate material to cover the excavated soil including the stockyard during non-working hours, and excess soil will	Contractor	DWRI field office (PIU and PMU) PIC	Included in the cost of contractor

Project Activity	Potential Environmental and Social Impacts	Proposed Mitigation Measures	Implementation Responsibility	Supervision Responsibility	Cost (NPR)
		be removed from the worksite to the designated disposal site or borrow area. • Allocate space at the construction site for the required materials to reduce delivery of construction materials and minimize vehicular emissions. • Safety mask googles or any personal protection gear will be provided to workers assigned to dusty areas. • Delivery or transport of material generating dust will be covered with suitable material to suppress dust • Maintain construction vehicles and diesel generators (if required) regularly to prevent smoke belching • Burning of garbage, liquid waste and other combustible materials within the construction site will not be allowed.			
	Vegetation clearing	• Government restrictions on the harvest and sale of plant and tree species will be strictly enforced. • If clearing of trees cannot be avoided, replacement equivalent to 25 times the number of cleared trees will be implemented. • The PMU and PIU will consult the local office of the Department of Forest for proper guidance.	Contractor	PIU and PMU	Included in the cost of contractor
	Occupational health and safety risks	• All instructions, guidelines, manuals and circulars issued by government, ADB and other authorized international agencies such as WHO, IFC, WB etc. shall be complied as per the instruction of the Employer. • OHS as a part of SEMP approved by Engineer and follow strictly. • A safety supervisor with required number of safety stewards at each work site mobilized by contractor.	Contractor	DWRI field office (PIU and PMU) PIC	Included in the cost of contractor

Project Activity	Potential Environmental and Social Impacts	Proposed Mitigation Measures	Implementation Responsibility	Supervision Responsibility	Cost (NPR)
		• Provide workers with appropriate safety gear such as hard hats, safety belts, and earmuffs/plugs, etc., and orient workers on safe building construction practices and other issues on safety. • Mandatory wearing of safety gears. • Compliance to the statutory age requirements for employment as provided for the Labour Act 2017, and Child Labour Prohibition and Regulation Act 2001. • Provide sanitary facilities and safe drinking water to workers. • Appropriate scaffoldings, clear and visible warning signs and lighting will be installed. • First aid kits will be made available at the construction sites including fire-fighting equipment will be provided onsite. • Prior to start of work daily, toolbox meetings that last for a few minutes, will be held to remind workers on the importance of compliance to safety rules and procedures. • Keep an ambulance at standby. • A medical bay will be established with bed, medicine and served by full-time Asst. Health Worker.			
	Community and safety risks	• Conduct awareness on safety to nearby settlements before the start of construction works. • Inform the PIU and/or PMU and nearby settlements (if needed) on the schedule of construction activities that may pose risks to public safety. • Install proper fencing and enclosure (at least 2 m-high) at the construction site to prevent unauthorized access.	Contractor	DWRI field office (PIU and PMU) PIC	Included in the cost of contractor

Project Activity	Potential Environmental and Social Impacts	Proposed Mitigation Measures	Implementation Responsibility	Supervision Responsibility	Cost (NPR)
		• Assign and/or post security personnel at the construction site to discourage theft and unauthorized access. • Provide clear and visible warning and danger signs at and around the construction site. • Provide temporary crosswalks (if needed) and assign worker to direct traffic and pedestrians accommodating pregnant women, elderly, children, and persons with disability.			
Clearing after completion of construction works.	• Improper disposal of debris and improper and/or inadequate clean-up. • Occupational health and community safety risks.	• Contractor to reinstate all the areas potentially damaged during construction phase. • All workers assigned to do clean-up and restoration works will be provided with proper safety gear and equipment. • The PIU and PMU will monitor the compliance of the Contractor.	Contractor	DWRI field office (PIU) PIC	Included in the cost of contractor
Operation Phase					
Operation of the system	Blockage to drainage system	• Making of the Discharge Sluice including valve or gates can mitigate this problem.	Contractor	Environmental Liaison Officer DWRI field office (PIU) PIC	Part of design, no additional cost
Impact of climate change	Flooding and erosion in the river basin	• Evaluation of the constructed technologies • Planning of LAPA and implementation	DWRI District Field Office	MOEWRIDWRI	-
• Operation of FFEWS • New flood shelters • CBDRM initiatives and capacity building	Reduction in the loss of lives and damage of properties	• Upscale beneficial impacts	PIU DWRI Field Office	PMUDWRI	Included in the operating budget of DWRI and DHM

CBDRM = Community Based Disaster Risk Management; DHM = Department of Hydrology and Meteorology; DWRI=Department of Water Resources and Irrigation; FFEWS= Flood forecasting Early Warning System; MOEWRI: Ministry of Energy Water Resources and Irrigation; PMU= Project Management Unit; PIU = Project Implementation Unit

X. CONCLUSION

175. The Priority River Basins Flood Risk Management Project funded by the Asian Development Bank (ADB) and implemented by the Ministry of Energy, Water Resources, and Irrigation aims to manage the flows through river channels to reduce the incidence of severe floods and provide protection to people, houses, public infrastructure, and agricultural land in selected river basins in the southern Nepal, the Terai region. In order to achieve the same objectives, Department of Water Resources and Irrigation is promoting Peoples Embankment Program to rehabilitate the degraded land near riverbanks as well as protect the land from flooding and erosion in the future. This Mohana–Khutiya River Basin Flood Risk Management sub-project, which is located in the Terai of Western Nepal in Kailali and Kanchanpur districts of State 7 will directly help to achieve the objectives of the Department benefiting the population living in Dhangadi Sub-Metropolitan City, Godabari and Gauriganj municipalities in Kailali district and Krishanapur municipality in Kanchanpur district.

176. While designing the flood protection structures, a 1 in 50 years return period including the impact of climate change scenario RCP4.5 is used. The selection of priority works was done in close cooperation with the WRPPF and DWRI field office, following a three-step approach: identifying tentative priority areas; verifying priority areas; and defining the priority areas. As such the basin will have 10,280 m of embankments, 2,150 m of additional revetments and 146 spurs for flood protection. CBDRM is implemented in 10 communities, which includes the construction of 13 flood shelters.

177. The environmental impacts during construction are of short duration, temporary, reversible, and can be easily mitigated by good and best practices in engineering construction. Post-construction impacts will be mainly beneficial to affected people. The IEE prepared includes an EMP outlining the impacts, mitigation measures, implementation arrangements and monitoring.

178. Stakeholders will be consulted during implementation to ensure that persons affected will be included every step of the way from site selection, design, and construction/installation of FFEWS and flood shelters. A GRM to deal with potential complaints on the project was described in the IEE. The PMU will be supported by the PIC environmental safeguard consultant while DWRI will designate an Environmental Liaison Officer to ensure technical support in complying with the requirements of ADB and Nepal. Environmental monitoring reports will be submitted by the PMU to ADB semi-annually during construction and annually post-construction. Like the IEE, these environmental monitoring reports will be similarly disclosed to ADB website.

179. With applying good practices in the construction activities and ensuring the compliance with the EMP the sub-project will have very minimal adverse impact on environment while implementation of the Sub-Project will result in significant reduction in the loss of human life, damages to houses, loss of agricultural lands and products, loss of livestock, and damages to public facilities. It aims for the protection of riverbank from erosion and thus preventing the loss of land due to riverbank erosion is averted and villages and farmlands will be protected. It will also help to convert the barren land into the arable lands. It will help to make the area attractive for investments and increasing economic activities in the area and creating income generating opportunities as well as stabilizing the livelihoods of the people living in the sub-project areas.

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ANNEXES

Annex I: Rapid Environmental Assessment Checklist

IRRIGATION

Rapid Environmental Assessment (REA) Checklist

Country/ Project Title : NEP: WRPPF: Mohana–Khutiya River Basins Flood Risk Management Project

Sector Division : Water Resources

SCREENING QUESTIONS	YES	NO	REMARKS
A. Project Siting: Is the subproject area adjacent to or within any of the following environmentally sensitive areas?			
• Adjacent to or within any environmentally sensitive areas?		√	
• Cultural heritage site		√	
• Protected Area		√	
• Wetland nearby		√	
• Buffer zone of protected area		√	
• Special area for protecting biodiversity		√	
B. Potential Environmental Impacts Will the Project cause…			
• loss of precious ecological values (e.g. result of encroachment into forests/swamplands or historical/cultural buildings/areas, disruption of hydrology of natural waterways, regional flooding, and drainage hazards)?		√	
• conflicts in water use rights and related social conflicts?		√	
• impediments to movements of people and animals?		√	T
• dislocation or involuntary resettlement of people?		√	
• potential social conflicts arising from land tenure and land use issues?		√	
• Noise from construction equipment?		√	
• dust during construction?	√		General impact observed in any construction work.
• poor sanitation and solid wastes disposal in construction camps and work sites and possible transmission of communicable diseases from workers to local populations?	√		General impact observed in camps constructed for construction workers.
• creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents?		√	
• introduction of increase in incidence of waterborne or water related diseases?		√	
• social conflicts between construction workers from other areas and community workers?		√	Most of the workers will be hired from the locals communities during the construction phase
• increased road traffic due to interference of construction activities?	√		More vehicular movement will take place in the construction area

SCREENING QUESTIONS	YES	NO	REMARKS
• continuing soil erosion/silt runoff from construction operations?		√	
• increase in risks due to rehabilitation or construction of dams?		√	
• loss of downstream beneficial uses (water supply or fisheries)?		√	No downstream impact.

Based on the above assessment the project may be categorized as "B" as per SPS, 2009.

The following questions are to help identify potential Climate and Disaster risks.

Screening Questions		Score	Remarks[1]
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather-related events such as floods, droughts, storms, landslides?	0	The project site is at low from landslides and high from flooding.
	Would the project design need to consider any hydro-meteorological parameters level, (e.g., sea-peak river flow, reliable water level, peak wind speed etc)?	1	The basin has a low risk for flooding.
Materials and Maintenance	Would weather, current and likely future climate conditions(e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters) affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	The increase in temperature, precipitation, and flooding will not likely affect the selection of construction materials.
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	1	Increased precipitation in future may require more maintenance works of the project to ensure they are usable particularly during incidents of heavy rain and flash floods
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design lifetime?	0	The design life of the project, particularly the embankment will be shortened if the required maintenance works are not undertaken.

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response will be categorized as high-risk project.

Result of Initial Screening (Low, Medium, High): MEDIUM

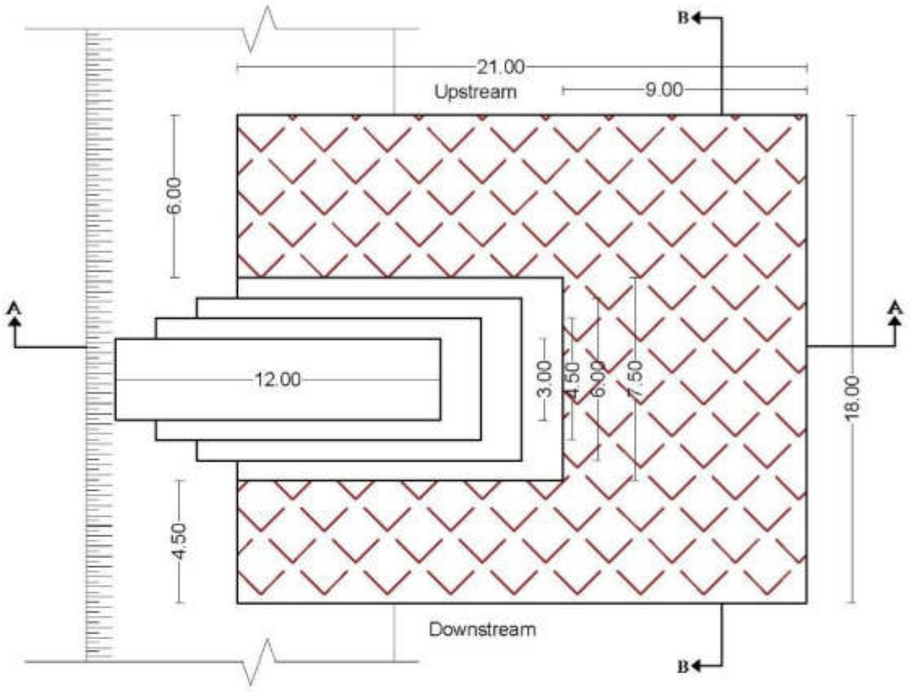
Other Comments:_____

_____

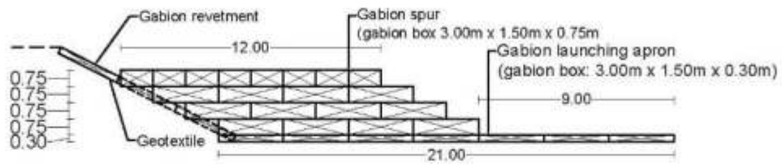
Prepared by:

[1] If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

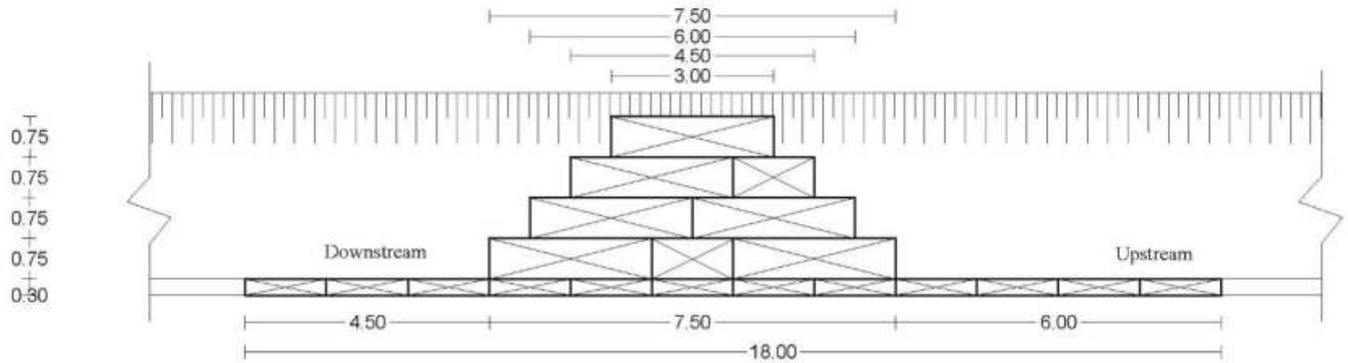
Annex II: Section of Embankments, Revetments and Spurs



PLAN VIEW (TYPE -1)
Scale 1:200



SECTION A-A
Scale 1:250

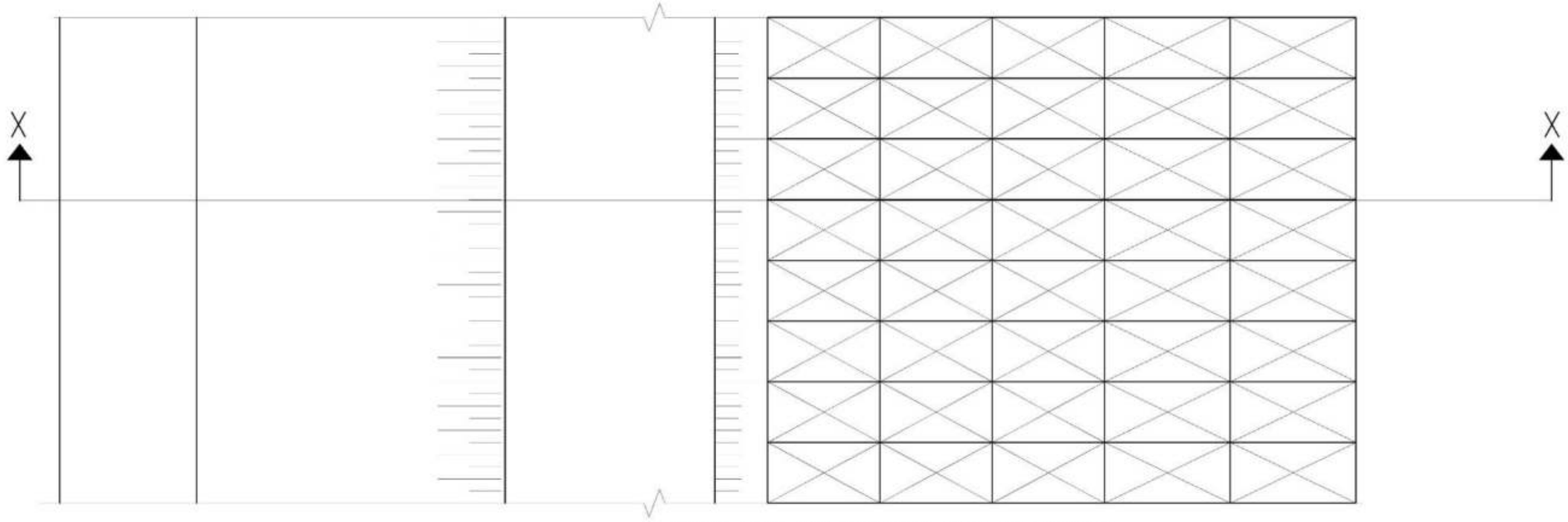


SECTION B-B
Scale 1:100

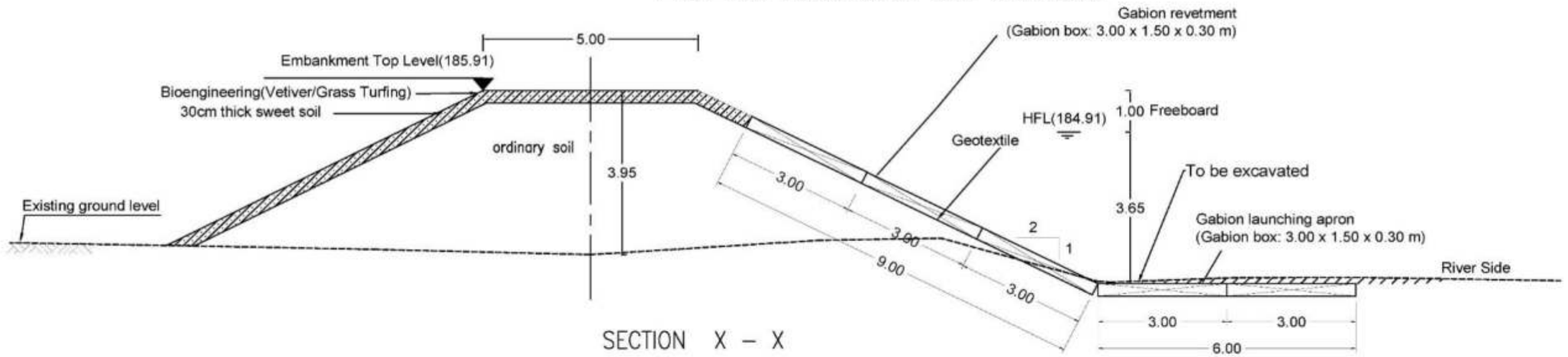
Notes: All levels and measurements are in meters unless indicated differently. All levels refer to meters above sea level (masl). HFL=High Flood Level

GOVERNMENT OF NEPAL MINISTRY OF ENERGY, WATER RESOURCES AND IRRIGATION DEPARTMENT OF WATER RESOURCES AND IRRIGATION Water Resources Project Preparatory Facility Jawalakhel, Lalitpur	**Project: Preparation of Priority River Basin Flood Risk Management Project (GRANT NO:0299-NEP)** **Sub-Project: Mohana Khutiya basin**	MOTT MACDONALD IN ASSOCIATION WITH TOTAL MANAGEMENT SERVICES (TMS)	**Drawing Title** **TYPICAL SPUR SECTION (TYPE 1)** **PRTW.01**		NAME	SIGNATURE	SCALE
				DRAWN BY:			
				DESIGNED BY:			
				CHECKED BY:			DATE: 12/24/18
				APPROVED BY:			

DWG NO: MK.001
SHEET NO: 5/5
REVISION: 0



PLAN VIEW EMBANKMENT WITH REVETMENT



SECTION X – X

Notes: All levels and measurements are in meters unless indicated differently. All levels refer to meters above sea level (masl). HFL=High Flood Level

GOVERNMENT OF NEPAL MINISTRY OF ENERGY, WATER RESOURCES AND IRRIGATION DEPARTMENT OF WATER RESOURCES AND IRRIGATION Water Resources Project Preparatory Facility Jawalakhel, Lalitpur	**Project:** Preparation of Priority River Basin Flood Risk Management Project **(ADB GRANT NO:0299-NEP)** **Sub-Project: Mohana Khutiya Basin**	MOTT MACDONALD IN ASSOCIATION WITH TOTAL MANAGEMENT SERVICES (TMS)	**Drawing Title** TYPICAL CROSS SECTION OF EMBANKMENT WITH REVETMENT PRTW.03 (0+000-0+330)		NAME	SIGNATURE	SCALE 1:100
				DRAWN BY:			
				DESIGNED BY:			
				CHECKED BY:			DATE: 12/25/18
				APPROVED BY:			

DWG NO: **MK.003**
SHEET NO: **1/1**
REVISION: **0**

Annex III: Consultation During Field Survey

List of Local Representatives and Community leaders		
SN	**Name**	**Address**
1	Sita Chaudhari	Siddababa Community Forest Dhangadhi-17, Uttar Khaireni
2	Devendra Bishta	Ward Representative Dhangadhi-12, Jageda Katan
3	Yadab Thapa	Community Forest User GroupKrishnapur-9, Kanchanpur, Rajghat
4	Hari Ram Chaudhari	NGO representative Krishnapur-9, Kanchanpur, Rajghat
5	Gopal Chaudhari	Ward Representative Dhangadhi-17, Uttar Khaireni
6	Rupesh Bohora	Ward Representative, Dhangadhi-15, Tarabariya
7	Mahadev Bhatta	DoI, Mahendranagar

Consulted People Farmers and Community members		
S.N.	**Name**	**Address**
1	Jagat ram Chaudhari	Dhangadhi-17, Uttar Khaireni
2	Dev Chaudhari	Dhangadhi-17, Uttar Khaireni
3	Karna Bahadur Chaudhari	Godawari- 9 Local person,
4	Bikhuwa Chaudhari	Godawari- 9 Local person, Dhanchauri
5	Devendra Bishta	Dhangadhi-12, Jageda Katan
6	Indra Bdr. Saud	Dhangadhi-15 Tarabariya
7	Gulan Chandra Chaudhari	Dhangadhi-15 Tarabariya
8	Nar Bdr Saud	Dhangadhi-15, Tarabariya
9	Raj Bahadur Saud	Dhangadhi-15, Tarabariya
10	Amar Bohara	Dhangadhi-15, Tarabariya
11	Gita Chaudhari	Mohana Bridge, Dhangadhi-3
12	Damaber Dutta Pant	Krishnapur-7, Shantipur
13	Dambar Bdr. Rokaya	Krishnapur-7, Shantipur
14	Ram Bdr. Bista	Krishnapur Krishnapur-7, Shantipur
15	Akal Bdr Bishta	Krishnapur Krishnapur-7, Shantipur
16	Padam raj Joshi	Krishnapur Krishnapur-7, Shantipur
17	Hikmat Awasthi	Krishnapur-9, Kanchanpur, Rajghat
18	Harischandra Thapa	Krishnapur-9, Kanchanpur, Rajghat
19	Phularam Chaudhari	Krishnapur-9, Kanchanpur, Rajghat
		

Annex IV: Notices and Recommendations from local

आर्थिक www.aarthikdainik.com अन्तर्राष्ट्रिय २०७५ साउन २९ गते मंगलबार ५

नेपाल सरकार
ऊर्जा, जलस्रोत तथा सिँचाइ मन्त्रालय
जलस्रोत तथा सिँचाइ विभाग
जलसाधन योजना तयारी सुविधा आयोजना
जावलाखेल, ललितपुर

प्रारम्भिक वातावरणीय परीक्षण (Initial Environmental Examination-IEE) अध्ययन गर्नेबारे सार्वजनिक सूचना

प्रथम पटक प्रकाशित मिति: २०७५/४/२९

जलस्रोत तथा सिँचाइ विभागअन्तर्गत Water Resources Project Preparatory Facility (WRPPF) आयोजनामार्फत निम्न खोलाहरूको तटीय क्षेत्रमा नदी नियन्त्रण/व्यवस्थापनका संरचना निर्माण गर्नुपर्ने भएकाले सो प्रस्ताव कार्यान्वयन गर्नुअघि उक्त प्रस्तावको प्रारम्भिक वातावरणीय परीक्षण (Initial Environmental Examination-IEE) अध्ययन गर्ने सिलसिलामा प्रस्ताव कार्यान्वयन गर्दा प्रभावित हुने क्षेत्रहरूको भौतिक, जैविक, रासायनिक, सांस्कृतिक तथा आर्थिक र सामाजिक प्रणाली, विभिन्न अवयवहरूको अन्तर्क्रिया तथा अन्तर्सम्बन्धमा के कस्तो प्रभाव पर्दछ भनी एकीन गर्न उक्त प्रस्ताव प्रभावित क्षेत्रमा पर्ने नगरपालिका, गाउँपालिका तथा त्यस क्षेत्रका विद्यालय, अस्पताल स्वास्थ्य चौकी तथा सरोकारवाला व्यक्ति तथा संघ/संस्थाको लिखित राय/सुझाव लिन वातावरण संरक्षण नियमावली २०५४ (पाँचौं संशोधन २०७३) को नियम ७ उप नियम २ बमोजिम सूचना प्रकाशित गरिएकाले यो सूचना प्रकाशित भएको मितिले १५ (पन्ध्र) दिनभित्र निम्न ठेगानामा आइपुग्ने गरी राय/सुझाव उपलब्ध गराइदिनुहुन अनुरोध गरिन्छ ।

प्रस्तावको नाम : मोहना खुटिया, मावा रतुवा नदी नियन्त्रण/व्यवस्थापन कार्य

प्रस्तावकको नाम : जलस्रोत तथा सिँचाइ विभाग, Water Resources Project Preparatory Facility (WRPPF)-Preparation of Priority River Basins Flood Risk Management Project, जावलाखेल, ललितपुर

क्र.सं.	आयोजनाको नाम	जिल्ला	प्रभाव पर्ने नगरपालिका/ गाउँपालिकाहरू
१.	मोहना खुटिया नदी व्यवस्थापन उप-आयोजना	कैलाली, कञ्चनपुर (प्रदेश नम्बर ७)	धनगढी उप-महानगरपालिका, कृष्णपुर नगरपालिका, गोदावरी नगरपालिका, १. कृष्णपुर नगरपालिका वडा नं ७ शान्तिपुर, २. कृष्णपुर नगरपालिका वडा नं ८ मजगाउँ पुलभन्दा माथि, ३. धनगढी उप-महानगरपालिका वडा नं १३ मजगाउँ पुलभन्दा तल ४. धनगढी उप-महानगरपालिका वडा नं ३ मन्दिरनजिकैको मोहना पुलमाथि ५. धनगढी उप-महानगरपालिका वडा नं १२ जयेडा कटानजिकै ६. कृष्णपुर नगरपालिका वडा नं ९ राजघाट ७. कृष्णपुर नगरपालिका वडा नं ९ सानागाउँ , ८. धनगढी उप-महानगरपालिका वडा नं ३ चटकपुर, ९. धनगढी उप-महानगरपालिका वडा नं १ धनगौरी क्षेत्रअन्तर्गत मोहना खोला दाहिने तथा देब्रे तट क्षेत्रमा करिब १०.०८५ किलोमिटर नदी नियन्त्रण/ व्यवस्थापन कार्य गरिनेछ ।
२.	मोहना खुटिया नदी व्यवस्थापन उप-आयोजना	कैलाली (प्रदेश नम्बर ७)	धनगढी उप-महानगरपालिका, गोदावरी नगरपालिका १. गोदावरी नगरपालिका वडा नं ३ लेहरीनजिकै २. गोदावरी नगरपालिका वडा नं ३ अर्जुनतोला ३. धनगढी उप-महानगरपालिका वडा नं १७ उत्तर छौनी ४. धनगढी उप-महानगरपालिका वडा नं १७ तरबरिया क्षेत्रअन्तर्गत खुटिया खोला दाहिने तथा देब्रे तट क्षेत्रमा करिब ३.९९५ किलोमिटर नदी नियन्त्रण/ व्यवस्थापन कार्य गरिनेछ ।
३.	मावा रतुवा नदी व्यवस्थापन उप-आयोजना	झापा, मोरङ (प्रदेश नम्बर १)	१. दमक नगरपालिका वडा नं ३-हल्दी, पावर प्लान्ट क्षेत्र, वडा नं ४- उदय टोल, २. मिक्लाजुङ गाउँपालिका वडा नं १-महेश चोक नजिकै ३. उर्लाबारी नगरपालिका वडा नं १- नगरपालिका क्षेत्र नजिकै, वडा नं६- सिलौटी, वडा नं७- शान्ति टोल, वडा नं १-दादाटोल मावा खोला दाहिने तथा देब्रे तट क्षेत्रमा करिब ३.९२ किलोमिटर नदी नियन्त्रण/ व्यवस्थापन कार्य गरिनेछ ।
४.	मावा रतुवा नदी व्यवस्थापन उप-आयोजना	झापा, मोरङ (प्रदेश नम्बर १)	१. दमक नगरपालिका वडा नं २- बेलडाँगी शरणार्थी क्याम्पनजिकै, वडा नं५- नगरपालिका क्षेत्रनजिकै, वडा नं ७- गोरखाम टोलनजिकै, वडा नं१०- सानो बारघरे क्षेत्रनजिक २. कमल गाउँपालिका वडा नं ६, ७- दुई वडाको सीमा क्षेत्र ३. रतुवामाई वडा नं१०- सल्लेडी, वडा नं४- चौकीघाटनजिक, वडा नं३-छत्तगौढी, मराडाँगी ४. गौरादह नगरपालिका -५ वागु दोभानदेखि दुवा टोलसम्म रतुवा खोला दाहिने तथा देब्रे तट क्षेत्रमा करिब ९.५४ किलोमिटर नदी नियन्त्रण/ व्यवस्थापन कार्य गरिनेछ ।

राय/सुझाव पठाउने ठेगाना

प्रस्तावकको नाम र ठेगाना	परामर्श दाताको नाम र ठेगाना
जलस्रोत तथा सिँचाइ विभाग, जलसाधन योजना तयारी सुविधा आयोजना (WRPPF) -Preparation of Priority River Basins Flood Risk Management Project, जावलाखेल, ललितपुर, नेपाल फोन नम्बर : ०१५५३६६५७, इमेल : wrppf.doi@gmail.com	Mott MacDonald Limited (UK) in association with Euro Consult Mott MacDonald B.V. (Netherlands) and Total Management Services Pvt. Ltd (Nepal) फोन नम्बर : ०१४४३९३४९, इमेल : erik.klaassen06@gmail.com

धनगढी उप-महानगरपालिका

नगर कार्यपालिकाको कार्यालय

धनगढी, कैलाली, सुदूरपश्चिम प्रदेश, नेपाल ।

सचिव : ०९१-५२०४२९
टेलिफोन : १०१
फ्याक्स : ०९१-५२०४२९
कार्यालय: ०९१-५२१४२९
www.Dhangadhimun.gov.np.

प.सं. : (प्र.शा.),२०७५/०७६
च.नं. ४६६

मिति:- २०७५/०५/१२

श्री जलसाधन योजना तयारी सुविधा आयोजना
जावालाखेल , ललितपुर

विषय : सूचना टाँसको जानकारी पठाएको बारे ।

उपरोक्त सम्बन्धमा तहाँको प.सं. २०७५।०७६, च.नं. ७१ , मिति २०७५।०५।१२ गतेको पत्र बमोजिम मिति २०७५।०४।२९ गते आर्थिक राष्ट्रिय दैनिक पत्रिकामा प्रकाशित सूचना थान १ (एक) मिति २०७५।०५।१२ गते यस कार्यालयको सूचना पाटीमा टाँस गरिएको व्यहोरा जानकारीका लागि अनुरोध गरिन्छ ।

१२/५/०७५

सन्त बहादुर सुनार
प्रमुख प्रशासकीय अधिकृत

प्रमुख प्रशासकीय अधिकृत

फोन नं :- ०९१-५०८००१
फ्याक्स नं :- ०९१-५२१३०६
इमेल :- mungodawari@gmail.com
वेभसाईट :- www.godawarimunkatali.gov.np

गोदावरी नगरपालिका

नगर कार्यपालिकाको कार्यालय
अत्तरिया, कैलाली
७ नं प्रदेश नेपाल
२०७३

प.सं :- २०७५/०७६
च.नं :- ५२८

मिति :- २०७५/०५/१२

विषय : सूचना टाँसको जानकारी पठाएको बारे ।

श्री जलसाधन योजना तयारी सुविधा आयोजना,
जावलाखेल, ललितपुर ।

उपर्युक्त सम्बन्धमा तहाँको प.सं. २०७५/७६, च.नं. ७१, मिति २०७५/०५/०८ गतेको प्राप्त पत्रानुसार मिति २०७५/०४/२९ गते आर्थिक राष्ट्रिय दैनिक पत्रिकामा प्रकाशित सूचना थान १ (एक) मिति २०७५/०५/१२ गते यस कार्यालयको सूचना पाटीमा टांस गरिएको व्यहोरा जानकारीका लागि अनुरोध गरिन्छ ।

०६।५।१२

खेमराज बिष्ट
प्रमुख प्रशासकिय अधिकृत

खेम राज बिष्ट
प्रमुख प्रशासकिय अधिकृत

फोन नं. - ०९९-५०४००९
फ्याक्स नं. - ०९९-५५१३०५
इमेल - mungodawari@gmail.com
वेभसाईट - www.godawarimunkailali.gov.np

गोदावरी नगरपालिका

नगर कार्यपालिकाको कार्यालय
अत्तरिया, कैलाली
७ नं. प्रदेश नेपाल
२०७३

प.स :- २०७५/०७६
च.नं :- 429

मिति :- २०७५/०५/१२

विषय :- सिफारिस गरिएको सम्बन्धमा ।

श्री जलसाधन योजना तयारी सुविधा आयोजना,
जावलाखेल, ललितपुर ।

उपर्युक्त सम्बन्धमा तहां कार्यालयको च.नं. ७१, मिति २०७५/०५/०८ गतेको पत्रानुसार यस गोदावरी नगरपालिका क्षेत्र भित्र पर्ने मोहना-खुटिया नदी व्यवस्थापनका लागि प्रारम्भिक वातावरणीय परिक्षण अध्ययन (IEE) अन्तर्गत मिति २०७५/०४/२९ मा आर्थिक राष्ट्रिय दैनिकमा सूचना प्रकाशित भए बमोजिम सो अध्ययन गर्दा वातावरणीय र सामाजिक क्षेत्रमा प्रतिकूल प्रभाव नपर्ने गरी एवम् स्थानीय प्रतिनिधि सग समन्वय गरी कार्य अगाडी बढाउनहुनका लागि सिफारिस साथ अनुरोध गरिन्छ ।

०६८।१९२

खेमराज विष्ट
प्रमुख प्रशासकिय अधिकृत

खेम राज विष्ट
प्रमुख प्रशासकिय अधिकृत

OK

दर्ता ८६

गोदावरी नगरपालिका
दर्ता नं. ६६५
दर्ता मिति: २०६५/५/१२

दर्ता ६४

दर्ता ११६

गोदावरी नगरपालिका
दर्ता नं.
दर्ता मिति:

धनगढी उप-महानगरपालिका
दर्ता नं. १६८०
मिति ८/१२
दस्तखत

धनगढी उप-महानगरपालिका
३ नं. वडा कार्यालय
दर्ता नं. ४६४
मिति २०६५/५/१२
दस्तखत

घनगढी उप-महानगरपालिका

नगर कार्यपालिकाको कार्यालय

.....शिक्षा... नं. वडा कार्यालय

घनगढी, कैलाली, सुदूरपश्चिम प्रदेश, नेपाल

पत्र संख्या :- ०६२/६६
चलानी नम्बर :- २४९

मिति :- २०६२/१२/१३

विषय :- सुचना टाँस गरी जानकारी पठाएको बारे।

श्री अक्षयधन योजना तथा सुविधा आयोजना
आवलाखेत, ललितपुर

उपरोक्त सम्बन्धमा तहा कार्यालयको च.नं.७६१ मिति २०६२/१२/१८ गते को प्राप्त पत्रानुसार मिति २०६२/८/२९ गते को आर्थिक राष्ट्रिय दैनिक पत्रिका मा प्रकाशित सूचना यान एक मिति २०६२/१२/१३ गते यस वडा कार्यालयको सूचना पाटिमा टाँस गरिएको व्यहोरा जानकारीका लागी अनुरोध छ।

२०६२/१२/१३

(उमेश प्रसाद जैशी)
वडा अध्यक्ष

धनगढी उप-महानगरपालिका

नगर कार्यपालिकाको कार्यालय

....१२.... नं. वडा कार्यालय

धनगढी, कैलाली, ७ नं. प्रदेश, नेपाल

पत्र संख्या :- ०७५/७६
चलानी नम्बर :- २४८

मिति २०७५।५।१३

विषय :- सिफारिस सम्बन्धमा।

श्री जलसाधन योजना तयारी सुविधा आयोजना
डब्लु. आर. पि. पि. एफ.
आरलाखेल ललितपुर

उपरोक्त सम्बन्धमा यस धनगढी उप-महानगरपालिका को वडा नं १२ फुड्का बि गाउ किराड को खपड दह भट्टा पछाडि को मोहना नदी क्षेत्रमा गरिने तटबन्धन को कार्यको लागि ताहा कार्यालय द्वारा मिति २०७५।८।२५ गते का आर्थिक राष्ट्रिय दैनिक पत्रिकामा प्रकाशित कार्यक्रम बमोजिम उक्त क्षेत्रमा तटबन्धन कार्य गर्दा वातावरणिय तथा सामाजिक क्षेत्रमा प्रतिकुल असर नपर्ने गरी कार्य अगाडी बढाउनका लागि सिफारिस गरियको व्यहोरा अनुरोध गरिन्छ।

(ओम प्रसाद जोशी)

वडा अध्यक्ष

कृष्णपुर नगरपालिका
८ नं वडा कार्यालय
विचवा, कञ्चनपुर
७ नं. प्रदेश, नेपाल
२०७३

पत्रसंख्या: २०७५/०७६ मितिः २०७५/५/१३

चलानी नः

विषयः सूचना टांसको जानकारी पठाएको बारे।

श्रीः जल साधन योजना तयारी सुविधा आयोजना
जावलाखेल, ललितपुर

उपरोक्त सम्बन्धमा तहां कार्यालयको प.सं. २०७५/०७६, च.नं ७१ मिति २०७५/५/८ गतेको प्राप्त पत्रानुसार मिति २०७५/४/२९ गते आर्थिक राष्ट्रीय दैनिक पत्रीकामा पर्काशित सुचना थान १ मिति २०७५/५/१३ गते यस कार्यालयको सूचना पाटीमा टांस गरिएको व्यहोरा जानकारीको लागी अनुरोध गरिन्छ।

२०७५।५।१४

हरिराम डगौरा
वडा अध्यक्ष

कृष्णपुर नगरपालिका
८ नं वडा कार्यालय
विचवा, कञ्चनपुर
७ नं. प्रदेश, नेपाल

२०७३

पत्रसंख्या: २०७५/०७६ मिति: २०७५/५/१३

चलानी नः ८५

विषयः सिफारिस गरिएको बारे।

श्रीः जल साधन योजना तयारी सुविधा आयोजना
जावलाखेल, ललितपुर

उपरोक्त सम्बन्धमा तहां कार्यालयको च.नं ७१ मिति २०७५/५/८ गतेको प्राप्त पत्रानुसार यस कृष्णपुर नगरपालिका वडा नं ८ भित्र पर्ने मोहना खुटिया नदी व्यवस्थापनका लागी प्रारम्भिक वातावरणीय परिक्षण अध्ययन (IEE) अन्तर्गत मिति २०७५/४/२९ मा आर्थिक राष्ट्रीय दैनिकमा सुचना प्रकाशित भए वमोजिम सो अध्ययन गर्दा वातावरणिय, जैविक विविधता, सामाजिक तथा आर्थिक क्षेत्रमा प्रतिकुल असर नपर्ने गरि एवम् स्थानीय जन प्रतिनिधि संग समन्वय गरि कार्य अगाडी बढाउन हुनका लागी सिफारिस गरिएको व्यहोरा अनुरोध गरिन्छ।

२०७५।५।१३

हरिराम डंगारा
वडा अध्यक्ष

कृष्णपुर नगरपालिका

नगर कार्यपालिकाको कार्यालय

पत्र संख्या : २०७५/७६
चलानी नं. : २७७

मिति:-२०७५/०५/१३

श्री जलसाधन योजना तयारी सुविधा आयोजना
जलस्रोत तथा सिँचाई विभाग
ऊर्जा, जलस्रोत तथा सिँचाई मन्त्रालय
जावलाखेल, ललितपुर

विषय:- सुचना टाँसको जानकारी पठाएको बारे ।

प्रस्तुत विषय सम्बन्धमा तहाँ कार्यालयको च.नं.७१ मिति २०७५/०५/१२ गतेको प्राप्त पत्रानुसार मिति २०७५/०४/२९ को आर्थिक राष्ट्रिय दैनिक पत्रिकामा प्रकाशित सुचना थान १ (एक) यस कार्यालयको सुचना पाटीमा टाँस गरिएको व्यहोरा जानकारीको लागि अनुरोध छ ।

मेघनाथ रिजाल
प्रमुख प्रशासकीय अधिकृत

प्रमुख प्रशासकीय अधिकृत

कृष्णपुर नगरपालिका

नगर कार्यपालिकाको कार्यालय

सुनरिया, कंचनपुर
७ नं. प्रदेश, नेपाल

पत्र संख्या : २०७५/७६
चलानी नं. : १७१

मिति:-२०७५/०५/१३

श्री जलसाधन योजना तयारी सुविधा आयोजना
जलश्रोत तथा सिँचाई विभाग
उर्जा, जलश्रोत तथा सिँचाई मन्त्रालय
जावलाखेल, ललितपुर

विषय:- सिफारिस गरिएको बारे ।

प्रस्तुत विषय सम्बन्धमा तहाँ कार्यालयको च.नं.७१ मिति २०७५/०५/१२ गतेको प्राप्त पत्रानुसार यस कृष्णपुर नगरपालिका क्षेत्र भित्र पर्ने मोहना – खुटिया नदि व्यवस्थापन उप-आयोजना अन्तर्गत पर्ने यस न.पा.को वा.नं.७ शान्तिपुर, वा.नं.८ मजगाउँ, वा.नं.९ राजघाट एवं मानागाउँ क्षेत्रको मोहना नदी व्यवस्थापनका लागि प्रारम्भिक वातावारणीय अध्ययन (IEE) अन्तर्गत मिति २०७५/०४/२९ को आर्थिक राष्ट्रिय दैनिक पत्रिकामा सुचना प्रकाशित भए बमोजिम सो अध्ययन गर्दा वातावारणीय, जैविक विविधता, सामाजिक तथा आर्थिक क्षेत्रमा प्रतिकुल असर नपर्ने गरी एवं स्थानीय जनप्रतिनिधिसँग समन्वय गरी कार्य अगाडी बढाउनहुनका लागि सिफारिस साथ अनुरोध छ ।

मेघनाथ रिजाल
प्रमुख प्रशासकीय अधिकृत

प्रमुख प्रशासकीय अधिकृत

कृष्णपुर नगरपालिका
९ नं वडा कार्यालय
विचवा, कञ्चनपुर
प्रदेश नं. प्रदेश, नेपाल
२०७३

पत्रसंख्या: २०७५/०७६ मितिः २०७५/५/१३

चलानी नः ६६

विषयः सिफारिस गरिएको बारे।

श्रीः जल साधन योजना तयारी सुविधा आयोजना
जावलाखेल, ललितपुर

उपरोक्त सम्बन्धमा तहां कार्यालयको च.नं ७१ मिति २०७५/५/८ गतेको प्राप्त पत्रानुसार यस कृष्णपुर नगरपालिका वडा नं ९ भित्र पर्ने मोहना खुटिया नदी व्यवस्थापनका लागी प्रारम्भिक वातावरणीय परिक्षण अध्ययन (IEE) अन्तर्गत मिति २०७५/४/२९ मा आर्थिक राष्ट्रीय दैनिकमा सुचना प्रकाशित भए बमोजिम सो अध्ययन गर्दा वातावरणिय, जैविक विविधता, सामाजिक तथा आर्थिक क्षेत्रमा प्रतिकुल असर नपर्ने गरि एवम् स्थानीय जन प्रतिनिधि संग समन्वय गरि कार्य अगाडी बढाउन हुनका लागी सिफारिस गरिएको व्यहोरा अनुरोध गरिन्छ।

६८/५/१३

छत्र बहादुर महरा
वडा अध्यक्ष

छत्र बहादुर महरा
वडा अध्यक्ष

कृष्णपुर नगरपालिका
९ नं वडा कार्यालय
विचवा, कञ्चनपुर
७ नं. प्रदेश, नेपाल
२०७३

पत्रसंख्या: २०७५/०७६ मिति: २०७५/५/१३

चलानी नः

विषय: सूचना टांसको जानकारी पठाएको बारे।

श्रीः जल साधन योजना तयारी सुविधा आयोजना
जावलाखेल, ललितपुर

उपरोक्त सम्बन्धमा तहां कार्यालयको प.सं. २०७५/०७६, च.नं ७१ मिति २०७५/५/८ गतेको प्राप्त पत्रानुसार मिति २०७५/४/२९ गते आर्थिक राष्ट्रीय दैनिक पत्रीकामा पर्काशित सुचना थान १ मिति २०७५/५/१३ गते यस कार्यालयको सूचना पाटीमा टांस गरिएको व्यहोरा जानकारीको लागी अनुरोध गरिन्छ।

छत्र बहादुर महरा
वडा अध्यक्ष

कृष्णपुर नगरपालिका
७ नं वडा कार्यालय
विचवा, कञ्चनपुर
७ नं. प्रदेश, नेपाल
२०७३

पत्रसंख्या: २०७५/०७६ मितिः २०७५/५/१३

चलानी नः १०६

विषयः सिफारिस गरिएको बारे।

श्रीः जल साधन योजना तयारी सुविधा आयोजना
जावलाखेल, ललितपुर

उपरोक्त सम्बन्धमा तहां कार्यालयको च.नं ७१ मिति २०७५/५/८ गतेको प्राप्त पत्रानुसार यस कृष्णपुर नगरपालिका वडा नं ७ भित्र पर्ने मोहना खुटिया नदी व्यवस्थापनका लागी प्रारम्भिक वातावरणीय परिक्षण अध्ययन (IEE) अन्तर्गत मिति २०७५/४/२९ मा आर्थिक राष्ट्रीय दैनिकमा सुचना प्रकाशित भए बमोजिम सो अध्ययन गर्दा वातावरणिय, जैविक विविधता, सामाजिक तथा आर्थिक क्षेत्रमा प्रतिकुल असर नपर्ने गरि एवम् स्थानीय जन प्रतिनिधि संग समन्वय गरि कार्य अगाडी बढाउन हुनका लागी सिफारिस गरिएको व्यहोरा अनुरोध गरिन्छ।

२०७५/५/१३

बल्लु राना
वडा अध्यक्ष

बल्लु राना
वडा अध्यक्ष

कृष्णपुर नगरपालिका
७ नं वडा कार्यालय
विचवा, कञ्चनपुर
७ नं. प्रदेश, नेपाल
२०७३

पत्रसंख्या: २०७५/०७६ मितिः २०७५/५/१३

चलानी नः १०८

विषयः सूचना टांसको जानकारी पठाएको बारे।

श्रीः जल साधन योजना तयारी सुविधा आयोजना
जावलाखेल, ललितपुर

उपरोक्त सम्बन्धमा तहां कार्यालयको प.सं. २०७५/०७६, च.नं ७१ मिति २०७५/५/८ गतेको प्राप्त पत्रानुसार मिति २०७५/४/२९ गते आर्थिक राष्ट्रीय दैनिक पत्रीकामा पर्काशित सुचना थान १ मिति २०७५/५/१३ गते यस कार्यालयको सूचना पाटीमा टांस गरिएको व्यहोरा जानकारीको लागी अनुरोध गरिन्छ।

१३/५/७३

बल्लु राना
वडा अध्यक्ष

बल्लु राना
वडा अध्यक्ष

फोन न.

धनगढी उप-महानगरपालिका
नगरकार्यपालीकाको कार्यालय
३ न. वडा कार्यालय

चटकपुर , धनगढी , कैलाली ७ न.प्रदेश नेपाल

प.सं. आ.व २०७५।०७६
च.न ४६८

मितीः२०७५।५।१२

श्री जलसाधन योजना तयारी सुविधा आयोजना
जावलाखेल , ललितपुर

विषयःसिफारीस सम्वन्धमा ।

उपरोक्त सम्वन्धमा तहां कार्यालयका च.न.७१ , मिती २०७५।५।८ गतेको प्राप्त पत्रानुसार यस धनगढी उप-महानगरपालीका वा.न.३ स्थित भन्सार मोहना पुल नजिक र वा.न.३ को चटकपुर मोहना क्षेत्रमा गरीने तटवन्धन कार्यको लागी तहां कार्यालय द्वारा मिती २०७५।४।२९ गतेको आर्थिक राष्ट्रिय दैनिक पत्रिकामा प्रकाशित कार्यक्रम वमोजिम उक्त क्षेत्रमा तटवन्धन कार्य गर्दा वातावरणीय तथा सामाजिक क्षेत्रमा प्रतिकुल असर नपर्ने गरी कार्य अघाडी वढाउनका लागी सिफारीस गरीएको व्यहोरा अनुरोध गरीन्छ ।

वल वहादुर ऐर
वडा अध्यक्ष

वडा अध्यक्ष

फोन न.४५७०२

धनगढी उप-महानगरपालिका
नगरकार्यपालीको कार्यालय
३ न. वडा कार्यालय

चटकपुर , धनगढी , कैलाली ७ न.प्रदेश नेपाल

प.स. .आ.व.२०७५।०७६
च.न.४२६

मितीः२०७५।५।१२

श्री जलसाधन योजना तयारी सुविधा आयोजना
जावलाखेल , ललितपुर

विषयःसुचना टांसको जानकारी पठाएको बारे ।

उपरोक्त सम्बन्धमा तहां कार्यालयको प.स.०७५।०७६ , च.न.७१ , मिती २०७५।५।८ गतेको प्राप्त पत्रानुसार मिती २०७५।४।२९ गतेको आर्थिक राष्ट्रिय दैनिक पत्रिकामा प्रकाशित सुचना थान १ मिती २०७५।५।१२ गतेका दिन यस वडा कार्यालयको सुचना पाटीमा टांस गरीएको व्यहोरा जानकारिका लागी अनुरोध गरीन्छ ।

राधा वि.क
का.वा.वडा अध्यक्ष

का.वा. वडा अध्यक्ष

धनगढी उप-महानगरपालिका

९ नं वडा कार्यालय

वंगरा, धनगढी, कैलाली, ७ नं. प्रदेश, नेपाल।

प. सं. ०७५/०७६
च.नं. ९६

मिति:-२०७५/०५/१३

बिषय :- सिफारिस सम्वन्धमा।

श्री जल साधन आर पी पी एफ
जावलाखेल ललितपुर।

उपरोक्त सम्वन्धमा यस धनगढी उप-महानगरपालिका नगर कार्यपालिकाको वडा नं. ९ वंगरा गाउँको पश्चिम किनारा भएर वहने र यसै वडाको पूर्वी क्षेत्र शिवनगर टोलको दक्षिण किनारा भएर वहने मोहना नदी क्षेत्रमा गरिने तटबन्धन कार्यको लागि तहा कार्यालयबाट मिति २०७५/०४/२९ गतेको आर्थिक राष्ट्रिय दैनिक पत्रिकामा प्रकाशित कार्यक्रम बमोजिम उक्त क्षेत्रमा तटबन्धन कार्य गर्दा वातावरण तथा सामाजिक क्षेत्रमा प्रतिकुल असर नपर्ने गरी कार्य अगाडी बढाउनका लागि सिफारीस गरिएको व्यहोरा अनुरोध गरिएको छ।

प्रेम व.भण्डारी
वडाध्यक्ष
वडा अध्यक्ष

धनगढी उप-महानगरपालिका

९ नं वडा कार्यालय

वंगरा, धनगढी, कैलाली, ७ नं. प्रदेश, नेपाल।

प. सं. ०७५/०७६ मिति:-२०७५/०५/१३

च.नं. ९६

विषय :- सूचना टांसको जानकारी पठाएको बारे।

श्री जल साधन योजना तयारी सुविधा आयोजना
जावलाखेल ललितपुर।

उपरोक्त सम्बन्धमा तहाको च.नं. ७१ मिति २०७५/०४/२९ गतेको प्राप्त पत्रानुसार मिति २०७५/०४/२९ गतेको आर्थिक राष्ट्रिय दैनिक पत्रिकामा प्रकाशित सूचना थान एक मिति २०७५/०५/१३ गते यस वडा कार्यालयमा टाँस प्रकास गरिएको व्यहोरा जानकारीको लागि अनुरोध छ।

प्रेम बहादुर भण्डारी
वडाध्यक्ष

वडा अध्यक्ष

धनगढी उप-महानगरपालिका

नगर कार्यपालिकाको कार्यालय

धनगढी, कैलाली, ७ न. प्रदेश, नेपाल

सचिव : ०९१-४२०४२९
इमकल : ९०१
फयाक्स : ०९१-४२०४२९
कार्यालय: ०९१-४२१४२९
www.Dhangadhimun.gov.np.

प.सं. : (प्र.शा.),२०७५/०७५
च.नं. ४६६

मिति:- २०७५/०५/१२

श्री जलसाधन योजना तयारी सुविधा आयोजना
जावालाखेल , ललितपुर

विषय : सिफारिस गरिएको सम्बन्धमा ।

उपरोक्त सम्बन्धमा तहाँ कार्यालयको च.नं. ७१ मिति २०७५।०५।१२ गतेको प्राप्त पत्रानुसार यस धनगढी उप-महानागरपालिका क्षेत्र भित्र पर्ने मोहना-खुटिया नदी व्यवस्थापनका लागि प्रारम्भिक वातावरणीय परिक्षण अध्ययन (IEE) अन्तर्गत मिति २०७५।०४।२९ मा आर्थिक राष्ट्रिय दैनिकमा सूचना प्रकाशित भए बमोजिम सो अध्ययन गर्दा वातावरणीय,जैविक विविधता,सामाजिक तथा आर्थिक क्षेत्रमा प्रतिकुल असर नपर्ने गरी एवम् स्थानीय जन प्रतिनिधि संग समन्वय गरी कार्य अगाडी बढाउनुहुनका लागि सिफारिस साथ अनुरोध गरिन्छ ।

०५/१२/१२

सन्त बहादुर सुनार
प्रमुख प्रशासकीय अधिकृत

प्रमुख प्रशासकीय अधिकृत

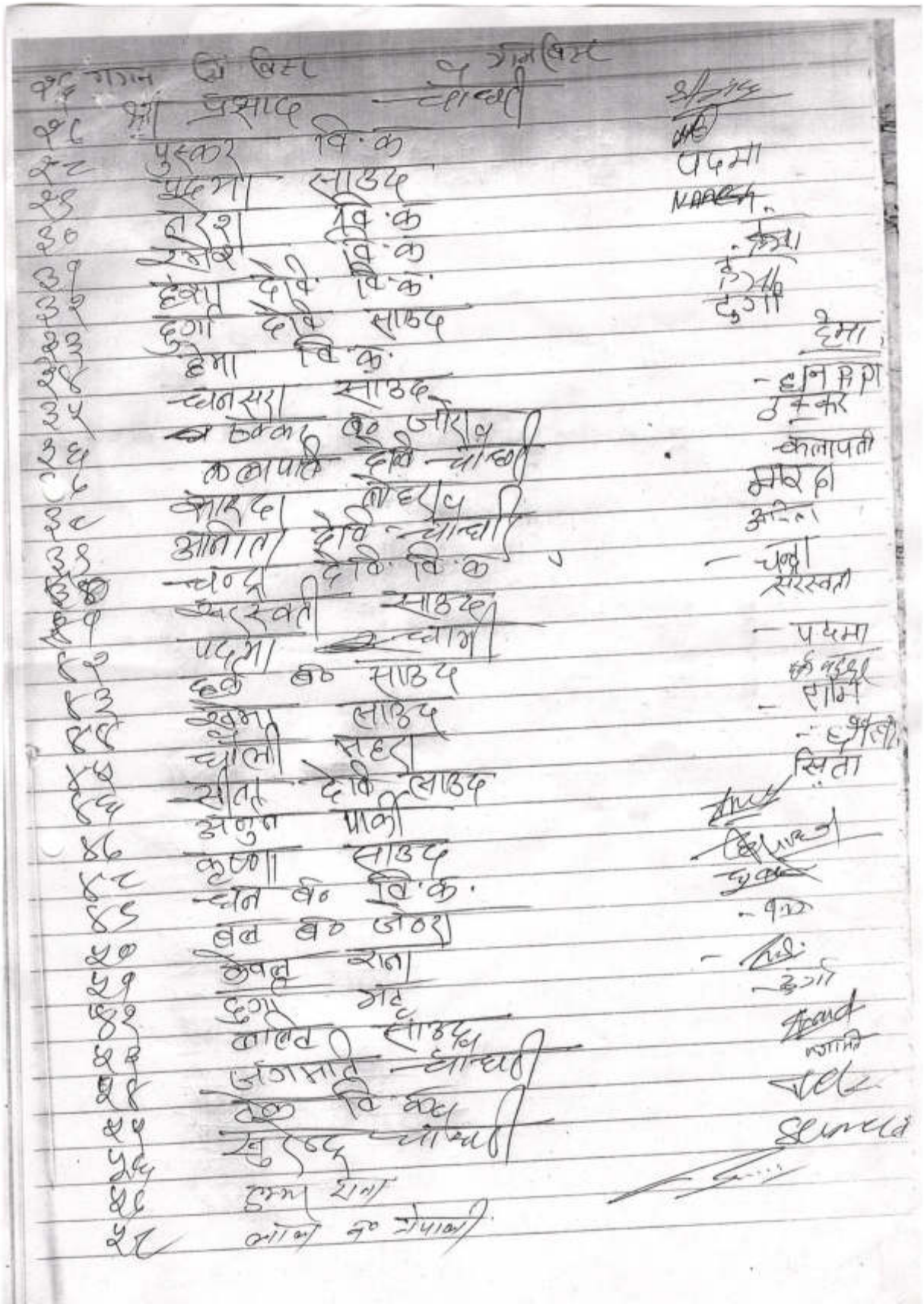
Annex V: Attendance and Minute of Consultation Meeting

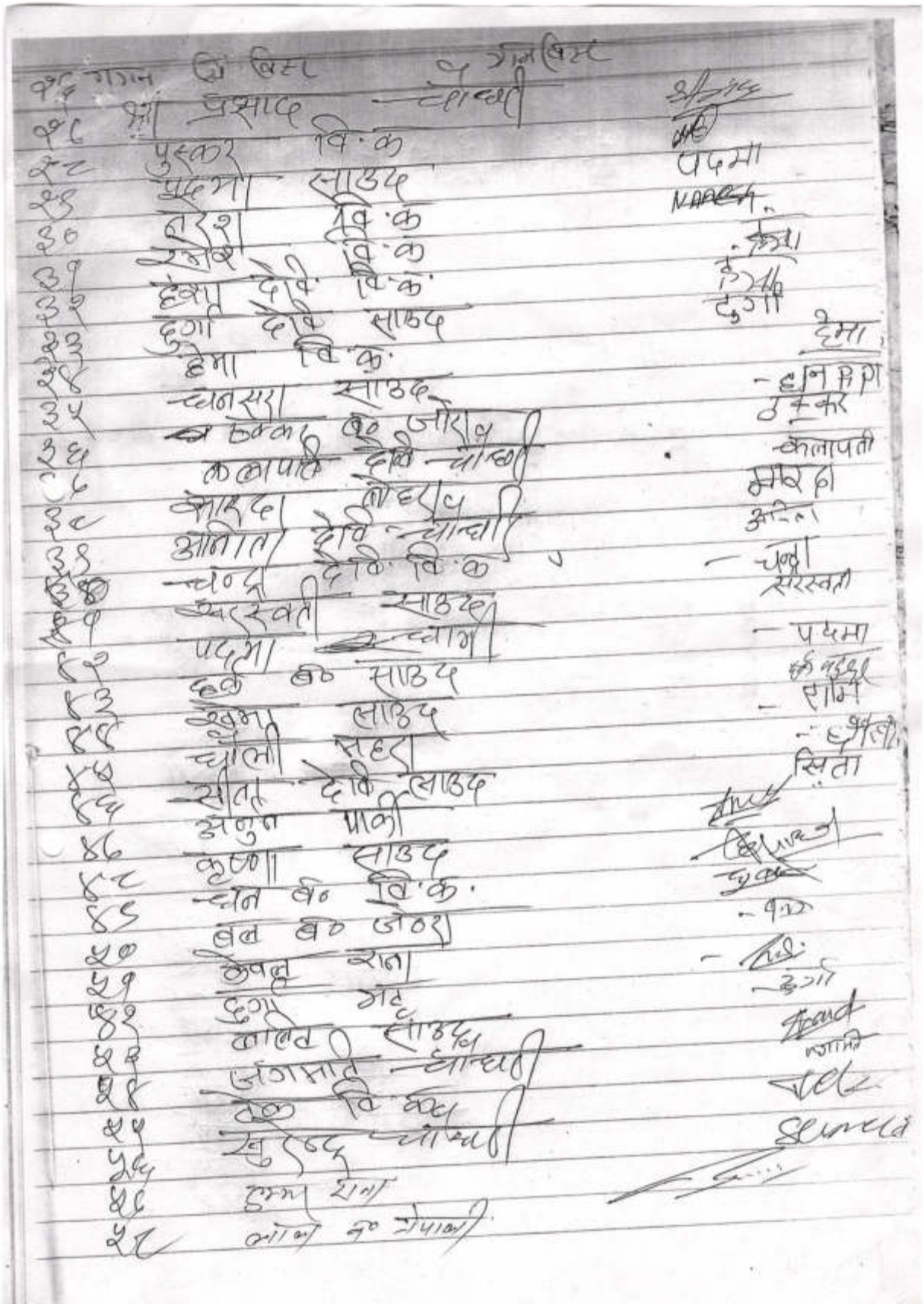
आज मिति २०६९ पौष २० गतेका दिन भसु गोदावरी नगरपालिका वडा नं. ६ मा रहेको अर्जुनी टोलका टोल समितिको सदस्य बासुदेव भट्टको अध्यक्षतामा बैठक बसि तपसिल का बमोजिम छलफल तथा निर्णय गरियो।

	उपस्थिती	हस्ताक्षर
१)	बासु देव भट्ट	बासुदेव
२)	पूर्ण नेपाली	[illegible]
३)	दिर्घ ऐर	दीर्घ ऐर
४)	अमर ब० साउद	अमर
५)	मिथुन चौधरी	[illegible]
६)	चन्द्र ब० बोहरा	[illegible]
७)	दबे लाल साउद	दबेलाल
८)	मान ब० साउद	मान ब०
९)	भैरव साउद	भैरव
१०)	मान ब० खडायत	मान
११)	राधा विष्ट	राधा
१२)	मदन ~~विष्ट~~	मदन सोनी
१३)	कुमार महत	कुमार
१४)	प्रेम ब० बोहरा	[illegible]
१५)	उत्तम साउद	उत्तम
१६)	नन्दा कामी	नन्दा
१७)	सुशीला राना	सुशीला
१८)	रोहित साउद	[illegible]
१९)	हुकम छेडाल	हुकम
२०)	कर्ण साउद	[illegible]
२१)	मन्जुली बोहरा	मन्जुली
२२)	शेर ब० बोहरा	[illegible]
२३)	चित्र शाह	[illegible]
२४)	प्रविन वि.क.	[illegible]
२५)	शिवराम शर्मा	[illegible]

आज मिति २०६९ पौष २० गतेका दिन यस गोदावरी नगरपालिका वार्ड नं ६ मा रहेको अर्जुनी टोलका ~~[illegible]~~ सदस्य बालदेव भट्टको अध्यक्षतामा बैठक बसि तपसिल का बमोजिम छलफल तथा निर्णय गरियो ।

	उपस्थिती	हस्ताक्षर
१)	बालु देव भट्ट	बासुदेव
२)	पूर्ण नेपाली	[illegible]
३)	दिर्घ सेर	दीर्घ सेर
४)	अमर ब० साउद	[illegible]
५)	मिथुन चौधरी	[illegible]
६)	चन्द्र ब० बोहरा	[illegible]
७)	दावे लाल साउद	[illegible]
८)	मान ब० ~~साउद~~	मान ब०
९)	भैरव साउद	भैरव
१०)	मान ब० खडायत	[illegible]
११)	राधा बिष्ट	राधा
१२)	मदन ~~[illegible]~~	मदन साउद
१३)	डम्मर महत	डम्मर
१४)	प्रेम ब० बोहरा	[illegible]
१५)	उत्तम साउद	उत्तम
१६)	नन्दा कामी	[illegible]
१७)	सुहाली राना	सुहाली
१८)	रोहित साउद	[illegible]
१९)	रुकम देउडाल	[illegible]
२०)	कर्ण साउद	[illegible]
२१)	मनुली बोहरा	मनुली बो
२२)	शेर ब० बोहरा	[illegible]
२३)	चित्र शाह	चित्रशाह
२४)	प्रमित बि.क.	[illegible]
२५)	[illegible]राम कामी	[illegible]





प्रस्तावहरु :-

(१) जनताको तटबन्धन कार्यको असर सम्बन्धमा ।

(२) काम संचालन सम्बन्धमा ।

निर्णय नं. १ :- प्रस्ताव नं. १ मा छलफल गर्दा [illegible] नं-९ [illegible] जनताको तटबन्धन कार्य [illegible] ५-६ बाट [illegible] कुराको जानकारी कार्यालय लाई जानकारी गराउने [illegible] छलफल गर्दा [illegible] गाउँमा [illegible] जानकारी गराउने निर्णय सर्वसम्मत बाट पारित गरियो ।

निर्णय नं. २ :-

प्रस्ताव नं. २ मा छलफल गर्दा [illegible] तोकिएको [illegible] कार्य [illegible] गराउने [illegible] काम [illegible] गराउने निर्णय गरियो ।

बासुदेव

२०७५।१।२

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आज मिति २०७५।१।२१ गतेका दिन यस [illegible] कृष्णपुर नगरपालिका वार्ड नं. ९ वडा (सावधिक ७) का स्थानीय आम जनता बाट मोहना नदी क्षेत्रमा जनताको तत्वावधान निम्न कार्यका लागि ढुङ्गा, वालुवा तथा गिट्टी संकलन कार्यका लागि प्रारम्भिक वातावरणीय परीक्षण (IEE) अध्ययन सम्बन्धी छलफल एवं सुनवाई गरी निम्न लिखित राय सुझाव संकलन गरियो।

(उपस्थिति)

१)	नरबहादुर चौधरी	9848455357
२)	फुलराम "	फुलराम
३)	तिलक ब० जोरा	तिलक
४)	भोजराज चौधरी	[illegible]
५)	कमल बहादुर विष्ट	[illegible]
६)	आशिष भण्डारी	[illegible]
७)	भरत ब० नेपाली	[illegible]
८)	टेक ब० कठहरा	Tek
९)	भुवन कठहरा	[illegible]
१०)	समिर महत	[illegible]
११)	नविन विष्ट	Nabin
१२)	मनिराम चौधरी	मनिराम
१३)	अर्जुन देवी	[illegible]
१४)	कमल कुमारी ओझा	[illegible]
१५)	जानकी चौधरी	जानकी
१६)	बिरे ब० चौधरी	[illegible]
१७)	रुपनी चौधरी	रुपनी
१८)	सुन्दर चौधरी	सुन्दर
१९)	नरेश देवी	नरेश
२०)	टिलु चौधरी	टिलु चौधरी
२१)	गर्गी चौधरी	[illegible]

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राय सुझाव —

१- यस जनताको तटबन्धनले यस कृष्णपुर नगरपालिका वार्ड नं. ५ वा (साविक ६) राजघाट को बाढीबाट प्रभावित स्थानीय बासी बाढीबाट हुने क्षेती न्यूनिकरण गर्न लाभान्वित हुने हुनाले यस कार्यलाई यथा शिघ्र कार्यान्वयन गर्न गराउन पहल गराउन —

२.) सो कार्यको लागि स्थानीय जनतालाई स्व रोजगार को अवसर पूर्णरुपले लाभान्वित हुनाले —

२०७५।५।२९

आज मिति २०७१।३।२४ तेका दिन यस श्री
ध. कु. न.पालीका ३ को स्थानीय जनताको आमन्त्र
वार महिना नदि क्षेत्रमा जनताको तरबन्धन निमार्ण कार
लागी ढुङ्गा बालुवा गिट्टी तथा बालुवा संकलन कार्यको प्रा
वातावरणीय परिक्षण (I E E) अध्ययन सम्बन्धी छल
एवं सुनवाई गरी निम्न लिखीत राय सुझाव संकल
गरियो

उपस्थिती

क्र.न	नाम	ठेगाना	फोन	दस्तखत
१)	कुमारि दाहाल	ध. ३. भा. ५।३	९८४२३६९८००	कुमारि
२.	उदय दाहाल	,, ,,	,	भवराज
३.	भोजराज चौ०	,, ,,		भगवती
४	मिन चौ			महेश्वर
५.	रामदास चौ०	,,	,,	रामदास
६	काली चौ०	,,	,,	काली
७	सुमन चौ.	,, ,,	९८०४६०४४४१	[illegible]
८	[illegible] चौ.	,,		[illegible]
९	राम मिलन चौ	,, ,,		राम मिलन
१०	राधा केशरी	,, ,,	८७१४४२१००	राधा केशरी
११	सुमित्रा खड्का	,, ,,		सुमित्रा
१२	भूपेन्द्र वाइबा	,, ,,	9812666306	[illegible]
१३	परश चौधरी	,, ,,	9800653166	[illegible]
१४	मनाकी चौ.	,, ,,		मान
१५	जानकी ,, ,,	,, ,,		जानकी
१६	मधु ,, ,,	,, ,,	,, ,,	मधु
१७	आरती ,, ,,	,, ,,	,, ,,	
१८	[illegible]			आशा
१९	किन्नी चौ	,, ,,		[illegible]
२०,	कल्पना चौ			[illegible]
२१	बासमती			कल्पना
				बासमती

Date |
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रायसुझाव हरु:

१) यस धनगढी उप महानगरपालीका वाड नं ६ वडहरुस्वीत पश्चिम मोहना नदि लो वर्षेनी समुदायको जमिन कटान गर्दै बाढी बाट प्रभावीत क्षेत्र न्यूनिकरण भई लाभान्वित हुने हुनाले त्यस कार्यलाई यथा सिघ्र कार्यन्वयन गराउन जनतातर्फबाट कार्यालय ६ मेहन्द्रनगर लाई अनुरोध गरिएको छ.

२) यस्ते कार्यमा संलग्न रहने दक्ष तथा अनुभवी दक्ष कामदार का लागी स्थानिय लाई अवसर मिलाउन को लागी कार्यालय लाई अनुरोध गर्ने।

आज मिति २०६८ साल ३ महिना २१ गतेका दिन यस गोदावरी नगरपालिका वार्ड नं ३ का स्थानीयहरुको आम भेलाबाट खुटिया नदी क्षेत्रमा जनताको तटबन्धन निर्माण कार्यको लागी ढुङ्गा गिट्टी तथा बालुवा संकलनको कार्यको लागी प्रारम्भिक वातावरणीय परिक्षण (IEE) अध्ययन सम्बन्धि एवं सुनुवाई गरी निम्न लिखित राय सुझाव संकलन गरियो ।

उपस्थिति

क्र.सं.	नाम	ठेगाना	फोन नं.	दस्तखत
१.	दल बहादुर सावद	गोदावरी न.पा. ३	९८४९००८६५१	दलबहादुर
२	टोपीलाल राना	" "	९८६८४६३०५२	[signature]
३.	हुकुम ब. साउद	" "	९८४८६६९००६	[signature]
४	विजय चौधरी	" "	९८४८४२३२६१	[signature]
५	लल्ला राना	" "	९८६८४४९४०७	लल्ला
६.	राम लाल राना	" "		रामलाल
७	पुरण राना	" "		[signature]
८.	चौधरी राना	" "		चौधरी राना
९	बहादुर राना	" "		बहादुर
१०	फुल्लु लाल राना	" "		[signature]
११	टोप बहादुर राना	" "		टोप बहादुर राना
१२	कालुराम चौधरी	" "		कालु
१३	खेमा देवी राना	" "		Khema
१४	हर्के ब. राना	" "		हर्के बहादुर
१५	दुःखीराम राना	" "		दुःखी
१६	अर्जुन बोहरा	" "		[signature]
१७	दिनेश राना	" "		[signature]
१८	रमेश राना	" "		[signature]
१९	धर्मु राना	" "		[signature]
२०	कालुराम राना	" "	९८६८४२९३८०	[signature]
२१	दयाराम राना	" "	9804693773	[signature]
२२	बहादुर राना	" "		बहादुर राना
	खुसी राम चौधरी	" "		खुशी राम

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राय सुझाव

(१) यस गोदावरी नगरपालिका वार्ड नं ३ स्थित मुड्केरी गाउँको पूर्व उत्तर पर्ने खहरेमा ली वर्षेनी कटानी गरेको, ~~साथै~~ र बाढीबाट प्रभावित हुने स्थानिय बासी बाट हुने क्षती न्यून, करण भई लाभान्वीत हुने हुनाले यस जनताको तटबन्धन बाट गतवर्षमा भएको तटबन्धन राम्रो भएकोले यस पनि त्यस्तै कार्यक्रम अगाडी बढाउन अनुरोध गर्दछौं।

(२). यस कार्यमा संलग्न रहेको दक्ष तथा अर्ध दक्ष कामदारको लागी स्थानियलाई अवसर दिनु हुन अनुरोध गर्दछौं।

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आज मिति २०६८।०५।२९ गतेका दिन धनगढी उप महानगर पालिका वडा नं. १८ का स्थानियहरुको आम भेला बाट खुटिया नदि क्षेत्रमा जनताको सरोकार निर्माण कार्यको लागि ढुङ्गा गिट्टी तथा बालुवा संकलन कार्यको लागी प्रारम्भिक वातावरणीय परिक्षण (IEE) अध्ययन सम्बन्धी छलफल एवं सुनुवाई गरि निम्न लिखित राय सुझाव संकलन गरियो ।

उपस्थिति

क्र.सं	नाम	ठेगाना	फोन	दस्तखत
१.	बम ब. बोहरा (वडाध्यक्ष)	धनगढी १८		[signature]
२	राम ब. चौधरी (")	"	9812640775	[signature]
३	पुष्प राज राना	"		[signature]
४	पति राम चौधरी	"	9814629142	[signature]
५	कमलेश चौधरी	"	9804642581	[signature]
६	बिजय चौधरी	"		[signature]
७	हिम्मत चौधरि	"	9814670958	[signature]
८	बिनोद चौधरि	"	9811660566	[signature]
९	आशिष चौधरी	"	98006008?8	[signature]
१०	सुरज चौधरी	"		[signature]
११	बिमल चौधरी	"	9815617351	Bimal
१२	सुनिता देवि चौधरी			सुनिता
१३	अनिता देवि चौधरी			अनिता
१४	सिता देवि चौधरी			सीता
१५	फूल कुमारी देवि चौधरी			फुलकुमा
१६	भोजिया देवि चौधरी			भोजी
१७	फुल मति देवि चौधरी			फुलम
१८	प्रकाश चौधरी			Prakash
१९	जगत नाथ चौधरी			जगन्ना
२०	राम प्यारी चौधरी			रामप्यारी
२१	सुस्मिता चौधरी			सुस्मि
२२	निशा देवि चौधरी			निशा
२३	मनिषा देवि चौधरी			मनिषा
२४	पुष्पा देवि चौधरी			पुष्पा

<u>सुझाव हरु</u>

(१) यस धनगढी उप महानगरपालिका वडा नं. १६ स्थित उत्तर बेहेडी शिविरको उत्तर पश्चिम खुटिया नदीले वर्षेनी जमिन कटान गरी बाढी बाट प्रभावित बाढी बाट पीडितहरण भई लाभान्वित हुने हुनाले यस कार्यलाई (यथा शिघ्र कार्यान्वयन गराउन जनताको तटबन्ध कार्यालय महेन्द्रनगर लाई अनुरोध गर्दै ।

(२) यस कार्यमा संलग्न रहने दक्ष तथा अर्ध दक्ष कामदारको लागि स्थानियलाई अवसर मिलाउनको मा लागि कार्यलाई अनुरोध गर्दै ।

(३) यस धनगढी उप महानगरपालिका वडा नं. १६ उत्तर बेहेडी मुक्त कमैया शिविर र मिलनपुर मुक्त कमैया शिविर साहुपुर मुक्त कमैया शिविर र ग्राम बोरिया टोललाई संरक्षण भएकोले उक्त कामको कार्यान्वयन शिघ्र कार्यान्वयन गराई उक्त गाउँको संरक्षण गरी बाढी कटानी लाई जोगाई उक्त गाउँको भलाईको लागि अनुरोध गरिन्छ ।

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			सु
२५	सुनिता देवि चौधरी		सुनिता
२६	शिवकाली देवि चौधरी		शिवकाली
२७	सिता देवि चौधरी		सिता
२८	सचिन्या राना		सचिन्या
२९	बासमती चौधरी		बासमती
३०	लक्ष्मी देवि चौधरी		लक्ष्मी
३१	इन्द्रा देवि चौधरी		इन्द्रा
३२	चैती देवि चौधरी		चैती
३३	राजप्यारी चौधरी		
३४	वन्दना देवि चौधरी		
३५	सिताराम चौधरी		सीताराम
३६	सिता देवि चौधरी	9815068625	सिता
३७	कोमला थापा		कोमला
३८	फुलमाते दर्गाबाथापा		
३९	धोकै राना		
४०	हिदुराम थापा		
४१	महगु राम चौधरी		महगु चौ
४२	दिलि ब. चौधरी		दिली [illegible]
४३	पतिराम चौधरी		
४४	रविन्द्र चौधरी		
४५	कुली चौधरी		[illegible]
४६	टेकला चौधरी		
४७	नारानि चौधरी		
४८	सिता चौधरी		सिता चौ
४९	रमिता चौधरी		
५०	सुनिता चौधरी		
५१	बुधराम चौधरी		बुधराम चौ
५२	कलपति चौ		कलपति
५३	मानिराम चौ		मानिराम
५४	माया चौधरी		मायाचौ
५५	कालु राम राना		कालु

आज मिति २०६४/०८/२१ गतेका दिन यस श्री [illegible] नगर पालिका वडा नं. ६ का स्थानियहरुको आम भेला बाट मोहना नदिका क्षेत्रमा जनताको तटबन्ध निर्माण कार्यका लागि ढुङ्गा गिट्टी तथा बालुवा संकलन कार्यको प्रारम्भिक वातावरणीय परीक्षण (IEE) अध्ययन सम्बन्धी छलफल एवं सुनुवाई गरि निम्न लिखित राय सुझाव संकलन गरियो।

उपस्थिति :-

			[illegible]
१-	टेक ब० भण्डारी	[illegible]	[illegible]
२.	अग्र ब. चौधरी	अग्रबहादुरचौधरी	।।
३-	डमर दत्त भट्ट	[illegible]	[illegible]
४-	यादव गिरि	[illegible]	[illegible]
५-	नरहरि [illegible]	[illegible]	९८००६२८८२२
६-	गगन [illegible]	गगन	
७।	चन्द्र बि.क	चन्द्र [illegible]	
८	पारवती [illegible]	पारवती	
९।	गोमती पार्की	गोमती	
१०	गोरे पार्की	[illegible]	
११	पदम बि. क	पदम	
१२	शालीमान पार्की	शालीमान	
१३	भानु पार्की	भानु पार्की	
१४	गगन पार्की बि.क	गगन	
१५	रती ओड	रति ओड	
१६	उदय गुरुङ	[illegible]	[illegible]
१७	प्रताप बि.क.	[illegible]	9800626197
१८	मालती पार्की	मालती पार्की	
१९	भिम पार्की	भिमपार्की	
२०	[illegible] पन्त	[illegible]	[illegible]
२१-	नारायण पन्त	नारायण	
२२-	पुस्कर राजपन्त	पुस्कर	
२३-	हेर बि. क.	हेर	
२४-	उदय बि.क.	उदय	
२५-	नरेश बि.क.	[illegible]	
२६-	सुरेश बि.क.	[illegible]	

* राय सुझाव :-

१- यस जनताको तटबन्धले यस कृष्णपुर न. पा. वडा नं. ६ शान्ति पुर लगायत वडा नं. ८ मजगैंका बाढी बाट प्रभावित र स्थानीय बासी बाढी बाट हुने सबै न्यूनिकरण मा लाभान्वित हुने हुनाले यस कार्यलाई यथा शिघ्र कार्यान्वयन गर्न गराउन पहल गर्दै ।

२- यसको निर्माण कार्यमा यस क्षेत्रका स्थानीय दक्ष एवं अदक्ष कामदारलाई प्राथमिकता दिनु पर्ने । तथा कार्य सम्पादन एवं ढुवानी को लागी सकेका बाटाहरु सम्म स्थितीमा रहेको र स्थानीय निर्माण सामग्री संकलनमा कुनै विवाद नहुन दिने र सामुदायिक वन निति पर्ने बाट दिइको सो कार्यका लागी नष्ट हुने अवस्था आए कुनै अवरोध रहने छैन ।

३. यस कृष्णपुर नगरपालिका वडा नं. ६ शान्तिपुर स्थित विगत सालमा कार्य संचालन भै आएको तटबन्ध का. सुरु गरि याथाशिघ्र कार्यान्वयन भएमा बाढिबा. जोगिने तथा आफ्नो क्षेत्र पनि बाढिबाट संरक्षा हुने हुदा यथाशिघ्र कार्यान्वयन गर्न ।

Annex VI: Quotation for Environmental Quality Monitoring

Monitoring and Analysis Quotation

A. Air Quality Monitoring and Analysis

S. N.	Parameters	Unit Rate, (NRs)	Remarks
A.	Particulate Matter		
1.	TSPM @ 24 hours	35,000.00	24-Hour Wind Direction @ 1 hour basis and inclusive of Windrose diagram
2.	PM_{10} @ 24 hours		
3.	$PM_{2.5}$ @ 24 hours		
B.	Gaseous Pollutants		
4.	Sulphur Dioxide @ 24 hours	5,000.00	-
5.	Nitrogen Dioxide @ 24 hours	5,000.00	-
6.	Carbon Monoxide (CO) single peak time only	3,000.00	
7.	Power Backup @ 24 Hour	5,000.00	-
8.	Transportation (LS)	30,000.00	-
9.	Manpower 2 persons @ 24 hours	30,000.00	This manpower is also involved for SPL monitoring

B. Ambient Sound Pressure Level Monitoring and Analysis (Twenty Four Hour basis)

S. N.	Parameters	Unit Rate, (NRs)
1.	Daytime Average Sound Pressure Level (L_d)	5,000.00
2.	Nighttime Average Sound Pressure Level (L_n)	5,000.00
3.	Twenty-ffour Hourrage Sound Pressure Level (L_{dn})	5,000.00
4.	Percentile Level	1,500.00

Note:

- The sound pressure level will be monitored for different time zones (early morning, morning, late morning, etc.) within twenty four hour.

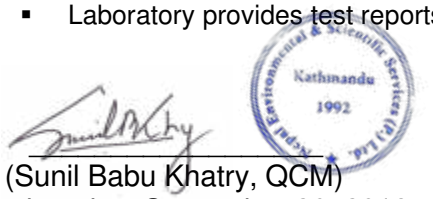
C. Water Quality Sampling and Analysis

S. N.	Parameters	Unit Rate, (NRs)
Surface Water		
1.	pH	100.00
2.	Turbidity	150.00
3.	Conductivity	150.00
4.	Total Dissolved Solids	350.00
5.	Total Suspended Solids	350.00
6.	Total Hardness	250.00
7.	Total Alkalinity	250.00
8.	Total Phosphorous	450.00
9.	Oil & Grease	750.00
10.	Biological Oxygen Demand	1,050.00
11.	Chemical Oxygen Demand	1250.00
12.	Total Nitrogen (Organic+Ammonia+Nitrate+Nitrite)	1650.00
13.	Metals (Fe+Mn+Pb+Zn)	2400.00
14.	Dissolved Oxygen	650.00
15.	*E. Coli*	1,050.00
Drinking Water		
1.	PH	100.00

S. N.	Parameters	Unit Rate, (NRs)
2.	Conductivity	150.00
3.	Turbidity	150.00
4.	Total Hardness	250.00
5.	Total Alkalinity	250.00
6.	Chloride	300.00
7.	Ammonia	450.00
8.	Nitrate	250.00
9.	Nitrite	250.00
10.	Calcium	200.00
11.	Magnesium	200.00
12.	Iron	600.00
13.	Manganese	600.00
14.	Arsenic	1050.00
15.	*E. Coli*	1250.00

Notes: We analyzed more other parameters in water and wastewater. We will provide additional quotation of analysis as per request. We advise water sampling from the different sites at a time of air and noise quality monitoring.

- Field cooperation and security to the monitoring team shall be maintained through the client.
- All the required information shall be communicated to the laboratory prior to field visit.
- About two liter sample is required for testing.
- Samples shall be appropriately labelled.
- We kindly request to contact laboratory prior to sampling.
- Laboratory provide sampling containers and preservatives.
- The payment shall be assured by the client.
- Laboratory provides test reports to the client after completion of testing and payment clearance.



(Sunil Babu Khatry, QCM)
Wednesday, September 26, 2018

Annex VII: Environmental Codes of Practice

The following table presents the environmental codes of practice (ECoP) to provide guidance in managing potential environmental impacts during construction phase.

ECoP 1.0 "Chance find" of physical cultural resources

ECoP 2.0 Managing air quality

ECoP 3.0 Managing noise and vibration

ECoP 4.0 Waste Management

ECoP 5.0 Occupational health and community safety

Area of Concern		Project Activity	Management Measures
ECoP 1.0	"Chance find" of physical cultural resources	Excavation for flood shelter foundation and other earthmoving works	The Contractor will ensure that: • Excavation works within the area of "chance find" will be stopped. • Identify and mark the area with a global positioning system (GPS) unit to determine the exact location and take photographs. • Secure the area discovered to avoid potential damage, loss or removal of any movable or transportable object. • Inform the PIU of the "chance find" and designate a security personnel until a representative from the Department of Archaelogy.
ECoP 2.0	Managing air quality	• Use of construction vehicles and machinery	Contractor will do the following: • Prepare air quality management plan as part of the overall construction management plan and consult PIU for concurrence. • Keep construction vehicles in good working condition and limit idling time of not more than 2 minutes. • Cover trucks and other vehicles transporting materials that generate dust. • Implement speed limits on vehicular movement within the construction sites. • Sprinkle water to crusher and orient workers to follow good practices while handling material in concrete-mix plant.

Area of Concern		Project Activity	Management Measures
		• Construction activities	The Contractor will do the following: • Spray water regularly (or as needed) to unpaved and opened land areas, material stockpiles, and access roads to contain dust. • Dust-generating construction activities will be enclosed to contain dust dispersion. • Workers assigned to activities generating high dust level will be provided with PPE such as masks, goggles, etc. • Must ensure that there will be minimum generation of dust and waste while unloading the materials from delivery trucks or construction vehicles. • Materials generating dust such as sand and gravel will be covered particularly during non-working hours. • Re-vegetate opened areas (if possible) to limit area of exposed land. • Stock cement and other dust-generating materials in covered space. • Provide area for mixing and loading of construction materials. • Burning of solid waste within the construction site will not be allowed. • Batching plant will be located upwind of the construction sites.
ECoP 3.0	Managing noise and vibration	• Vehicular traffic	The Contractor will ensure: • Regular upkeep and maintenance of construction vehicles to minimize generation of unwanted noise. • Drivers of construction vehicles to comply with speed limits • Use of horns will be allowed only when necessary. • Divert routes to minimize traffic, observe loading and unloading procedures, and to minimize unnecessary noise at the construction site.

Area of Concern		Project Activity	Management Measures
		• Use of construction machinery and equipment	The Contractor will ensure: • Enclosure and/or isolation of noise-generating machinery and equipment to contain noise levels. • Identify and organize all noise-generating activities to minimize increase in ambient noise levels. • Proper and regular maintenance of equipment and machinery to avoid unwanted generation of noise. • Avoid the use of alerts, horns, or sirens unless absolutely necessary like emergency.
		• Construction works	Contractor will ensure that: • Nearby local residents are notified of noise generating activities, time and duration. • Operators of heavy equipment and machineries will be educated/oriented on construction techniques to reduce generation of noise. • Temporary noise barriers or enclosures are installed, where needed. • Onsite deliveries will be planned to minimize noise from delivery trucks. • Noise-generating activities will be conducted only during daytime (7AM to 10 PM). • Schedule of noise-generating activities and deliveries of materials will be coordinated with the PIU to ensure minimal disruption to nearby settlements.
ECoP 4.0	Waste Management	• Generation of waste at construction sites	Contractor will do the following: • Identify the activities that will generate waste and identify location for disposal. • Develop waste management plan for different waste streams prior to start of construction works. • Orient workforce on disposal of waste, the location of disposal site and specific requirements for management of these sites.

Area of Concern		Project Activity	Management Measures
			• Wastes that cannot be re-used will be disposed of safely at designated sites. • Minimize generation of waste by implementing 3Rs (Reduce, Re-use, Recycle), and segregate waste at source. • Waste will be transported in fully covered trucks to prevent spillage along the way. • Provide appropriate bins/containers for waste at construction sites. • Conduct orientation to workforce on waste management practices • Require workers to observe good housekeeping at all times.
		• Handling of hazardous waste	Contractor will ensure that: • Chemical wastes are stored in sealed container and properly labeled. • All chemical containers such as paints are labeled properly for easy identification. • Material Safety Data Sheets (MSDS) of all chemicals onsite during construction are maintained and properly recorded. • Chemical and other hazardous materials are stored in bunded place or in an area lined with impervious material to prevent soil contamination and away from drainage system. • Store sufficient stock of absorbent materials for used chemicals or spent lubricants, lube oil, etc.
ECoP 5.0	Occupational health and community safety The Contractor will be responsible to include the protection of every person and nearby property from construction accidents. The	• Construction works for the flood shelters and FFEWS	The PIU and the Contractor shall inform the communities and adjacent settlements along the access roads of the following: • Schedule of construction works, routing of traffic (if needed), possible health concerns (exposure to dust, noise, and vibration).

Area of Concern		Project Activity	Management Measures
	Contractor will be responsible for complying with all safety requirements of Nepal and any other measures necessary to avoid accidents, including the following: (i) Notice or signboards shall be properly installed at the construction site (ii) Conduct safety training or orientation to workers prior to start of work; (iii) Provide required PPE to workers and its use will be mandatory; (iv) In case of an emergency, suspend all work. To maintain good community relations, the Contractor will: (i) Inform local authorities and community about construction and work schedules, interruption of services, and rerouting of traffic. (ii) Restrict construction activities at night. If needed, ensure that night work is carefully scheduled and the community is properly informed so they can take necessary measures.		Contractor will do the following: • Set-up a health and safety committee and designate a Safety Officer. • Provide workers with personal safety equipment (PPE) such as footwear, gloves and eye protection devices, helmets, etc. • Prepare an emergency action plan. • Maintain PPE properly by cleaning dirty ones and replace damaged sets. • Provide adequate lighting, drainage systems to prevent water stagnation, and adequate space to administer first aid. • Implement appropriate standards of safety to all workers and site visitors to comply with the national requirements and the World Bank-IFC Environmental, Health and Safety Guidelines 2007. • Conduct toolbox meetings prior to start of construction works. Record names of workers present during the meetings. Worker not joining toolbox meeting will not be allowed to work. • Enforce safety procedures and provide training on PPE to workers. • Designate someone to deal with community and occupational health and safety. • Clear and visible danger and warning signs shall be placed as soon as construction begins and will remain until works are completed. • Keep a record of workers and place assigned.
		• Child labor	Contractor will not hire children below 15 years old.
		• Training and record keeping	The Contractor will: • Keep a record of occupational accidents, diseases, and injuries. • Prevent work-related accidents or injury by minimizing workplace

Area of Concern		Project Activity	Management Measures
			hazards consistent with international best practice. • Ensure health care facilities and first aid kits are readily available. • Train construction workers about general health and safety practices, and on specific hazards related to their work.
		• Security of construction site	Contractor will ensure that: • Security personnel will be deployed to prevent unauthorized entry at construction site. • All the tools, equipment and construction materials at the site are accounted for, identified, clearly labeled/marked, and recorded. • Maintain a record of tools' serial numbers and check inventory on a regular basis. • Implement an inventory system where tools and equipment are checked in and out, securely stored when not in use to prevent theft. • Provide proper fencing of construction site perimeter with secured chain and lock. • Construction site will have controlled access points to allow for close monitoring of entry and exit from the site. • Workers will have proper identification while within the site. • Staff or workers required to have access to the site after working hours will be notified with the PIU. • Job site will be adequately lighted. • Pre-employment investigations are conducted to verify previous employment, references (if needed), education and criminal background.

Annex VIII: Outline of Environmental Due Diligence Report (DDR)

Name of the Sub-Project	
Address	
Telephone/Fax	
Email	
Project Investment	

1.0 Subproject Description:

(a) Introduction
(b) Existing Environmental Setting

Salient Environmental and Socioeconomic Features of the Project Area

Indicator		Description
Climate		
Rainfall		
Relative Humidity		
Windspeed		
Ambient Air Temperature		
Air Quality		
Ambient Noise Level		
Soil and elevation		
Terrestrial Ecology	Flora	
	Fauna	
Existing sources of air and noise pollution		
Existing sources of water pollution		
Source of water supply		
Availability of power		
Land use		
Demography		
Employment		

(c) A map or figure showing the environmental features of the flood shelters and its surrounding
(d) Environmental Sensitivity and Due Diligence: (REA Checklist)
(e) Budget
(f) Emergency preparedness and response plan
(g) Conclusion and Recommendation

Annex IX: Standard Construction Contract Environmental Clauses

A. Environmental Protection and Pollution Control

1. General

The Contractor shall observe and comply with all National Laws, Regulations, and Guidelines pertaining to environmental protection, pollution control, waste management, and biodiversity protection. In conducting his/her construction activities, the Contractor shall take all necessary precautions to minimize environmental disturbance to the project area and surroundings and to prevent the escape of polluting substances into streams, water courses, and ground water. The Contractor shall also utilize all necessary practicable methods and devices as are available to prevent and otherwise minimize atmospheric emissions or discharges of air contaminants.

Except where otherwise agreed or provided for by the Employer or expressly stipulated in Particular Specifications or Technical Specifications forming part of the Contract Documents, no separate payment will be made for complying with the provisions of this Clause and attendant sub-clauses; and all costs shall be deemed to be included in the prices for the Contractor's mobilization for construction, and the various rates and lump sum items for the works included in the priced Bill of Quantities.

2. Pollution of Water Courses and Streams

The emission of polluting liquids or other waste into drains, water courses, or ground water shall not be permitted.

No concrete or cement washings from the works or drainage from the Contractor's concrete batching and mixing areas, asphalt (hot mix) plants, or other manufacturing or production facilities shall be allowed to discharge into streams or drains without passing through an adequate system of settling ponds.

Storage of fuels, fueling and maintenance of equipment and vehicles, etc. shall take place only on sites and under conditions that that do not allow spilt fuels to be discharged to water bodies.

Fuel storage and fueling areas shall be equipped with adequate protective measures to confine and retain accidental spillages. No drainage from fuel store and plant maintenance depots shall be allowed to be discharged without passing through an adequate arrangement of oil traps and separators.

Washing of vehicles shall not be permitted in rivers/streams but only in specially designated and equipped areas.

Operations in quarries and borrow areas shall be carried out in such a way as to minimize any possible pollution from particulate matter entering the streams. Adequate sanitary waste control facilities shall be provided in site offices and workers camps, and sewage waste shall be collected regularly and disposed in accordance with relevant environmental legislation.

The Contractor shall accordingly be responsible for the installation, operation and maintenance of a comprehensive drainage system to all areas of the Works. The system shall be constructed such that no discharges of oil, cement, silt or other liquid or solid waste matter can enter the

streams and water courses at the site; and it shall have all necessary solid waste and sediment traps, settling ponds, oil separators, etc., required to ensure that pollution of streams watercourses and natural bodies of water does not occur. The Contractor shall be responsible for maintaining the system to the satisfaction of the Employer's Construction Supervisor and all costs of providing the system shall be deemed to be included in the various rates and lump sum items for the works included in the priced Bill of Quantities.

3. Air Quality

The Contractor shall take all necessary steps to minimize air pollution resulting from his/her operations.

Except where stipulated in these Specifications for the disposal of natural vegetation and organic materials from clearing operations, the burning of waste materials for disposal, particularly oil and petroleum wastes, rubber, plastics and similar materials will not be permitted.

During the performance of the work required under the Contract or of any operations appurtenant thereto, whether on the Project Site or elsewhere, the Contractor shall take all steps necessary, and shall furnish all labor, equipment, materials and means, required to reduce dust nuisance from the Works, and to prevent dust originating from his/her operations from damaging crops, orchards, cultivated fields, and dwellings; or causing a nuisance to persons. The Contractor shall be held liable for any damage resulting from dust originating from his operations including on Government roads, rights-of-way or elsewhere.

The emission of dust into the atmosphere shall not be permitted during the manufacture, handling and storage and handling of cement and of concrete aggregates, and the Contractor shall use such methods and equipment as are necessary for the prevention, or the collection and disposal, of dust during such operations. All truckloads of loose materials shall be covered during transportation

Concrete batching and mixing areas, or other manufacturing or production facilities shall be sited at least 500m from the nearest habitation. Emission outlets shall be fitted with pollution control devices in compliance with relevant current Government emission control legislation.

The cost of spraying water on haul roads, access roads, government roads, aggregate stockpiles, etc.; or of any other methods of reducing the formation of dust; and the cost of furnishing and applying materials to maintain the works areas, adjacent areas, and roads, in a dustless condition, shall be deemed to be included in the various rates and lump sum items for the works included in the priced Bill of Quantities.

4. Noise and Vibration

The Contractor shall take all necessary precautions to minimize the amount of noise and vibrations coming from construction activities

The Contractor shall ensure that all plant and equipment are properly maintained in good operating condition, and that noisy construction activities shall be effectively sound reduced by means of silencers, mufflers, acoustic linings or shields, acoustic sheds or screens or other

means, to avoid disturbance to any nearby noise sensitive receivers. All plant and equipment shall comply with relevant Government legislation covering sound emissions.

Operation of trucks and heavy vehicles and machinery shall be restricted to the hours of 06:30 to 19:00.

All necessary measures shall be undertaken to protect schools, hospitals and other adjacent noise sensitive receptors, including the use of noise barriers.

5. Damage to Property, Crops, and Vegetation

The Contractor shall limit the movement of his/her employees and equipment within the project area and on adjacent land, including access routes approved by the Employer's Construction Supervisor, so as to minimize damage to natural vegetation, crops and property, and shall endeavor to avoid any damage to land.

The Contractor shall strictly ensure employees and equipment do not enter any sensitive environmental areas that are demarcated as "no-entry" zones.

The Contractor shall preserve existing trees, plants and other vegetation that are to remain within or adjacent to the Works and shall use every precaution necessary to prevent damage or injury thereto. Trees or shrubs shall only be felled or removed where such impinge directly on the permanent works or necessary temporary works areas; and where such is approved by the Employer's Construction Supervisor.

On completion of the Works all areas disturbed by the Contractor's construction activities shall be restored by the Contractor to their original condition, or as may be acceptable to the Employer.

The Contractor shall be responsible directly to the Employer for any excessive or unnecessary damage to crops or lands arising from his/her operations, whether within the project area, on lands adjacent thereto, or adjacent to approved access roads: and deductions will be made from the payment due to the Contractor to cover the cost of such excessive or unnecessary damage, as determined by the Employer.

6. Occupational Health and Safety, and Environmental Health and Safety of Community

The Contractor shall comply with applicable national safety laws, rules, and regulations.

Personal protective clothing and equipment shall be furnished and maintained by the Contractor without cost to employees whenever such equipment is required as a condition of employment or is required by any national laws or regulations.

The Contractor shall provide information and training to employees on communicable diseases to which he/she may have routine workplace exposure. Information and training shall include the symptoms of diseases, modes of transmission, methods of self-protection, workplace infection control procedures, special precautions and recommendations for immunizations where applicable.

B. Reporting

The Contractor shall maintain a record of all emissions and spills of liquid, solid and gaseous matter which occur at the site, whether into water courses, streams, on land, or into the air. This record shall be compiled daily and shall include details of date, time and nature of the event, along with details of the remedial and clean-up measures carried out.

Copies of these records shall be given to the Employer monthly.

The Contractor shall also maintain a record of any complaints made by any Governmental or Community Organization or by the public, regarding his/her operations. This record shall contain the date and time of receipt of the complaint, the name and address of the complainant and the action taken to remedy the situation. Copies of these records shall be given to the Employer monthly.

C. Environmental Management Plan

The requirements of this clause and attendant sub-clauses on Environmental Protection and Pollution Control notwithstanding; the Contractor shall observe and comply with all relevant environmental protection and mitigation, monitoring, and reporting requirements in the environmental management plan (EMP) as stipulated in the Particular Specification. In the event of any conflict between the foregoing sub-clauses and the environmental protection and mitigation measures and pollution control requirements of the EMP, the EMP shall take precedence.

The Contractor shall prepare and submit to the Employer's Construction Supervisor a site specific environmental management plan (SEMP) demonstrating the manner in which the Contractor will comply with the requirements of the foregoing sub-clauses on Environmental Protection and Pollution Control, the EMP, and any particular environmental mitigation measures as stipulated in the Particular Specifications or Technical Specifications forming part of the Contract Documents.

The SEMP shall be submitted within 15 working days of the Contractor receiving the Notice to Proceed with the Works, and shall include the set of management plan listed as part of the EMP (e.g. waste management plan, dust management plan, noise management plan, surface water management plan, emergency management plan, health and safety management plan, or any other management plan as stated in the EMP). Training shall be provided to workers about the appropriate implementation of the SEMP. Construction or rehabilitation works at the sites cannot start until the SEMP is approved by the EA.

Where stipulated in the Particular Specifications or Technical Specifications forming part of the Contract Documents, and provision has been made in the Bill of Quantities; payment for the implementation of the SEMP will be made in accordance with the Unit Rates, Lump Sum or Provisional Sum Items included in the Priced Bill of Quantities.

Annex X: Nepal's Drinking Water Quality Standards

Group	Parameter	Unit	Maximum Concentration Limits
Physical	Turbidity	NTU	5 (10)**
	pH		6.5-8.5*
	Color	TCU	5 (15)**
	Taste & Odor		Would not be objectionable
	Total Dissolved Solids	mg/l	1000
	Electrical Conductivity	µc/cm	1500
	Iron	mg/l	0.3 (3)**
	Manganese	mg/l	0.2
	Arsenic	mg/l	0.05
	Cadmium	mg/l	0.003
	Chromium	mg/l	0.05
	Cyanide	mg/l	0.07
	Fluoride	mg/l	0.5-1.5*
	Lead	mg/l	0.01
	Ammonia	mg/l	1.5

Group	Parameter	Unit	Maximum Concentration Limits
Chemical	Chloride	mg/l	250
	Sulphate	mg/l	250
	Nitrate	mg/l	50
	Copper	mg/l	1
	Total Hardness	mg/l	500
	Calcium	mg/l	200
	Zinc	mg/l	3
	Mercury	mg/l	0.001
	Aluminum	mg/l	0.2
	Residual Chlorine	mg/l	0.1-0.2*
Micro Germs	E-Coli	MPN/100ml	0
	Total Coli form	MPN/100ml	95 % in sample

*Note : * These standards indicate the maximum and minimum limits*

*** Figures in parenthesis are upper range of the standards recommended*

Source : Nepal Gazette (26 June 2006)

Source: Government of Nepal, National Planning Commission. Central Bureau of Statistics. 2019 *Environment Statistics of Nepal.* Kathmandu.