Initial Environmental Examination

Project Number: 54047-001
August 2022

Bangladesh: Climate Resilient Livelihood Improvement and Watershed Management in Chattogram Hill Tracts Sector Project

Dighinala Watershed Management

Prepared by the Ministry of Chittagong Hill Tracts Affairs for the Asian Development Bank (ADB).

CURRENCY EQUIVALENTS

(as of 25 August 2022)
Currency unit – Bangladesh Taka (Tk)
Tk1.00 = $ 0.0105
$1.00 = Tk 95.04

ABBREVIATIONS

ADB	Asian Development Bank
BECA	Bangladesh Environmental Conservation (Amendment) Act, 2010
CAP	Corrective action plan
CHT	Chattogram Hill Tracts
CHTRC	Chittagong Hill Tracts Regional Council
CHTRDP	Chittagong Hill Tracts Rural Development Project
DoE	Department of Environment
DPMO	District Project Management Office
EARF	Environmental Assessment and Review Framework
ECA	Environmental Conservation Act
ECC	Environmental Clearance Certificate
ECR	Environmental Conservation Rules, 1997, Amended 2002
EMP	environmental management plan
GRC	grievance redress committee
GRM	grievance redress mechanism
HDC	Hill District Council
IEE	initial environmental evaluation
INGO	Implementing Non-governmental organization
LCC	Location Clearance Certificate
LGD	Local Government Division
LGED	Local Government Engineering Department
MoCHTA	Ministry of Chittagong Hill Tracts Affairs
O&M	Operation and maintenance
PISC	Project Implementation Support Consultants
PD	Project director
PIU	Project Implementation Units [in each Project district]
PMO	Project Management Office
PMU	Project Management Unit [at LGED headquarters]
PISC	Project Implementation Support Consultant
REA	Rapid Environmental Assessment

SEC	Small ethnic communities or tribes, minor races, ethnic sects and communities (Government of Bangladesh)
SPS	ADB Safeguard Policy Statement (2009)
ToR	Terms of References
XEN	Executive Engineer

GLOSSARY OF BANGLADESH TERMS

jhum	–	swidden or shifting cultivation
mouza	–	a small administrative area usually composed of a number of villages
para	–	similar to term village
union	–	administrative division – subdivision an upazila
upazila	–	administrative division – subdivision a district

WEIGHTS AND MEASURES

hectare	–	ha
kilometer	–	km
meter	–	m

NOTE

In this report, "$" refers to United States dollars.

Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

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EXECUTIVE SUMMARY

1. The Climate Resilient Livelihood Improvement and Watershed Management in Chattogram Hill Tracts (CRLIWM-CHT) Sector Project will serve communities not covered by the ADB-funded Chittagong Hill Tracts Rural Development Project (CHTRDP) in Bangladesh.[1] The project cost is USD150 million, where ADB will provide USD120 million as a sector project loan. Implementation period is expected to be seven years with five envisioned outputs: (Output 1) community infrastructures development, (Output 2) watershed management, (Output 3) improvement of agricultural production storage, processing and marketing, (Output 4) enhancing rural non-farm skills and capacities strengthening of CHT institutions, (Output 5) upgrading of rural roads. Chapter 1 goes into these outputs in more details. The initial environmental examination (IEE) is for the Dighinal Watershed Management Subproject. This IEE will serve as example and template for other watershed management subprojects under Output 2.

2. This IEE report primarily: (i) provides information on the proposed subproject and its requirements to ADB SPS 2009 and government policies (ii) baseline conditions of the physical, ecological, physical cultural and socio-economic environments and/or resources within the subproject's area of influence; (iii) presents information on stakeholder consultations and participation; (iv) identification of monitoring and reporting requirements; and (vii) recommends a mechanism to address grievances on the environmental performance of the project. The IEE identifies potential direct, indirect, cumulative, and induced impacts and risks to physical, biological, socioeconomic (including impacts on livelihood through environmental media, health and safety, vulnerable groups, and gender issues), and physical cultural resources in context to project's area of influence. The IEE report is prepared based on findings from on-site visits and investigations, detailed discussions with government bodies and other stakeholders such as people in paras (or villages).

3. Chapter 2 goes deeper into legislative measures required at the national level, and by ADB and international treaties. For the protection and conservation of environment, the Government of Bangladesh (GoB) has various laws and regulations for the protection and conservation of the natural environment.

4. All projects implemented under ADB financing must comply with the Safeguard Policy Statement (SPS) of 2009. ADB requires environmental assessment of all project loans, program loans, sector loans, sector development program loans, financial intermediation loans and private sector investment operations. Implementation of the environmental safeguards is the responsibility of the client/borrower, while ADB is to monitor compliance. Other requirements of SPS are screening, categorization, developing an environment management plan (EMP), information disclosure, consultation and participation, monitoring and reporting, and grievance redress mechanisms.

[1] CHTRDP-I was implemented from 2003-2010, and CHTRDP-II from 2011-2021.

5. The Environmental Assessment and Review Framework (EARF) has been prepared to support and provide guidance to the executing agency and implementing agencies to screen, categorize, prepare environmental assessments including environmental management plans, and monitor the implementation of environmental management plans in accordance with the laws of the Government of Bangladesh (GoB), and SPS 2009.

6. Chapter 3, describes the proposed Project, including its background and purpose, implementation arrangements. Project's Output 2, watershed management, will be implemented with the support of Implementing NGO (INGOs), one for each of the three hill districts. The INGOs will support the social and technical activities within the subwatersheds. The Project will be implemented over a seven-year period, with a six-month Inception Phase in Project Year 1, and a six-month project closure phase in Project Year 7.

7. The CHT is a unique multi-tiered administrative structure comprising ministry and line department counterparts, district administration, local government institutions, and CHT-specific institutions. These are the (i) Ministry of Chittagong Hill Tracts Affairs (MoCHTA) - responsible for coordinating all development activities in CHT, (ii) Chittagong Hill Tracts Regional Council (CHTRC) - supervises and coordinates all activities, (iii) Hill District Councils (HDCs)[2] - to implement activities for Outputs 1-4, and (iv) Local Government Engineering Department (LGED) – to implement Output 5.

8. The executing agency (EA) for the project is the MoCHTA. The CHTRC will be the lead implementing agency (IA), where the Project Director (PD) of the Project Management Office (PMO) will manage the subprojects with support from District Project Management Office (DPMO) at the district level. The LGED will create a Project Management Unit (PMU) to manage implementation of rural roads with the support of Project Implementation Units (PIUs) at the district level. A project steering committee (PSC) will be established under the chairmanship of Minister, MoCHTA and be responsible for overall coordination at national level and policy guidance.

9. Chapter 4 describes the subproject's background, technical specifications, and budget. The subproject aims to tackle resource use problems, food insecurity and land degradation through interventions on watershed level. Identification of watershed interventions was carried out in close consultation with the community in term of their acceptance, willingness and ability to implement. The suitability and effectiveness of the proposed watershed management interventions as well as the community's management capacity for implementation, operation and maintenance are important aspect on selecting watershed interventions. Based on this, interventions have been worked out on (i) agricultural land conservation, (ii) forest/shrub land conservation, (iii) degraded land improvement, (iv) stream bank protection, (v) water resource development, (vi) demonstration, and (vii) community infrastructure.

10. In development of the budget for the Dighinala Watershed Management Subproject, it has been assumed that out of 7 years project period, the first 2 years will be focused on inception

[2] CHT districts of Rangamati, Bandarban and Khagrachari.

activities, organizing the community, and building staff capacity and other start-up activities including those aimed at trust building with the community and social preparation. Therefore only 5 % of the budget for physical interventions is allocated in the first year. Starting from the second year, during 4 years 20% of the total budget for physical interventions will be allocated for each year. For the 6th year the remaining 15% of the total budget. The final year can then be used for project closure related activities. The community will be responsible for the O&M of the community assets and individual households for O&M of interventions on their own land benefiting themselves. O&M committees will be formed to take responsibility for maintaining community watershed management assets.

11. Chapter 5 describes alternatives in location, design and project scenario briefly. Without the watershed management interventions, it is expected that land degradation processes will continue in the Dighinala Watershed, resulting in lowered productivity of agricultural land, increased flooding during the monsoon and water shortages in the dry season. This has a knock-on effect on incomes and leads to lowered biodiversity. Also, climate resilience will be reduced in the 'without project' scenario, as degraded lands are less resilient to the vagaries of climate change.

12. Building on the previous, a detailed description of the environment is given in Chapter 6. The total sub-watershed area is 2,329 ha[3] and consists of different land use types. Agriculture land covers almost 40% of the sub-watershed and is the main source of livelihood, where 77% of the population depending on it. The main crops grown in the sub-watershed are rice, different cash crops such as turmeric, vegetables, and betel leaf, sugarcane, and broom grass. Homesteads covers an area of 733 hectares, which is basically the area covered by houses, open space and homestead gardens of fruit trees and trees. There are more than 70 ponds and reservoirs covering a total area of 26 hectares. These are the major water sources for agriculture and human use. The sub-watershed has a typically monsoon climate with about 65% of rain falling in four months from June to September.

13. On a socio-economic level, the sub-watershed consists of 29 paras with 2690 households made up of 9869 people, 4945 men and 4924 women. Agriculture and livestock are the main livelihoods of the population in the sub watershed, with 77% of the population engaged in this sector. Of the remainder 6.4 % of the HHs are service holders, whereas 5.5% of HHs have a shop, 3.2 % run a business. Based on discussions during community consultations, about 78% of the population is considered poor and very poor.

14. Chapter 7 discusses positive and negative anticipated environmental impacts and mitigation measures. The positive impacts can be summarized as (i) improved water availability in the valleys during dry period from improved irrigation, (ii) improved water availability for the water-starved communities for household use, (iii) improved production, income and livelihood, (iv) stabilization of very steep slopes of homesteads keeping the land intact for production activities, and (v) soil and water resources will be conserved. Negative impacts have been

[3] Land use assessment through Google tools with the district team, then verifying results in the field.

carefully considered, and categorized on activity, phase (operation/ construction) and type of impact (i.e., magnitude, extend, duration and significance).

15. Following, Chapter 8 goes deeper into the disclosure, consultation, and participation of involving persons interested in or affected by project activities forms a critical part of best practice project planning and environmental assessment. Three stakeholder consultations were organized in 2021 - 2022. On 19th September 2021 a meeting was held in Uttar Pukurghat Para, attended by about 25-30 participants, all from the Chakma ethnic group. And on 20th September 2021 a meeting was held in Madya Banchara Para, attended by about 70-75 participants, also all from the Chakma ethnic group. During the ADB fact-finding mission of June 2022, one other stakeholder consultation meeting was held on the 8th June 2022 at Rangapani Chara, attended by 32 community members from the local Chakma ethic group.

16. PMU and PIU, with support from PISC, will disclose safeguards information through public consultation and make available relevant documents in public locations. Documents include: subject project IEEs, the EARF, Semi-annual environmental monitoring report during project implementation until ADB issues project completion report and an updated IEE of subproject and corrective action plan prepared during project implementation.

17. Adaptive mechanisms will be used to address limitations on environmental safeguard activities and consultations due to government restrictions and COVID-19 risks

18. As explained in Chapter 9, a dedicated multi-tier grievance redress mechanism (GRM) will be established to receive, evaluate, and facilitate the concerns and complaints of the affected people on social and environmental performance. The GRM aims to ensure (i) basic rights and interests of every affected person are protected, and (ii) concerns from poor environmental or social performance of the project are addressed. There will be multiple channels by which grievances can be received by the Project Management Office. To ensure the GRM is in line with the ADB SPS, the GRM will be a time-bound, simple, transparent, gender- and culturally-responsive in addressing feedback, concerns and suggestions of, and facilitation of solutions for, all the relevant stakeholders of the

19. The GRM has three tiers (i.e., Tier 1: Community Level, Tier 2: Grievance Redress Committee, and Tier 3: Regional Advisory Council). In Tier 1, there are two types: (i) type A refers to the Alternative dispute resolution forum at subproject level - addresses land disputes for rural roads component (Output 5), and (ii) type B refers to para development committee or PDC - all other social and environmental safeguards concerns raised across project Outputs 1 - 5. For any unresolved grievances, Tier 2 will resolve complaints and concerns from Tier 1. Complaints that cannot be settled in Tier 2 should be elevated to the Regional Advisory Council. None of the three levels of the GRM possess any legal mandate or authority to resolve land issues, they rather act as an advisory body or facilitator to try to resolve issues between the affected household/person and the CRLIWM-CHT Sector Project.

20. Chapter 10 lists and outlines the Environmental Management Plan and Monitoring Report. These are to check whether the mitigation measures as mentioned are being implemented properly. For the Environment Safeguard, different institutions are in play: (i) the PMO, (ii) DPMO, (iii) PISC, (iv) Para Development Committees and/or Coordination Development Committees, (v) contractors, (vi) ADB project team. Chapter 9 gives a detailed list of tasks of these actors.

21. As conclusion and recommendation, CRLIWM-CHT Sector Project will have minor to moderate negative impacts however the extent of these impacts is expected to be site-specific and localized. With EMPs in place, the potential impacts will either be eliminated or minimized to insignificant levels. However, the EMPs needs to be updated based on the specific condition of the area and final design when the actual sites are defined. In the event of any unanticipated environmental impact(s) during implementation, PMO, with PISC's, support will update the IEE and EMP, or alternatively prepare an environmental due diligence report including EMP for ADB review and disclosure on the ADB website.

CHAPTER 1. INTRODUCTION

A. About CRLIWM-CHT Sector Project

1. The proposed Climate Resilient Livelihood Improvement and Watershed Management in Chattogram Hill Tracts Sector Project ("CRLIWM-CHT Sector Project" or "the proposed Project") will aim to enhance sustainable livelihood opportunities and access to basic services for the rural population of the Chattogram Hill Tracts (CHT) (Figure 1). The indicated project size of the proposed project is USD125 million, of which ADB will provide USD100.0 million as a sector project loan. The project implementation period is expected to be seven years.

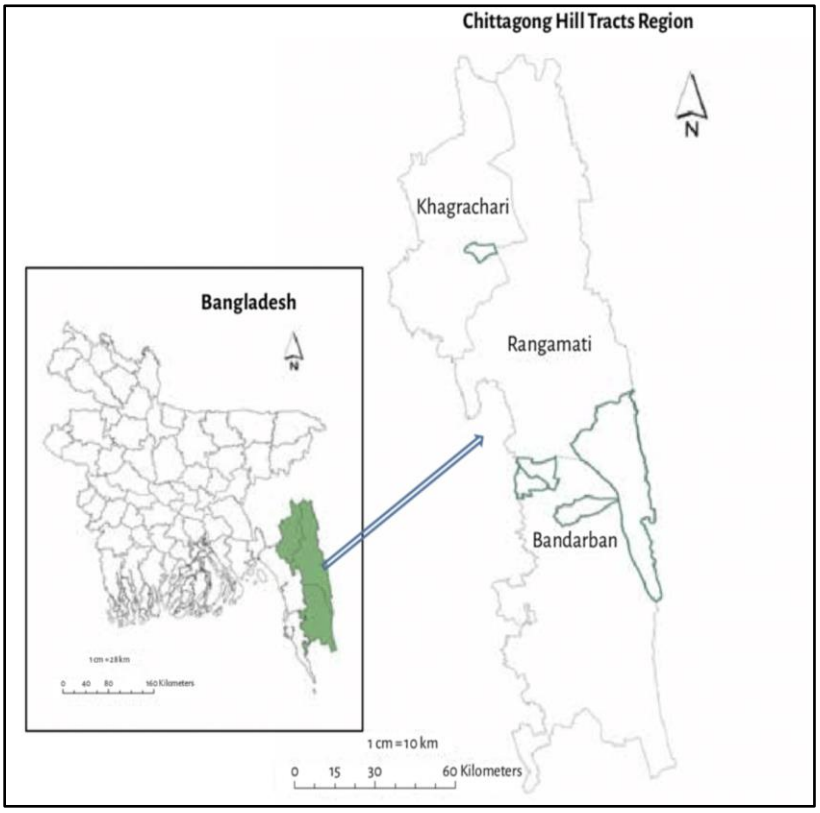


Figure 1. Map of CHT in Bangladesh covering districts of Bandarban, Rangamati and Khagrachari.[4]

2. The proposed Project will serve communities not covered by the ADB-funded Chittagong Hill Tracts Rural Development Project in Bangladesh (CHTRDP), of which CHTRDP-I was implemented from 2003-2010 and CHTRDP-II from 2011-2021.

[4] Source of map: Ahammad, Ronju & Stacey, Natasha. (2016). Forest and agrarian change in the Chattogram Hill Tracts region of Bangladesh.

3. The project is aligned with the following benefits: enhanced human health and well-being, reduced vulnerability, and improved food security of the CHT people. The project will have the following outcome: climate resilient livelihoods and access to basic services for the rural population in CHT including women and small ethnic communities (SEC) enhanced. The proposed sector project is expected to have five outputs:

4. *Community infrastructure developed (Output 1).* The community infrastructure (CI) component will follow the approach and methodology of the successful CHTRDP-II and includes three main types of village infrastructure interventions, particularly:

- small village access roads (VARs), footpaths and steps for better access to health services, schools, and markets, and provide increased economic opportunity;
- small-scale water supply, sanitation and hygiene infrastructure (WASH) and renewable energy - small-scale water supply schemes using ring wells, shallow/deep tube wells or gravity flow systems, sanitary latrines at household and community level; and
- agricultural infrastructure, including small weirs, lined channels, power tillers, and lift pumps. For women involved in weaving, weaving sheds are an additional option.

5. *Watershed management strengthened (Output 2).* Land use pressure coupled with deforestation, landslides, and bamboo and other non-timber forest products (NTFP) extraction decreased the land rotation period from 10 - 15 years to 2 - 3 years. Land being worked, with greater intensity, has resulted in soil nutrient depletion and topsoil erosion. Small catchments often remain dry in most of the pre-monsoon and post monsoon period. Proper conservation and utilization of land, water, crop and vegetation resources in watersheds have become urgent to meet people's daily basic needs for fuelwood, fodder and construction materials. This component will aim at strengthening the functioning of community-based organizations to improve climate resilient livelihoods by:

- promoting appropriate/sustainable land use and regenerative agricultural practices in fulfilling the basic needs for food, fodder, fuelwood, construction materials mainly bamboo and timber, and medicinal plants and rehabilitation of degraded lands enhancing productivity;
- improving proper water resource management, while fulfilling water needs for agriculture and human use; and
- strengthening the local stakeholders/community-based organization in planning, implementation and maintenance of watershed management interventions.

6. *Agriculture production, storage, processing and marketing improved (Output 3).* Most rural households in CHT are involved in agriculture and agricultural labour. Only small number of households have secondary income outside agriculture, and it can be an important driver for economic development. However, the returns from agriculture in the CHT are low due to a variety of reasons that include: (i) poor accessibility to markets, (ii) prevalence of low value crops, (iii) soil erosion, (iv) reduced soil fertility, (v) watershed degradation, (vi) shortened crop rotation, (vii) use of extreme sloping land, (viii) monoculture, and (ix) overexploitation of forest with no replacement programme. Improving soil health would thus contribute towards increased productivity. This can

be achieved through sustainable agricultural practices, such as regenerative agriculture, in close coordination with the watershed management component. Promising value chains will be supported by targeted training programmes and infrastructure support to improve the livelihoods of farmers cultivating these specific products. Apart from training, measures are likely to include improved collection and storage facilities for perishable produce from the region.

7. *Rural non-farm skills improved and capacities of CHT institutions strengthened (Output 4).* The proposed sector project will include a stand-alone skills development component focusing on rural non-farm skills. This is meant to strengthen skills in sectors allied to the project's main objectives.[5] The skills component will specifically target employment opportunities that will arise from implementing this project.[6] The main direct beneficiaries will be motivated rural youth, both men and women.[7] Capacity building measures to strengthen implementing agencies and implementing non-government organizations (INGOs) also are included in the component.

8. *Rural roads improved (Output 5).* The rural roads component aims at upgrading existing roads in the target areas. As Implementing Agency (IA), Local Government Engineering Department (LGED) will work through its district level offices, with *upazila* officers.[8] When making the final selection of roads targeted for improvement, elected and non-elected officials at various levels will be consulted by LGED, with the shortlist then to be submitted to the CHTRC for approval. During the implementation phase of the CRLIWM-CHT Sector Project, a next batch (SPB-2) of around 50 km would then need to be prepared for implementation and are expected to include unpaved, earthen union and *upazila* roads, and potentially require more land acquisition as they require road widening.

9. The first four outputs of the proposed Project will be implemented by the Chittagong Hill Tracts Regional Council (CHTRC) and the Hill District Councils (HDCs) – IAs. The last component (Output 5) will be implemented by the LGED. The Ministry of Chittagong Hill Tracts Affairs (MoCHTA) is the Executing Agency (EA).

B. Purpose of the IEE Report

10. For environmental safeguards, the proposed Project is a category "B" based on Safeguards Policy Statement (SPS, 2009) classification system, and and an initial environmental examination (IEE) report is hence required by ADB for the watershed management subproject. This report serves to assess and document potential environmental impacts that may arise due to the proposed interventions under the subproject. Accordingly, the IEE report identifies and recommends mitigation measures to mitigate the impacts and/or reduce their magnitude. An

[5] Examples of skills allied to the project's main objectives are construction related skills, improving available workmanship, agricultural processing techniques, and maintenance skills for agricultural equipment.

[6] Including latent demand that will become realized once this project is implemented.

[7] Training under consideration is for motor and pump mechanics, masonry and carpentry, cement ring production (for latrines), food processing (linked to agriculture component), weaving, tailoring, automotive mechanics, electrical installation and maintenance, e-commerce/entrepreneurship, mobile phone servicing, plumbing, and sewing machine operation.

[8] Responsible for surveys, with designs being prepared by the LGED design office in Dhaka.

environmental management plan (EMP) is produced covering the environmental impacts, environmental monitoring program, and the responsible entities for mitigation and monitoring.

11. Further, this IEE report primarily: (i) provides information on the proposed subproject interventions and its requirements to ADB SPS 2009 and government policies (ii) baseline conditions of the physical, ecological, physical cultural and socio-economic environments and/or resources within the subproject's area of influence; (iii) presents information on stakeholder consultations and participation; (iv) identification of monitoring and reporting requirements; and (vii) recommends a mechanism to address grievances on the environmental performance of the project.

12. This initial environmental examination (IEE) is for the Dighinala Watershed Management Subproject which is to be funded under the Output 2 of the sector project. It is expected that the IEE will serve as an example and template for other watershed management subprojects for project readiness and implementation under this component.

C. Scope of the IEE Report

13. The IEE for Dighinala Watershed Management Subproject captures the environmental setting of all the subproject site including physical, biological, and socioeconomic conditions and the national and local legal setting, as well as international environmental agreements that are relevant to the project. Based on these, the IEE potential environmental impacts to physical, biological, socio-economic (including impacts on livelihood through environmental media, health and safety, vulnerable groups, and gender issues), and physical cultural resources in context to project's area of influence.

14. The IEE report is prepared based on findings from on-site visits and investigations, detailed discussions with CHTRC, HDC and other stakeholders such as people in paras (or villages).

CHAPTER 2. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

15. CHT was a self-governed independent territory until it was annexed to the province of Bengal in 1860 by the British. In 1900, the *Chittagong Hill Tracts Regulation* declared the area as an 'Excluded Area' restricting 'outsiders' from purchasing land or settling in the CHT. With independence from the British in 1947, the CHT was included as part of East Pakistan. In 1962, the Government of Pakistan replaced the 'Excluded Area' status to 'tribal area' with the intention of settling outsiders in the CHT. In 1971, following the *Liberation War of Bangladesh*, the CHT became part of Bangladesh.

16. The CHT has a unique multi-tiered administrative structure comprising ministry and line department counterparts, district administration, local government institutions, and CHT-specific institutions. These are MoCHTA – responsible for coordinating all development activities in CHT, CHTRC – supervises and coordinates all activities, and HDCs – to implement activities. There are also traditional institutions of circle chiefs, headmen, and *karbari.*[9]

A. Environmental Legislation

17. The Government of Bangladesh has various laws and regulations for the protection and conservation of the natural environment. A number of these environmental laws and regulations are summarized in this section. The concept of environmental protection through national efforts was first recognized and declared in Bangladesh with the 1992 adoptions of the Environment Policy and Environment Action Plan. This was followed up by the Bangladesh Environmental Conservation Act (BECA) of 1995 (as amended in 2002 and 2010) is the umbrella Act that includes laws for (i) conservation of the environment, (ii) improvement of environmental standards, and (iii) control and mitigation of environmental pollution. It is currently the main legislative framework document relating to environmental protection in Bangladesh.[10]

18. The Environment Conservation Rules (ECR) 1997 (as amended 2003 and 2010) are the first set of rules, promulgated under the BECA 1995. Among other things, the ECR 1997 sets (i) the National Environmental Quality Standards for ambient air, various types of water, industrial effluent, emission, noise, vehicular exhaust etc., (ii) requirement for and procedures to obtain environmental clearance certificate (ECC), and (iii) requirements for IEE and EIA according to categories of industrial and other development interventions.

19. BECA of 1995 provides the Director General (DG) a discretionary authority to grant ECC to an applicant by exempting the requirement of site or location clearance, provided the DG considers appropriate. Presently, "EIA Guidelines for Industries" published by the Department of Environment (DoE) and the ECR 1997 are the formal documents providing guidance for conducting Environmental Assessment. Any proponent planning to set up or operate an industrial project is required to obtain an ECC from the DoE, under the ECA 1995 amended in 2002.

[9] This is the village headman. The circle chief, headmen, and karbari were established by CHT Regulations of the year 1900.

[10] ECA of 1995 repealed earlier Environment Pollution Control ordinance of 1977.

20. The environmental category of any project is listed in Schedule-1 of ECR. As per Schedule 1 of ECR, interventions under the watershed management will not trigger requirement under this rule.

B. Regulatory Requirements for the Proposed Project

21. In respect with environment and social considerations, list of national legal instruments with relevance to the interventions under Dighinala Watershed Management Subproject is shown in the table below.

Table 1. National policies relevant with Dighinala Watershed Management Subproject.

Act/ Rule/ Law/ Ordinance/SRO	Enforcement Agency – Ministry/ Authority	Key Features
National Environmental Policy 2018	Ministry of Environment, Forests and Climate Change	Ensure sustainable development through environmental conservation, pollution control, conservation of biodiversity and by combating the negative impacts of climate change. With specific objectives: • maintaining natural balance and ensuring overall development of the country through conservation of environment and sustainable management; • expansion of climate change adaptation programs to reduce its negative impacts; • introduce and encourage wide-spread use of low-carbon emitting technology; • identification control of all types of pollution and degradation of environment; • ensuring environment friendly development in all sectors.
Environment Court Act, 2000 and subsequent amendments in 2002	Ministry of Environment, Forests and Climate Change; and Judiciary	• Government of Bangladesh has given highest priority to combat environment pollution • Passed 'Environment Court Act, 2000 for completing environment related legal proceedings effectively • Applicable for completing environmental legal requirements effectively
Road Transport Act 2018 The Motor Vehicles Ordinance, 1983 The Bengal Motor Vehicle Rules, 1940	Bangladesh Road Transport Authority	• Exhaust emissions • Vehicular air and noise pollution • Road/traffic safety • Vehicle licensing and registration • Fitness of motor vehicles • Parking by-laws.
Water Supply and Sanitation Act, 1996	Ministry of Local Government, Rural Development and Cooperatives	• Management and control of water supply and sanitation in urban areas. • Not directly applicable, however, indirectly applicable when considering water usage management and sanitation facilities

Act/ Rule/ Law/ Ordinance/SRO	Enforcement Agency – Ministry/ Authority	Key Features
The Ground Water Management Ordinance, 1985	Upazila Parishad	• Management of ground water resources • Installation of tube-wells at any place after license from Upazila Parishad only • Proposed interventions will use surface water source however, should groundwater also be required then licenses will need to be obtained prior to installation of any tube wells.
The Forest Act, 1927 and subsequent amendments in 1982 and 1989	Ministry of Environment and Forests	• Categorization of forests as reserve, protected and village forests • Permission is required for use of forest land for any non-forest purposes • Applicable if the proposed subproject is in the forest land Area (Chattogram Hill Tracts Region)
Bangladesh Wild Life (Preservation) Act, 1974	Ministry of Environment and Forest; Bangladesh Wild Life Advisory Board	• Preservation of wildlife sanctuaries, parks, and reserves • Applicable if the proposed subproject is in the wildlife sanctuaries, parks, and reserves (Chattogram Hill Tracts Region)
National Biodiversity Strategy and Action Plan (2004)	Ministry of Environment and Forest Bangladesh Wild Life Advisory Board	• Conserve, and restore the biodiversity of the country for wellbeing of the present and future generations • Maintain and improve environmental stability for ecosystems • Ensure preservation of the unique biological heritage of the nation for the benefit of the present and future generations • Guarantee the safe passage and conservation of globally endangered migratory species, especially birds and mammals in the country • Stop introduction of invasive alien species, genetically modified organisms and living modified organisms
National Water Bodies Protection Act, 2000	Town development authority/ Municipalities	The characterization of water bodies as rivers, canals, tanks or flood plains identified in the master plans formulated under the laws establishing municipalities in division and district towns shall not be changed without approval of concerned ministry
The Protection and Conservation of Fish Act 1950 subsequent amendments in 1982	Ministry of Fisheries and Livestock	Protection and conservation of fish in Government owned water bodies
The Embankment and Drainage Act 1952	Ministry of Water Resources	An Act to consolidate the laws relating to embankment and drainage and to make better provision for the construction, maintenance, management, removal and control of embankments and water courses for the better drainage of lands and for their protection from floods, erosion and other damage by water
Antiquities Act, 1968	Ministry of Cultural Affairs	• This legislation governs preservation of the national cultural heritage, protects and controls ancient monuments, regulates antiquities as well as the maintenance, conservation and restoration of protected sites and monuments, controls planning, exploration and excavation of archaeological sites • Not applicable as the subproject study areas do not have any likely cultural heritage or ancient monuments of national or

Act/ Rule/ Law/ Ordinance/SRO	Enforcement Agency – Ministry/ Authority	Key Features
		international significance. However in case, any such evidence of archaeological findings arise, the subproject will act in consonance to the Act.
Administrative and Regulatory Guidelines and Instructions for Land Acquisition	Ministry of Land	• Regulation of land acquisition process by certain administrative instructions and procedural requirements
Ozone Depleting Substances (Control) Rules, 2004	Ministry of Environment and Forests	• Ban on the use of Ozone depleting substances • Phasing out of Ozone depleting substances
Noise Pollution (Control) Rules 2006	Ministry of Environment and Forests	• Prevention of noise pollution • Standards for noise levels

C. Applicable Standards

22. The ECR, 1997 provides the environmental standards applicable to watershed management component of CRLIWM-CHT Sector Project. Schedule 2 of the ECR presents the national standards for ambient air quality, while Schedule 4 presents the national standards for ambient noise. Following requirements of ADB SPS 2009, watershed management subproject will apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in World Bank Group's Environment, Health and Safety Guidelines.[9] When the Government of Bangladesh regulations differ from these levels and measures, subproject will achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific subproject circumstances during implementation, the EA will provide full and detailed justification in environmental monitoring reports for any proposed alternatives that are consistent with the requirements presented in ADB SPS 2009.

23. In view of this, tables below show the ambient air quality standards and noise level standards with corresponding World Health Organization (WHO) standards.

Table 2. Ambient air quality standards of Bangladesh and WHO air quality guidelines.

Parameter	Bangladesh Ambient Air Quality Standard (µg/m3) [a]	WHO Air Quality Guidelines (µg/m3)		Applicable to ADB-funded Projects Per ADB Safeguard Policy Statement [d] (µg/m3)
		Global Update [b] 2005	Second Edition [c] 2000	
TSP	200 (8-h)		-	200 (8-h)
PM_{10}	50 (1-year) 150 (24-h)	50 (24-h) 500 (10-min)	-	50 (24-h)
$PM_{2.5}$	15 (1-year) 65 (24-h)	10 (1-year) 25 (24-h)	-	25 (24-h)
SO_2	80 (1-year) 365 (24-h)	20 (24-h) 500 (10-min)	-	20 (24-h)
NO_2	100 (1-year)	40 (1-year) 200 (1-h)	-	40 (1-year) 200 (1-h)
CO	10,000 (8-h) 40,000 (1-h)	-	10,000 (8-h) 100,000 (15-min)	10,000 (8-h)
Lead	0.5 (1-year)	-	-	0.5 (1-year)
Ozone (O_3)	235 (1-h) 157 (8-h)	100 (8-h)	-	100 (8-h)

ADB = Asian Development Bank, CO = carbon monoxide, h = hour, µg/m3 = microgram per cubic meter, min = minute, NO_2 = nitrogen dioxide, $PM_{2.5}$ = particulate matter 2.5 microns, PM_{10} = particulate matter 10 microns, SO_2 = sulphur dioxide, TSP = total suspended particle, WHO = World Health Organization.

[a] Based on SRO 220-Law 2005 (Amendment of Schedule 2 of ECR, 1997). Air Quality Management Project of Bangladesh http://www.doe-bd.org/aqmp/standard.html

[b] IFC World Bank Group. 2007. Environmental, Health and Safety General Guidelines. Washington, D.C.

[c] WHO Regional Office for Europe. 2000. Air Quality Guidelines for Europe, Second Edition. Copenhagen.

[d] If less stringent levels or measures are appropriate in view of specific project circumstances, executing agency will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS

Table 3. Ambient noise level standards of Bangladesh and WHO noise level guidelines.

Receptor/ Source	National Noise Standard Guidelines, 2006[a] (dB)		WHO Guidelines Value for Noise Levels Measured Out of Doors [b] (One Hour LAq in dBA)		Applicable Per ADB Safeguard Policy Statement [c] (dBA)	
	Day	Night	Day	Night	Day	Night
Industrial area	75	70	70	70	70	70
Commercial area	70	60	70	70	70	60
Mixed area	60	60	55	45	55	45
Residential area	55	45	55	45	55	45
Silent area	50	40	55	45	50	40

[a] Schedule 4 of ECR, 1997 (as amended in 2006).

[b] WHO. 1999. Guidelines for Community Noise; World Bank Group. 2007. Environmental, Health and Safety General Guidelines. Washington, D.C.

c If less stringent levels or measures are appropriate in view of specific project circumstances, the executing agency will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

Table 4. Noise limits for various working environments

Location/ activity	Equivalent Noise LAeq, 8h	Maximum LAmax, fast
Heavy Industry (no demand for oral communication)	85 dB(A)	110 dB(A)
Light Industry (decreasing demand for oral communication)	50 – 65 dB(A)	110 dB(A)
Open offices, control rooms, service counters or similar	45 – 50 dB(A)	--
Individual offices (no disturbing noises)	40 – 45 dB(A)	--
Classrooms, lecture halls	35 – 40 dB(A)	--
Hospitals	30 – 35 dB(A)	40 dB(A)

Note: For acceptable indoor noise levels for residential, institutional, and education settings refer to WHO (1999)

Table 5. Noise exposure limits for work environment (in dBA)

Noise Levels (dBA)	Permissible Exposure (time)	Noise Levels (dBA)	Permissible Exposure (time)
85	16 hrs	111	26 min
87	12 hrs 6 min.	114	17 min
90	8 hrs	115	15 min
93	5 hrs 18 min	118	10 min
96	3 hrs 30 min	121	6.6 min
99	2 hrs 13 min	124	4 min
102	1 hr 30 min	127	3 min
105	1 hr	130	1 min
108	40 min	-	-

Note: Exposure above or below the 90 dBA limit have been time weighted to give what OSHA believes are equivalent risks to a 90 dBA 8 hr. exposure (Marsh, 1991, p.322).

Table 6. Standards for drinking water of Bangladesh

Parameters	Unit	DoE (Bangladesh) Standard for drinking water
pH	-	6.5-8.5
Hardness(as $CaCO_3$)	mg/L	200-500
Iron	mg/L	0.3-1.0
Chloride	mg/L	150-600
Arsenic	mg/L	0.05
Residual chlorine	mg/L	0.2
Total Coliform	n/100mL	0
Fecal Coliform	n/100mL	0
Ammonia	mg/L	0.5
Nitrate	mg/L	10
Phosphate	mg/L	6

Source: ECR'97, Schedule-3

Table 7. Surface water quality standards

Standard	pH	Ec µS/cm	DO mg/l	BOD^{5d} mg/l	COD (mg/l)	TSS mg/L	TDS mg/L	Fe mg/l	Mn mg/l	As ppb	Turbi-dity NTU	NO3-N mg/l	Cl- mg/l	Tota Coliform cfu/100ml
Standard per ECR,1997 (Schedule 3A)	6.5-8.5		5 0r abo ve	6 or less	NYS			NYS	NYS	NYS		NYS	NYS	5000 or less
Standard per ECR,1997 (Schedule 10)	6-9		4.5-8	50	200			2	5	20		10	600	NYS

Table 8. Groundwater quality standards

Standard	pH	DO (mg/l)	BOD^{5d} (mg/l)	COD (mg/l)	EC (µs/Cm)	Fe (mg/l)	Mn (mg/l)	As (ppb)	NO3-N (mg/l)	Chlo-ride (mg/l)	TSS (mg/l)	TDS (mg/l)
Standard per ECR,1997 (Schedule 3B)	6.5-8.5	6.0 or above	0.2	4.0	NYS	0.3-1.0	0.1	50.0	10.0	150-600		1000

D. ADB Safeguard Policy Statement (SPS, 2009)

D.1. ADB SPS 2009 Objective

24. The objective of SPS 2009 is to "ensure the environmental soundness and sustainability of projects and to support the integration of environmental considerations into the project decision-making process." All projects implemented by ADB are to comply with the SPS 2009. ADB requires environmental assessment of all project loans, program loans, sector loans, sector development program loans, financial intermediation loans and private sector investment operations. Implementation of the environmental safeguards is the responsibility of project EA and IAs, while ADB is to monitor and provide guidance to compliance.

D.2. Requirements

25. *Screening.* Environmental category is a function of project location, scale, the most sensitive environmental components, and the magnitude of potential environmental impacts (including direct, indirect, cumulative, and induced). Projects are assigned to one of four categories, which are:

- *Category A* – where projects are likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. The impacts may affect an area larger than the sites or facilities subject to physical works. Such projects require an environmental impact assessment (EIA).
- *Category B* – where potential adverse impacts are less than those of Category A. Impacts are generally site specific, few if any are irreversible, and in most cases mitigation

measures can be designed more readily than for Category A projects. Such projects require an IEE.

- *Category C* – incurs minimal or no adverse environmental impact and thus does not require environmental assessment, although environmental implications need to be reviewed. Environmental Due Diligence will be adequate for such projects; and
- Category FI refers to projects that involve investment of ADB funds through a financial intermediary and is not applicable to the present Project.

26. *Categorization.* The watershed management component of CRLIWM-CHT Sector Project potentially has moderate environmental impacts and subproject under this component (including the Dighinala Watershed Management) is classified as *Category B* according to the ADB SPS 2009 and require an IEE. Watershed interventions may potentially impact surface waters, lead to erosion, and have a range of possible impacts on adjacent communities (e.g., due to noise, dust, etc.).

27. *Environmental Management Plan (EMP).* To address potential impacts and risks identified by the environmental assessment, an EMP is prepared. The level of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the subproject's impact and risks. As one of the commitment of contractors, and EA and IA, EMP will be part of Output 2 implementation. The details of EMP for the watershed management subproject are shown in Section 11.

28. *Information disclosure.* Information about environmental safeguard issues is to be made available in a timely manner, in an accessible place, and in a form and language(s) understandable to affected people and to other stakeholders, including the public, so they can provide meaningful inputs into project design and implementation. For illiterate people, suitable communication methods are to be used. Specific information and recommendation for information disclosure is discussed in Section 9.

29. *Consultation and participation.* Communities, groups, or people affected by proposed projects, and civil society are to be engaged through information disclosure, consultation, and informed participation in a manner commensurate with the risks to and impacts on affected communities. Section 9 discusses the results of public consultation with stakeholders and beneficiaries.

30. *Monitoring and reporting.* The EA and/or IA will (i) monitor implementation of EMP, verify compliance with safeguard measures and progress toward intended safeguard outcomes; and (ii) prepare and disclose environmental monitoring reports (EMRs). As part of monitoring, EA and IAs will identify necessary corrective actions[11], prepare corrective action plan (CAP) and reflect this plan in EMRs. The EA and IAs will implement these corrective actions and ensure effectiveness to put non-compliance back on track.

[11] In case of non-compliance with environmental safeguards during project implementation, CAP will be prepared by the EA/IA.

31. *Grievance Redress Mechanisms (GRM).* Projects are to develop and maintain a GRM to receive and facilitate resolution of affected peoples' concerns and grievances on environmental and social performance. The GRM is to address concerns and complaints promptly, using understandable and transparent processes that are gender responsive, culturally appropriate, readily accessible to all segments of the affected people, and that do not impede access to the national judicial or administrative remedies. Section 10 of the IEE discusses the GRM process common for environment and social safeguards.

D.3. Environmental Assessment and Review Framework (EARF)

32. The EARF has been prepared to support and provide guidance to MoCHTA (or EA), and CHTRC and LGED (or IAs) forscreening subprojects and respective interventions, environmental safeguards categorization, prepare environmental assessments including environmental management plans, and monitor the implementation of environmental management plans in accordance with the laws of the Government of Bangladesh GoB, and ADB's Safeguard Policy Statement (2009). The EARF includes an outline of the legal and regulatory setting provided by GOB and ADB and provides an overview of potential environmental and social impacts expected by the sector project. The EARF also sets out what needs to be done, rationale and process from a sector project cycle perspective. Different annexes of the EARF provide formats for various environmental safeguards documentations.

E. International Treaties

33. Of the international environmental agreements to which Bangladesh is a party, those potentially relevant to Output 2 are listed below. Their relevance will depend on whether natural habitats will be affected by the subproject and to which degree, and whether potentially affected areas also include wetlands. At present it seems unlikely that Dighinala Watershed Management Subproject actions will create the need for invoking these conventions, but these cannot be ruled out.

- Convention on Wetlands of International Importance (also known as the Ramsar Convention, 1971; Bangladesh 1992); this promotes conservation and wise use of all wetlands.
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES Convention, 1975, Bangladesh 1981), this aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival.
- Convention on Biological Diversity (1993, Bangladesh 1994); this addresses two objectives (i) sustainable use of biological diversity components, (ii) fair and equitable sharing of genetic resources utilization benefits.
- Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or Bonn Convention) (1983; Bangladesh 2005) - addresses conservation of terrestrial, marine, and avian migratory species throughout their ranges, including conservation of migratory species habitats.

CHAPTER 3. DESCRIPTION OF THE PROJECT

A. Project Background and Purpose

34. The proposed Project will contribute to improving livelihoods and sustainable use of natural resources in the CHT while increasing resilience to climate change. It will do so by addressing selected deficiencies in the five forms of capital that are needed to support holistic and sustainable development of livelihoods of communities. Specifically, the project will address physical capital by improving roads and bridges and small-scale water supply and irrigation schemes, and providing agricultural equipment. It will build human capital by improving vocational skills in rural non-farm sector and developing capacity of CHT institutions and stakeholders. Social capital will be improved by strengthening the local government institutions to continue the system of participatory bottom-up planning and implementation of subprojects that has been established under the CHTRDP-II. Natural capital will be improved by supporting the restoration of critical watersheds through village community forest management, improving sustainable agricultural land management practices, and implementing a few pilot projects in rural solid waste management. Finally, financial capital will be enhanced by channeling public funds for infrastructure development and promoting private investment in market links and basic agro-processing facilities.

35. The proposed Project will enhance the climate and disaster resilience of CHT infrastructure and livelihoods. The CRLIWM-CHT Sector Project will do so by: (i) scaling up the watershed management pilot projects done under CHTRDP II into a comprehensive component on integrated watershed management along with improved hydro-met monitoring facilities; (ii) introducing more sustainable measures for roadside slope and riverbank protection adopting bioengineering techniques; (iii) incorporating climate proofing measures in the design of infrastructure; (iv) incorporating climate adaptation and disaster risk reduction measures in the agriculture production and processing interventions; and (v) strengthening capacity of the CHT institutions to assess and manage climate risks.

36. *Output 1: Community infrastructure developed*. This output will support infrastructure interventions aimed at improving village access, water supply and sanitation, household renewable energy supply, and agriculture productivity. Intervention have been grouped in three categories: (i) village access roads (VAR) including footpaths and steps; (ii) WASH and renewable energy, and (iii) agriculture infrastructure (Agri-infra.

37. The first 421 paras to be supported by the proposed Project were selected by the CHTRC in consultation with the respective HDCs. The remaining 579 paras will be selected in a similar manner within the first year of project implementation, ensuring that all ethnic communities in the CHT are represented. The infrastructure interventions are identified through a participatory needs assessment and planning process involving the communities of selected paras. It is expected that about 85 additional such Union-scale subprojects[12] will be implemented during the project.

[12] A Union is the lowest administrative tier, coming below the upazila (sub-district).

38. *Output 2: Watershed management improved*. This output will involve participatory watershed management interventions to improve the CHT's resilience to climate change, mitigate risks from natural disasters and to support sustainable land use and regenerative agricultural practices. These measures will address food security and water security concerns of beneficiary communities. Watersheds are selected based on criteria including the level of degradation. Interventions are selected using resource mapping and participatory planning methods involving Para Development Committees (PDC) and Village Common Forest (VCF) Groups. Interventions will focus on: (i) agriculture land conservation; (ii) forest/shrub land conservation; (iii) degraded land improvement; (iv) stream bank protection; (v) water resources development; (vi) demonstration of good agricultural practices. Monitoring arrangements combining geographical information system (GIS) and field-based approaches will also be included under this Output. Activities will be implemented by beneficiary communities, facilitated by an NGO. Local contractors will implement more complex civil works. The capacity of community-based organizations in planning, implementation and maintenance of watershed management interventions will also be strengthened. The component will support a total of 9 sub-watersheds, with an average size of 1,350 ha. per watershed, benefiting a total population of around 75,000 people in 180 paras.

39. *Output 3: Agriculture production, storage, processing and marketing improved*. This output will support farmers' (including women farmers) participation in agriculture value chains. The output will: (i) improve farmers skills and knowledge to participate in value chains of locally produced fruits, vegetables, spices, condiments, and livestock; (ii) provide farmers with better skills and knowledge to improve their cultivation practices, add new produce to their mix, and access backward linkages to procure improved inputs and applies these in a judice manner; (iii) coordinate with institutions to identify and address bottlenecks in value chain development; and (iv) link farmers with market through engagement with private sector value chain operators. INGO will support farmers in 9 upazilas to improve cultivation practices and market linkages together with private sector and business service providers. The project will build on work done during CHTRDP-II and focus on high value vegetables, fruits, pond fisheries, spices and medical plants, and poultry as main product groups. Farmers will be organized in common interest groups around one of these categories.

40. *Output 4: Rural non-farm skills improved and capacities of CHT institutions strengthened.* This component will target rural youth (both men and women), especially from small ethnic communities (SEC), to participate in skills training in sectors allied to the project's main objectives. The skills component will specifically target employment opportunities that will arise from implementing this project itself – including the demand that will become realized once this project is implemented. Training will be delivered by specialized technical and vocational education and training (TVET) institutes and NGOs. Skills development will increase the resilience of rural communities by providing new non-farm employment and preparing them to cope with climate change impacts. The training will focus on developing rural non-farm skills that are relevant and in demand, enabling skilled youth to remain in the CHT. The component will also strengthen capacities of local government and project implementation entities for climate adaptation and disaster preparedness, especially in relation to the watershed and agriculture value chain components.

41. *Output 5: Rural Roads Improved.* The project will undertake upgrading and improving of around 130 km of rural roads to enhance connectivity and resilience to climate change. Road surfaces will be upgraded to herringbone brick (HBB) surfaces or bituminous coated surfaces. New or improved bridges will be included together with drainage infrastructure which takes into consideration the climate scenarios for the CHT. The first batch of subprojects (SPB-1) – comprising of 15 union and upazila roads with a total length of 94 km – will constitute part of the project readiness requirement.

42. Nature-based, bioengineering techniques will be integrated in road design to protect hill slopes and riverbanks adjacent to roads from erosion and landslides. These interventions will institutionalize bioengineering solutions at a policy/corporate level within LGED. [13] This will reduce emergency maintenance and losses incurred by road users due to such events. Measures to improve road safety in the hilly CHT region are also being integrated in designs. The LGED will allocate sufficient budget to maintain completed roads in accordance with their standard procedures.

43. The rural roads rehabilitation component of the Sector Project aims at upgrading existing roads in the target areas, which are often in a poor to very poor condition and form a significant barrier to development of rural communities. Poor access not only hampers economic development but also leads to reduced access to health and education facilities and plays a much broader role in overall well-being.

B. Lessons Learned from Previous Projects

44. Two successive Chittagong Hill Tracts Rural Development Projects supported by ADB have significantly improved living conditions and livelihood opportunities of almost 900,000 CHT people in around 1,600 Paras.[14] Together these projects have: (i) improved 445 km of access roads; (ii) developed around 55,000 community infrastructure facilities (e.g. small-scale water supply schemes, irrigation canals, village roads and steps); (iii) provided basic agriculture equipment (power tillers, water pumps) to around 135,000 communities; (iv) supported crop diversification and marketing in around 2,600 communities; and (v) improved capacity of CHT agencies and farmers.

45. The key lessons learned from these projects were: (i) implementing arrangements involving communities and all levels of government through a bottom-up process were essential in ensuring inclusiveness and equity in the delivery of interventions; (ii) improved access and community infrastructure especially, piped water supply schemes were highly valued by communities since they reduced time spent collecting water and reduced water-borne illnesses significantly; (iii) for the rural road component, the risk from climate induced disasters (e.g, erosion and landslides) was a key issue to be addressed to protect investments, where bioengineering solutions will help mitigate these risks to infrastructure; (iv) delays in approval and implementation

[13] This support is provided through TA 9461-REG: Protecting and Investing in Natural Capital in Asia and Pacific.
[14] Chittagong Hill Tracts Rural Development Project I was implemented from October 2002 to February 2010 and Chittagong Hill Tracts Rural Development Project II commenced in December 2011 and was completed in June 2021.

of Land Acquisitions and Resettlement Plans (LARPs) occurred when District Commissioners did not understand ADB safeguards policies as well as customary land laws applicable in the CHT. These delays will be mitigated by taking advanced action during project preparation.

C. Implementation Arrangements

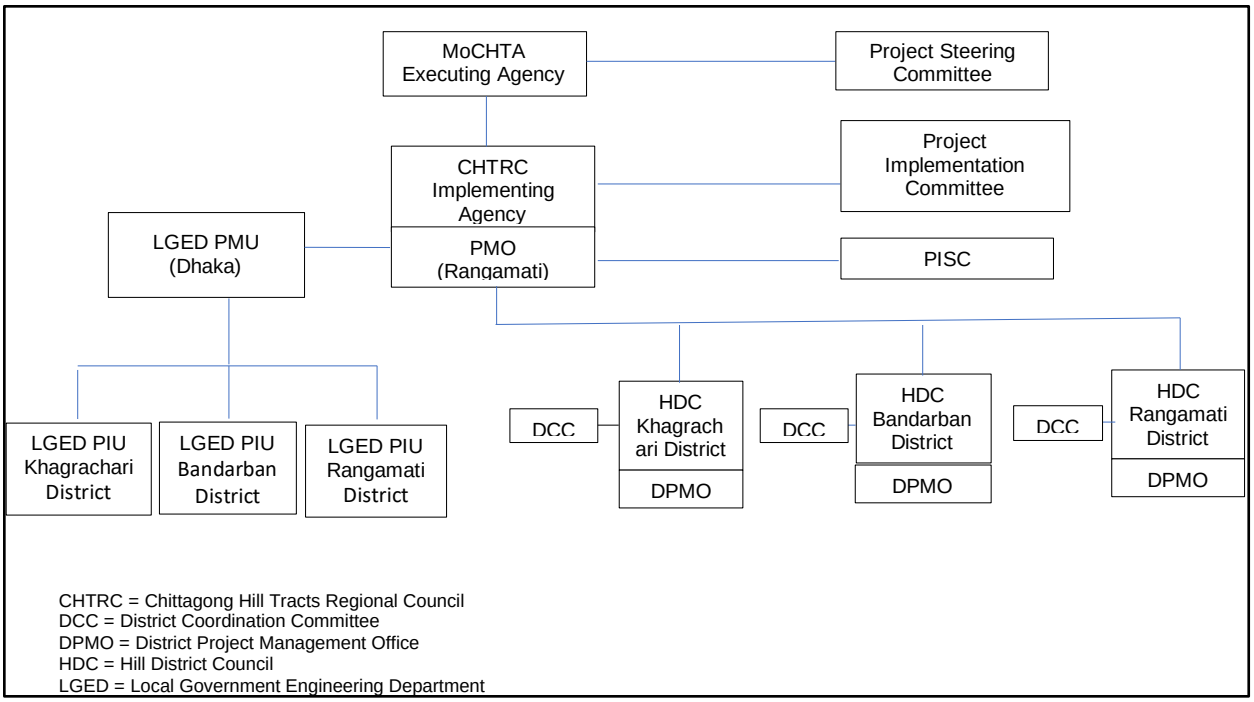
C.1. Project Schedule

46. The implementation period of CRLIW-CHT Project will be from 2023 to 2029. In the span of seven years, the proposed Project will enhance human health and well-being, reduced vulnerability, and improved food security of the CHT people. By June 2030, all targets under the five components are achieved (Annex 1).

C.2 Institutional and Implementation Arrangements

47. MoCHTA will be the executing agency and will be responsible for overall project implementation. The CHTRC will be the lead implementing agency and the LGED will be the implementing agency for the rural road component. A Project Management Office (PMO) headed by a Project Director (PD-PMO) will be established within the CHTRC, to manage and closely coordinate project activities across all agencies. LGED will establish a Project Management Unit (PMU) headed by a Project Director (PD-LGED), and Project Implementation Unit (PIU) in the three district Executive Engineers' offices to implement rural roads component (Output 5). For purposes of project related monitoring and reporting, the PD-LGED will coordinate through CHTRC. The PD-PMO will consolidate and compile all reports required by the Government and ADB. A District Project Management Office (DPMO) will be established in each of the three districts, attached to the Hill District Councils (HDCs) of Bandarban, Khagrachari and Rangamati, and be headed by a Deputy Project Director (DPD). The DPDs will report directly to the PD-PMO. The Project's watershed management (Output 2), will be implemented under the responsibility of the PD-PMO and the DPMOs.

48. A project steering committee (PSC) will be established under the chairmanship of Minister, MoCHTA and be responsible for overall coordination at national level and policy guidance. One of the members of the steering committee will be the Joint Secretary of the Development Wing of MoCHTA. At the regional level, a Project Implementation Committee will be established and be chaired by the Chairman of the CHTRC. At the district level, District Coordinating Committees will be established and be headed by the Chairman of the respective HDCs.



Source: ADB

Figure 2. Implementation arrangements for BAN:CRLIWM-CHT Project

C.3. Institutional arrangement at the Community level

49. The watershed management output will be implemented by Implementing NGO consortia (INGO), one for each of the three hill districts, with management support and training support from the DPMO technical and administrative team, and from the project implementation support consultant (PISC) to be attached to the CHTRC Project Management Office (PMO). The INGOs will support the social and technical activities within the watersheds in their district together with the communities.

50. Within each district, the INGO for watershed management component will establish watershed project teams. Members of the project team will as much as possible be recruited from within the watershed and receive training before and during their assignment. INGO watershed project teams will work closely with the union office and para leaders within watersheds.

51. The CHTRC PMO in Rangamati with support of the PISC (including qualified national and international watershed management experts) will provide oversight and support to all watershed management activities in the three hill districts.

C.3.1. Para Development Committees (PDC)

52. If not yet existing, PDCs will be formed from the households within watershed paras before subproject implementation. It is desirable that all households within the para join the PDC. However, it will not be mandatory to include all households in the committee before the implementation as some households may take time to be convinced and to become part of the

community group. Following its own constitution, each PDC will form its own executive body from the household members of the concerned para. The executive committee is required to have at least 30% women participation. The PDC will be responsible for implementing and managing the interventions in the watershed under the guidance and supervision of INGO watershed project teams. The DPMO will be responsible for the overall management, backstopping and monitoring of the watershed interventions.

53. However, before the PDC is formed, existence and status of any group within the para such as village common forest committees will be explored and if possible, such groups will be considered for project implementation with some modification if required.

C.3.2. Para Networking Committee

54. A para networking committee of the PDCs within subproject watershed will be formed, where the members from the concerned union/s will participate to harmonize and coordinate different development programs in the area. The head of the committee (or other delegated members) of the PDCs within the watershed will participate in the meeting of para networking committee. Meetings of the network will be organized at least once a year and chaired by the union chairman. Additional meetings can be held as and when needed as well. The INGO watershed project teams will support the networking committee in preparing and conducting the meetings.

C.3.3. Planning

55. The PDC (or other group) and watershed management INGO will be responsible for the preparation of the annual plan for the prioritization and implementation of earlier agreed watershed interventions taking changes in field realities into account. If they manage to increase contributions from the beneficiaries and other stakeholders including local government, the PDC can also plan additional activities. Also, the target beneficiaries will be motivated to demand activities of their concern during the planning.

56. Together with annual plans the performance of the previous year should be evaluated to assess which activities were implemented, who were the beneficiaries, who contributed, how benefits were distributed, etc. to evaluate the activities have contributed to a balanced and gender sensitive development.

57. Upon approval of the annual para plan by the DPMO and PMO, INGO watershed project teams will carry out additional surveys, design and estimates to the extent this is needed, subject to DPMO/PMO approval with technical support from the PISC and DPMO engineers.

C.3.4. Implementation and Supervision

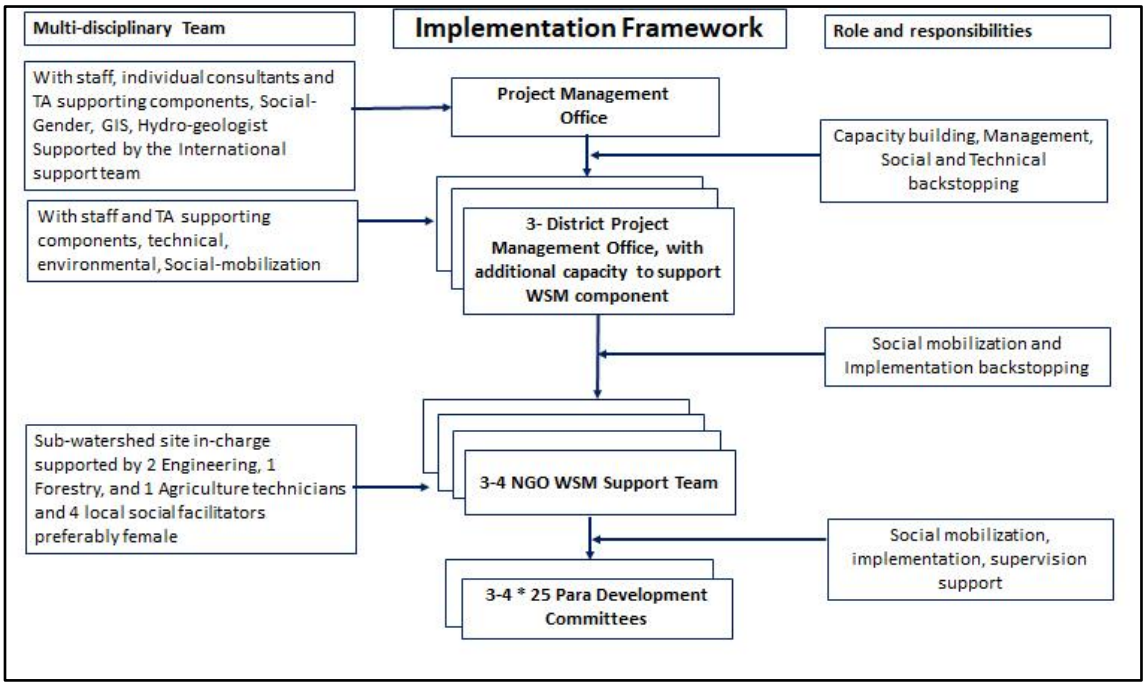
58. With support from the PDC and other implementation partners, and Operation and Maintenance (O&M) team will be formed from the beneficiaries with at least 50% participation of women. The O&M team will be responsible for the operation and maintenance of all watershed

interventions. It is expected that almost all beneficiaries of the watershed management interventions and community infrastructures will be SECs.

59. The PDC may propose to form a labour contract society (LCS) for implementation of the interventions.

60. The INGO watershed project teams will be stationed at an appropriate location in the watershed to support the PDC in the implementation and supervision of the watershed interventions. These watershed project teams will have one officer either from engineering or forestry or agriculture background, 4 social facilitators (at least 50% women), 2 sub-engineers, 1 forest technician, and 1 agriculture technician. The officer will lead a watershed project team. The watershed office will be supported by an administrative assistant and 1 office attendant.

61. The watershed project team will be socially and technically backstopped by the multi-disciplinary DPMO, which will receive social and technical support from the PMO and PISC.



Source: Feasibility Study Dighinala Watershed Management

Figure 3. Implementation framework for watershed management at the component level.

CHAPTER 4. DESCRIPTION OF THE SUBPROJECT

A. Background of the Subproject

62. Dighinala Watershed has key resources to produce basic needs of people such as food, fodder, fuel wood and water. Proper utilization of these resources is essential for livelihood and reducing water induced impacts such as erosion, flooding and drought. Around 50% of agriculture lands in the Watershed are below 3% and subject to inundation during monsoon season.[15] Whereas 5% of the agriculture lands in the valley are in slope between 3% - 15%, which can be intensively cultivable land with moderate soil conservation techniques such as levelling and drainage improvement. Agriculture lands along rivers is subject to seasonal flooding that demand streambank protection measures.

63. Almost 31.5% of the watershed, homestead areas are located in slope gradients of less than 15% that requires conservation measures such as (i) drainage management, (ii) some plantation and orchard management for its sustainable use, and (iii) erosion protections. Around half of homestead areas have sloped gradient of less than 3% and is at risk of inundation during monsoon season. While 11 % of homestead areas have slope gradients above 15%, which requires conservation measures such as drainage management for runoff water, and some plantation and orchard management.

64. Orchards in Dighinala Watershed extends over about 33 hectares, of which 3% has slope gradient of less than 3% at risk of inundation during monsoon that requires drainage management. For the 97% of orchards, these areas are located on slope with gradients between 3 - 15%. That will require some conservation measures such as proper drainage to prevent erosion. Overall, orchard management support will be needed such as technical support for tree management and input support to increase productivity.

65. Forest areas cover about 28% of the watershed, and has slopes with a gradient below 30%. In this case, all the forest areas can be optimally used with intensive forest management. All paras within Dighinala Watershed have village common forests or VCF, which community manages by these forests. For productive use of these forests, enrichment plantation would be highly desirable with community preferred species, and silvicultural practices such as thinning and pruning.

66. Ponds and reservoirs are main sources of water for cultivation and household use. They are prone to sedimentation from runoff in the catchment. Buffer strip plantations around ponds and reservoir embankments, hedgerows across the water channels feeding the ponds/reservoirs, and excavation can be considered to improve capacity of these ponds and reservoirs.

[15] These lands in the watershed can be intensively cultivable with drainage improvement during monsoon periods.

67. There are 3 ha of degraded lands that requires rehabilitation measures. These will be mainly consist of conservation plantation and protection to reduce sedimentation downstream and limit further degradation.

68. Located along riverbanks, barren sandy areas cover about 7 ha in the watershed. Plantation of multiples species such as bamboo, grasses and casuarina, etc. will be carried out along with some structural measures to protect the area from erosion or sediment deposition. Protection of these area from grazing will be essential. To make the plantation a success, conservation measures would be necessary such as mulching, water harvesting pits and watering.

B. Watershed Issues

B.1. Food Security

69. Landless households are at 8.8% of the population in the watershed. Although 77% of the total households (at 2,690) are agriculture-based, households produce food at different levels. There are 26% of households produce food for less than 3 months only, while 24 % of the households produce food enough for 3 to 6 months. The other 22 % of households are producing food sufficient for 6 to 9 months. At a higher level, 18 % of the households produce food sufficient for 9 to 12 months, and only 11 % produces surplus food (see Table 9).

70. These findings indicates that almost 89% of households will be looking for more land to cultivate or they have to earn additional income by other means (e.g. migratory labour) to meet their food requirements.

Table 9. Number of households with varying capacity to meet food requirements.

Description	Total Number of HHs.	Total Number of Agriculture Based HHs.	No. of HHs meeting food requirements from their own lands				
			3 mos. and less	3 to 6 mos.	6 to 9 mos.	9 to 12 mos.	More than 12 mos.
No of Households	2,690	2,081	533	502	455	367	224
Percentage based on agriculture based HHs.			26	24	22	18	11
Agriculture based HHs in %		77					

Source: Feasibility Study Dighinala Watershed Management

B.2. Land Degradation Status

71. A land degradation mapping was carried out in September and October 2021. The results of mapping indicate the prevailing types of degradation process, degree of degradation and cause of the degradation of each land use unit. To reverse or reduce the degradation process,

assessments of recommended watershed intervention measures was carried out for each land-use units.

72. Topsoil erosion due to surface run-off is the primary cause of land degradation process and found in 99% of Dighinala Watershed. The other primary cause of land degradation, sedimentation is prevailing in only 1% of the watershed, which includes all ponds/reservoirs and a valley agriculture land affected mainly from flooding. As the main secondary land degradation process, gully erosion is prevailing in valley agricultural lands (499 ha), whereas riverbank erosion land degradation process prevailed in valley agriculture lands, homestead and barren sandy areas. Details are shown in table below.

Table 10. Land degradation process in different land-uses

		Primary Degradation Process		Second Degradation Process	
Code	**Symbols**	**Wt**	**Ws**	**Wg**	**Wr**
Foot slope agriculture	AF	98	0	0	0
Valley agriculture	AV	711	0	499	0
Valley agriculture flood affected	AVF	61	1	0	61
Orchard	AO	33	0	0	0
Homestead	AH	733	0	0	1.3
Less dense forests	FL	25	0	0	0
Medium dense forests	FM	464	0	0	0
Dense Forests	FD	169	0	0	0
Pond/reservoir	WP	0	26	0	0
Barren degraded lands	BD	3	0	0	0
Barren Sandy Area	BS	7	0	0	7
	Total	**2,302**	**27**	**499**	**69**
Percentage		**99**	**1**	**21**	**3**

Wt =Topsoil erosion by water Ws= Sedimentation, Wg= Gully erosion, Wr = Riverbank erosion
Source: Feasibility Study Dighinala Watershed Management

73. In Table 11, a natural degradation rate is prevailing at the foot slope and valley agriculture lands, where light degree degradation occurs due to flooding. Similarly for orchard areas, natural degradation rate affects 9.1%, whereas light and moderate degree of degradation happens 72.7% and 15.2%, respectively. Natural degree of land degradation process accounted for 2.7 % of homestead lands. Light and moderate degree of land degradation are apparent at 61.5 and 33.3% of the homestead land, respectively. Strong degree of land degradation process is occurring in 2.6% of the homestead land.

74. For forest areas, light degree of land degradation process is prevailing at 28% whereas moderate land degradation process prevailed at 72%. Only light degree of land degradation prevails in all ponds and reservoirs due to sedimentation. Details of land degradation is shown in the table below.

Table 11. Degree of land degradation process in different land-use types.

Code	Symbols	Degree of Land Degradation Process (Figure in Hectares)				Total
		Natural	Light	Moderate	Strong	
Agriculture Lands	**A**	**831**	**537**	**249**	**19**	**1636**
Foot slope agriculture	AF	98	0	0	0	98
Valley agriculture	AV	711	0	0	0	711
Valley agriculture flood affected	AVF	0	62	0	0	808
Orchard	AO	3	24	5	0	33
Homestead	AH	20	451	244	19	733
Forest Lands	**F**	**0**	**185**	**472**	**0**	**657**
Less dense forests	FL	0	0	25	0	25
Medium dense forests	FM	0	121	343	0	464
Dense Forests	FD	0	64	105	0	169
Water body	**W**	**0**	**26**	**0**	**0**	**26**
Pond/reservoir	WP	0	26	0	0	26
Barren Lands	**B**	0	4	6	0	10
Barren degraded lands	BD	0	0	3	0	3
Barren Sandy Area	BS	0	4	3	0	7
	Total	**831**	**752**	**727**	**19**	**2,329**
Percentage		36	32	31	1	100

Source: Feasibility Study Dighinala Watershed Management

75. Based on the table above, a natural degree of land degradation process is prevailing in 36% of the watershed area, where nothing needs to be done. Light degree of land degradation process happens in 32% of the area, where there is indication of risks. This process is still in an initial phase and degradation can be easily managed and damages can be repaired with minor efforts. However, a moderate degree of land degradation process prevailed in 31 % of the areas, where degradation is apparent, but controlling impacts and full rehabilitation are still possible with considerable efforts. Similarly, strong degradation process prevails in 1% of the watershed area, where there is evident sign of degradation and change in land properties are significant and very difficult to restore within reasonable time limits. No area beyond restoration exists in the watershed.

C. Technical Specifications

76. Identification of watershed interventions was carried out in close consultation with the community in term of their acceptance, willingness and ability to implement. The community's management capacity for implementation, operation and maintenance are important aspect on selecting watershed interventions. The suitability and effectiveness of the proposed interventions are important as well. Other factors considered were the appropriate pace of technical and administrative capacity and resources available.

77. The proposed watershed management interventions for Dighinala Watershed are summarized in Table 12. The watershed management interventions details are described in Annex 2 .

Table 12. Proposed watershed interventions for the Dighinala Watershed

Conservation Measures			Unit	Quantity
Symbol		Description		
M	Tba	Trust building activity[16]	Lumpsum	29
Agriculture Land Conservation				
A	Atj	Transforming Jhum into agroforestry	Ha	3
	Afp	Fruit tree planting	Ha	9
	Adi	Drainage improvement	Ha	15
	Aom	Orchard Management support	Ha	10
Forest / Shrub Land Conservation				
F	Fmp	Support community forest management plan preparation	Lumpsum	1
	Fep	Forest Enrichment plantation	Ha	3
	Fco	Forest Cultural Operation	Ha	100
Degraded Land improvement				
D	Dcp	Rehabilitation of degraded lands	Ha	3
	Drd	Reclamation of disaster affected riverbed side and agriculture land	Ha	3
	Dlt	Land slide treatment	Nos	3
	Dgt	Gully treatment	Nos	15
Stream Bank Protection				
S	Sbs	Buffer strip plantation / Bio-engineering methods	m	6,000
	Spw	Protection wall / Embankment / Retaining wall / Spurs	m	500
Water Resource Development				
W	Wci	Irrigation canal improvement	Nos	4
	Wdw	Drinking Water spring improvement	Nos	1
	Whr	Water harvesting reservoir with dam construction	Nos	6
	Whp	Water harvesting pond construction	Nos	10
	Wpi	Conservation pond/reservoir improvement	Nos	31
	Wgr	Ground water recharge pits/trenches	Nos	10
	Wli	Wetland improvement	Nos	1
Demonstration				
C	Arf	Regenerative farming (vermicomposting, fruit bagging, pheromone traps including necessary material support)	HHs	29
	Aci	Drip irrigation	HHs	15

[16] The trust building activities includes the community activities benefiting the whole community rather than few individuals. The activity will be identified during the para development planning.

Conservation Measures			Unit	Quantity
Symbol		Description		
	Ahi	Homestead improvement	HHs	29
	SRI	System of Rice Intensification	HHs	7
	Ffs	Farmers Field School (SRI and Drip Irrigation 2 years)	Two package for 2 years	4
	Ffs	Farmers Field School (Regenerative farming and Homestead improvement One for each demonstration activity for 2 years)	Two package for 2 years	4
Community Infrastructure component				
CI	Dtw	New Tube well installation with Iron filtration	Nos	3
	SL	Sanitary Toilet including water supply	Nos	1

Source: Feasibility Study Dighinala Watershed Management

78. The social mobilization support is expected to motivate community and its members to identify more activities of their interest. This kind of support will increase more watershed management interventions that can be achieved within the limits of annual subproject budget. Social mobilization for strengthening the functioning of the community-based organizations will be key to ensure sustainable management of local watershed resources (land, water and vegetation on forest and agriculture). The activities planned for the social mobilization under Dighinala Watershed Management Subproject are detailed in the table below.

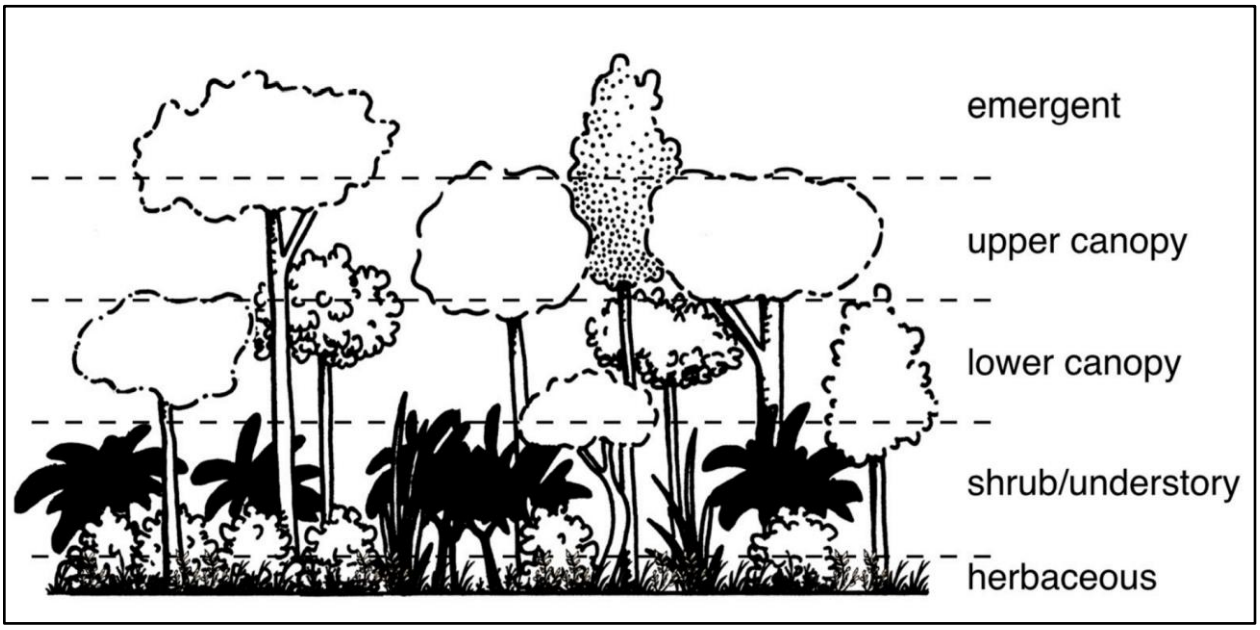


Figure 4. Schematic diagram of an agroforest structure[17]

[17] sustainability-10-03337-v2.pdf

Table 13. Summary of social mobilization activities

Description	Quantity / Times	Units	Remarks
Rapport building and sensitization (Self Introduction, Project modality, Activities, and Objectives)	-	-	As regular staff task
Para Orientation Meeting	29 (No. of Paras)	Lumpsum	Number of paras (once in a project period)
Support community in para group formation and preparation of constitution (includes member listing, group formation, preparation of constitution and formulating executive body)	29 (No. of Paras)	Lumpsum	Once in the project period provide stationary support
Paras networking in the watershed (Establishment)	1	Lumpsum	Once in the project period
Management support/coaching to the CBOs on its functioning	-	-	
Support in regular meeting, accounting and record keeping	-	-	As regular staff task
Preparation of annual para development plan	203	Lumpsum	Once in a year for project period (No. of paras*no of years). Logistic support
Social auditing (after completion of each activity.)	203	Lumpsum	
Community Capacity building	-	-	
Para net-working interaction	7	lumpsum	Once in a year for project 5 years of implementation. Logistic support
Cross community activity visits	7	lumpsum	
Cross district study tour (Once in Rangamati and Second in Bandarban)	2	lumpsum	Times in project period

Source: Feasibility Study Dighinala Watershed Management

D. Budget for Physical Interventions and Social Mobilization

79. In allocating budget for the Dighinala Watershed Management Subproject, first 2 years (out of 7 years project period) will be focused on inception activities, organizing the community, and building staff capacity and other start-up activities including those aimed at trust building with the community and social preparation. Therefore, only 5 % of the budget for physical interventions is allocated in the first year. Starting from the second year, 20% of the total budget for physical interventions will be allocated for each year. The final year can then be used for project closure related activities. The estimated annual total cost of physical watershed interventions is given in Table 14.

80. A one-time social mobilization support cost is allocated in first two years, assuming by second year all the group will be established and ready for implementation.

Table 14. Annual cost for physical watershed intervention and social mobilization.

Description	Annual cost x '000 Taka							
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Physical Watershed Interventions	3,951	11,857	15,809	19,762	19,762	7,905	-	79,046
Community Infrastructure Interventions	-	900	900	-	-	-	-	1,800
Social Mobilization Cost[18]	885	885	710	710	510	510	510	4720
Staffing cost	4008	4008	4008	4008	4008	4008	4008	28056
Staff travel cost	612	612	612	612	612	612	612	4284
Nonexpendable equipment (75% and 25% in first and second years)	896	299	-	-	-	-	-	1195
Logistic	438	438	438	439	439	439	439	3070
Annual Total	**10,790**	**18,999**	**22,477**	**25,531**	**25,331**	**13,474**	**5,569**	**122,171**

Source: Feasibility Study Dighinala Watershed Management

81. The annual budget indicated the upper limit of the project contribution for the implementation of the watershed interventions. However, the community may seek contributions from the beneficiary households and other stakeholders such as the union parishad and other development agencies to implement more watershed interventions and other community infrastructure in the area. There will be no limit for the community contribution in the implementation of the watershed interventions. The social mobilization support aimed to motivate the community and its members to demand more activities of their interest for their benefits so that there will be more demands for the activities than what can be achieved within the limits of the annual project budget. The project aims to create competing environment for implementing more activities through increasing contribution from beneficiaries, government institutions, and NGOs. Furthermore, actual cost will vary depending on the types of interventions. The detailed cost of the interventions will be worked out after the survey, design and estimation of the watershed interventions.

E. Design Considerations

82. Most of the watershed interventions were piloted in the CHTRDP-II and are familiar to CHT communities. This includes multiple cropping, agroforestry, rainwater harvesting ponds and reservoirs constructed with cross-dams for irrigation, fisheries and household use, vegetative techniques used to control stream bank erosion, etc. The design of the interventions must emphasize simple and easy techniques and be cost effective by using local materials to the extent possible so that the community can replicate the interventions in similar situations in the CHT.

[18] All one-time support cost is included in first two years.

The intervention must be designed considering all interlinked activities as an integrated package for its sustainability so that the interventions provide environmental services, increase production for consumption by the community and for generating additional income. Beneficiaries will need to be involved from in annual planning, implementation and maintenance so that local knowledge is integrated in the design, and implementation and maintenance meets the communities needs and priorities. Watershed interventions must be designed and implemented in such a way that maintenance will be minimum or simple so that the community will be able to do by themselves after the project phases out.

F. Operation and Maintenance (O&M)

83. The community will be responsible for the O&M of the community assets and individual households for O&M of interventions on their own land benefiting themselves. O&M committees will be formed to take responsibility for maintaining community watershed management assets. A sustainable O&M system is essential to make project interventions successful and sustainable over time. With support from the project, it will be the responsibility of the community to establish a financial and technical system to get proper resource for the future maintenance of the activities. In this regard, it will be important to train the beneficiary households to ensure that the maintenance requirements are fully understood including costs. At least 50% of the women must be engaged in the O&M of the subproject interventions.

84. Adequate financial resources are the key to effective O&M services. Therefore, the community must discuss and plan to raise required an O&M fee from the beneficiary households of the watershed interventions from the planning stage (selection of the interventions). The beneficiary households will be willing to contribute the O&M fee only if the beneficiary households really feels that they will be benefitting from the interventions either in term of services or monetary terms. This urges the community to select or plan activities that really going to benefit the participating households in term of monetary term or getting services. The O&M fee can be regarded as a payment for environmental services received which will result in higher production, more income and protection against natural disasters. The limited financial capacity of CHT rural communities needs to be considered, with contributions in kind maximized and cash contributions avoided where feasible

CHAPTER 5. ANALYSIS OF ALTERNATIVE

85. *Alternative location*. The Dighinala Watershed Management feasibility study includes a detailed prioritization of all watersheds in Khagrachari district. Hence, based on this ranking, watersheds that are in the greatest need of interventions have been targeted by the subproject. Selection of other watersheds may mean tackling those with a lower priority, instead of high priority watersheds facing the most serious land degradation issues.

86. *Alternative design.* In terms of design, the Dighinala Watershed Management Subproject includes a range of interventions, and hence the relative impact and efficiency of each type of intervention can be compared and adapted if needed. Also, at most locations a number of intervention types are combined to have a joint impact on the health of the watershed.

87. *Without project scenario***.** Without the project, it is expected that land degradation processes will continue in the Dighinala Watershed, resulting in lowered productivity of agricultural land, increased flooding during the monsoon and water shortages in the dry season. This has a knock-on effect on incomes and leads to lowered biodiversity. Also, climate resilience will be reduced in the 'without project' scenario, as degraded lands are less resilient to the vagaries of climate change.

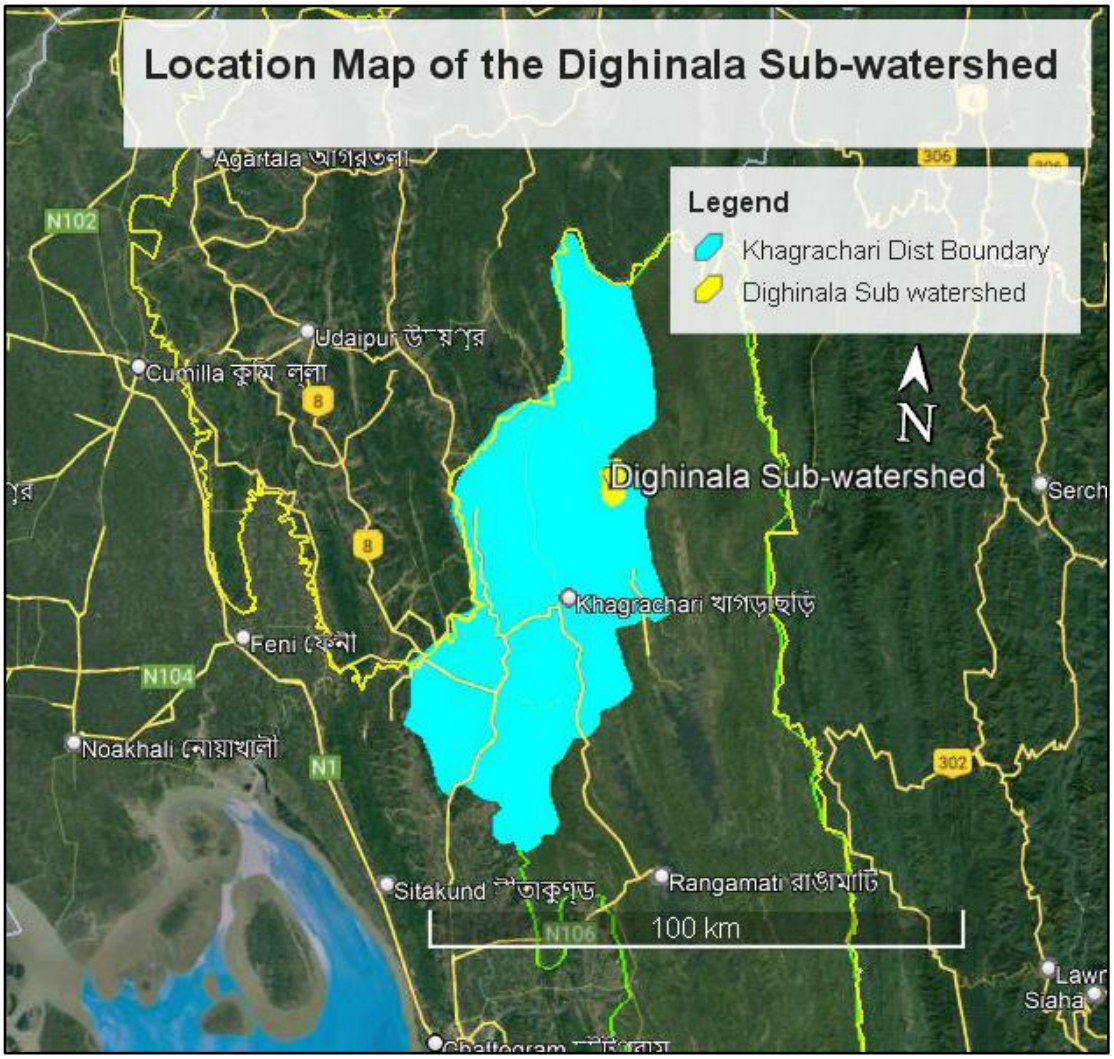
CHAPTER 6. DESCRIPTION OF THE ENVIRONMENT

A. Physical Environment

A.1. Location

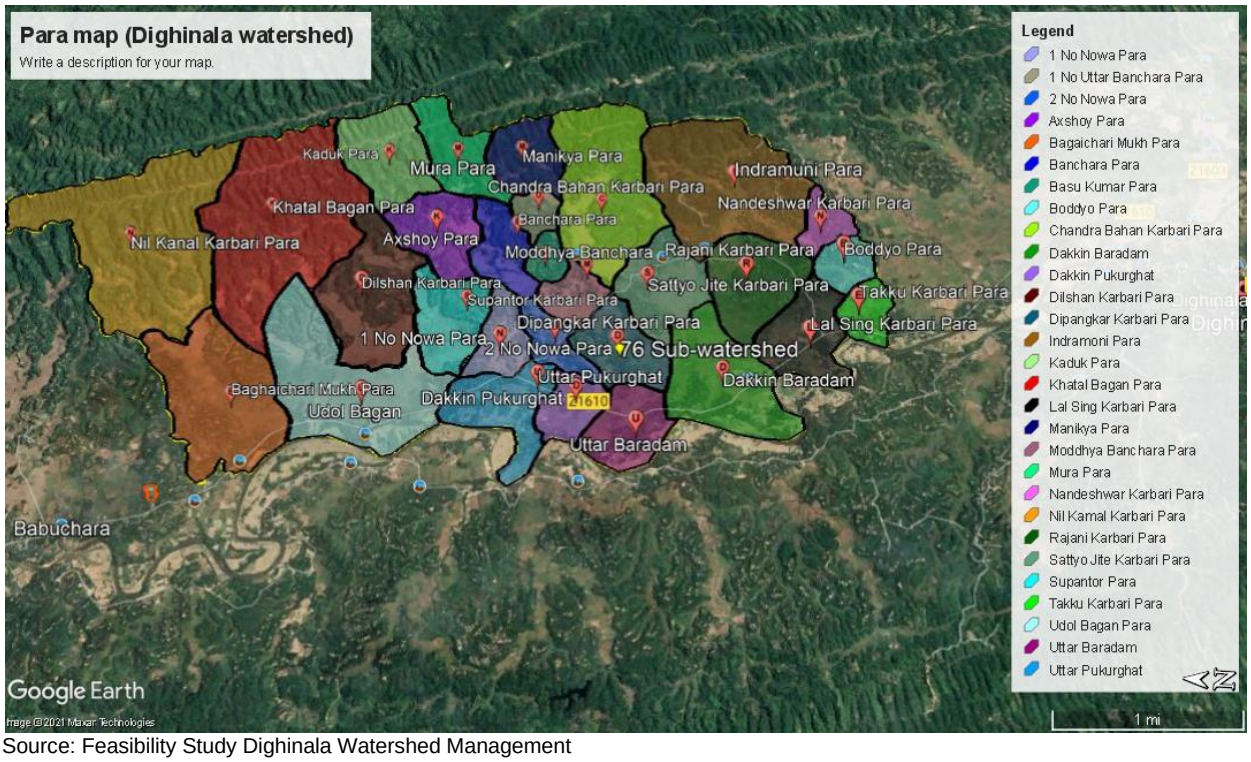
88. The Dighinala Watershed is located in the 4 no. Dighinala Union of Dighinala Upazila, Khagrachari District. The site is located about 25 km northeast from the Khagrachari district headquarter on the Khagrachari to Dighinala-Babuchhara road. The watershed is located at 23°20'58" - 23°16'15.52" latitude: and 092°04'53" - 092°02'25" longitude. See Map 2.1 and 2.2.

89. The watershed covers an area of 2,329 hectares. The area consists of flat to gently sloping valleys and moderate to steep sloped hill areas. The elevation varies from 40 to 171 meters. 79% of the watershed area consist of gentle slopes in the valley and about 20% of hill slopes.



Source: Feasibility Study Dighinala Watershed Management

Figure 5. Map of Dighinala Watershed in Khagrachari District.



Source: Feasibility Study Dighinala Watershed Management

Figure 6. Distribution of paras in the watershed (north direction pointing left).

A.2. Land-use

90. The total watershed area is 2,329 ha[19] and consists of different land use types. Table 15 provides few details of land use in Dighinala Watershed.

Table 15. Land-use categories in the sub-watershed and corresponding area.

Code	Description	Area in Ha	Percent
A	Agriculture Lands	1,636	70.2
AF	Foot slope Agriculture land	98	4.2
AV	Valley agriculture lands	711	30.5
AVF	Valley agriculture land affected by flood	62	2.7
AO	Orchard	33	1.4
AH	Homestead	733	31.5
F	Forest	657	28.2
FL	Low density forest	25	1.1
FM	Medium density forest	464	19.9
FD	Dense forest	169	7.2
W	Water bodies	26	1.1
WP	Pond/reservoir	26	1.1

[19] Land use assessment through Google tools with the district team, then verifying results in the field.

Code	Description	Area in Ha	Percent
B	Barren Lands	10	0.4
BD	Barren degraded land	3	0.1
BS	Barren Sandy Area	7	0.3
Total		**2,329**	**100**

Source: Feasibility Study Dighinala Watershed Management

91. Agriculture land covers almost 40% of the sub-watershed and is the main source of livelihood, where 77% of the population depending on it. The main crops grown are rice, different cash crops such as turmeric, vegetables, betel leaf, sugarcane, and broom grass. Rice is economically and culturally the most important staple food crop, and its production is regarded as the single most important economic asset in villages. Nowadays, whoever can afford is growing different fruit trees (e.g., banana, mango, litchi, and malta oranges) in orchards and partly in homestead gardens. A few households are also known to cultivate ginger by extensive earth work in the hill slopes. This is causing erosion and thus reducing the production capacity of the land.

92. Homesteads cover 733 ha, which is basically the area covered by houses, open space and homestead gardens of fruit trees and trees. Of homestead units, 101.5 ha is covered by houses, 55.29 ha by courtyards, 256.62 ha by fruit trees, 67.87 ha by open space, 23.45 ha by ponds, 214.33 ha used for agriculture, and 14 ha is covered by shrubs. There are quite a number of trees on these homestead plots managed by individual households.

93. Out of 29 paras 19 paras in the watershed have a VCF called the “Banchara Para Bon”, which is managed by the community. There are significant number of trees grown around the village settlement individually as well. 35 % of the area categorized as homestead is covered with trees including fruit trees, see below. Tree cover density in the forests is improving as the community is taking care of the forests around the community. However, there is a need of enrichment plantation of community preferred species in some part of the forest to improve the growing stock.

94. There are more than 70 ponds and reservoirs covering a total area of 26 hectares. These are the major water sources for agriculture and human use. Fish are cultivated in all ponds, however only 8 families are cultivating fish for business purpose.

95. Degraded land and sandy areas cover an area of 3 hectares and 7 hectares, respectively.

A.3. Topography

96. Only 2% of the watershed has slopes of a 30% to 60% gradient which with intensive conservation measures can be moderately used. About 18% of the land has slopes with gradients between 15 to 30%, which can be optimally used with some conservation measures. Similarly, 28% of land has slopes between 3–15% which will have less erosion and inundation problems and can be intensively used with limited conservation measures. 51% of the land has slope with

less than 3% gradient and can be intensively used with some conservation measures. However, these areas can be inundated during the monsoon and areas close to streams are affected by the floods. Table 5.1 provides details.

Table 16. Slope gradients for different classes

Slope Class	Gradient in %	Area in ha.	Percentage
I	< 3%	1,192	51
II	3 – 15%	663	28
III	15-30%	419	18
IV	30-60%	56	2
V	>60	0	0
	Total	**2,329**	**100**

Source: Feasibility Study Dighinala Watershed Management

A.5. Climate

97. Bangladesh has already been experiencing the effect of global warming. Projected average temperature rises in Bangladesh are broadly in line with the global average for the different emissions pathways. The highest emissions pathway (RCP8.5) results in a projected rise of 3.6ºC by 2080-2099 above the 1986-2005 baseline. Rises in minimum and maximum temperatures are considerably higher than the change in average temperature and are concentrated in the period December-March.

98. Dighinala Watershed has a typically monsoon climate with about 65% of rain falling in four months from June to September, see Table 7.2.

Table 17. General climatic conditions

Seasons	Months	Climatic records	Remarks
Rainy season	Mid-June to Mid-September	Mean annual rainfall recorded in Khagrachari district is 1740 mm (65% fall between June to September) Mean temperature 25^{0}C (Approx.), and mean Humidity-76% (Approx.)[20]	Impacts of climate change in CHT is now very much apparent. Erratic trend of rainfall and increasing trend of temperature are being recorded.
Dry/Winter season	November to February		
Pre-monsoon	March to Mid-June		
Post-monsoon	September-October		

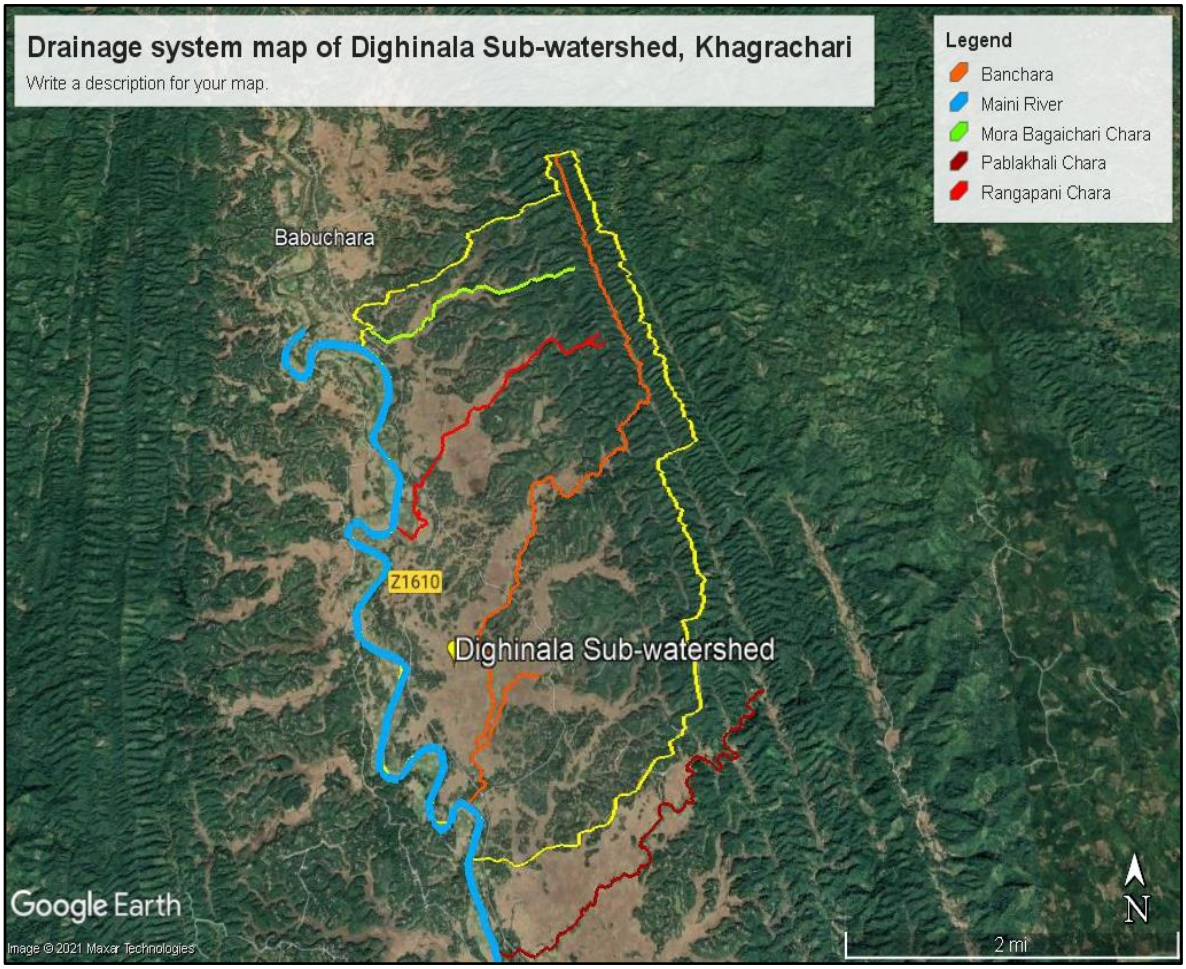
Source: Feasibility Study Dighinala Watershed Management

A.6. Hydrology

99. The Maini River forms at the western border of Dighinala Watershed. Banchhara (8.6 km.), Mora Bagaichari Chara (3.2 km.) and Rangapani (4.5 km.) are some major drainage systems

20 https://weatherspark.com/y/111967/Average-Weather-in-Khagrachhari-Bangladesh-Year-Round

(Figure 7). Most of the streams in the watershed is ephemeral.[21] Therefore, most of the streams will remain dry from February till the monsoon starts in June month resulting in water scarcity for agriculture and human use.



Source: Feasibility Study Dighinala Watershed Management

Figure 7. Drainage systems in Dighinala Watershed.

100. For Khagrachari as a whole, the stream flow per hectare of watershed is estimated as 1.45 litres/second for during April-May and 0.29 litre/second during October and March, indicating water scarcity to pre-kharif (April-May) and rabi (October-March) cropping seasons respectively.[22] This underlines the need for improved harvesting, storage and utilization of rainwater for agricultural and human use. Most of the valley cultivation area along the river and streams in the flat valley is flooded during the monsoon urging for protective measures.

[21] The river system in Dighinal watershed has an elevation difference of only 131 meters.
[22] Analysis carried out based on the report by CEGIS, 2013.

A.7. Air Quality and Noise Levels.

101. According to environmental monitoring report for the CHTRDP II[23], air quality is not being monitored because "this rural development project has no significant impact on air quality".

102. Dighinala Watershed is a rural area and no significant disturbance on noise. Mostly, vehicle movements along roads are source of noise within the 29 paras.

A.8. Water Quality

103. Overall, there is little pesticide use in the project area and only a moderate use of fertilizers. These are used mainly in rice paddies and only a little on other crops. Hence, the impact of agrochemicals on water quality is expected to be low (in upland areas) and moderate (in the lower areas where rice paddies are concentrated).

104. Another main source of contamination of surface waters is human and livestock excrement, which is concentrated in/around villages. While access to sanitary latrines has greatly improved in Bangladesh overall, this still lags behind in the CHT, and especially in more remote villages the level of access to sanitary latrines may be 50% or less.

B. Biological Environment

B.1. Terrestrial Habitats

105. *Forests.* Dighinala Watershed was originally all forested, but it has largely been converted to agriculture, being mainly rice paddies in the flatter, lowland areas and orchards in the more sloped highland areas. Forests extend over 28.2% of watershed land area. Dense forest covers an area of 169 hectares (7.2%), whereas medium density and low-density forest covers an area of 464 hectares (19.9%) and 25 hectares (1.1%) respectively.

106. The scattered forests are managed by the community as a VCF. The main trees species in the forests are Teak (*Tectona grandis*), Gamari (*Gmelina arborea*) and bamboo and some species such as Karoi (*Albizia procera*) and Garjan (*Dipterocarpus turbinatus*).

107. *Wildlife*. Five mammal species and 18 bird species have been identified in the subproject area (Table 7.3) and include the red jungle fowl (Figure 9, IUCN red data listed as 'Least Concern'). Not all are fully identified, as there are 21 Cuckoo species (including Coucals), for example, 12 kingfisher species and 19 owl species, and 'waterfowl' is also a broad category. While most of these are common, some are likely to be listed as vulnerable or perhaps even endangered, though given the current level of detail of the assessment this is difficult to ascertain. There are ten primate species known from Bangladesh, including five macaque species and most likely the species found in the subproject area is either a rhesus or long-tailed macaque, both of which are listed as 'Least Concern'.

[23] https://www.adb.org/projects/42248-013/main

108. To err on the side of caution, it may be concluded that some threatened species may possibly be encountered in the subproject area. However, the watershed management interventions would not affect their habitats, instead the subproject would improve ecology through improving the land cover, managing watersheds and shifting communities into sustainable practices.

Figure 8. Photograph of teak forest (left), and upland orchard (right) in the watershed.

Figure 9. Male Red Jungle Fowl (*Gallus gallus*) normally occurs within the subproject sites.

B.2. River Habitats

109. *Rivers and streams.* As mentioned above, the Maini River forms the western border of the watershed. Banchhara, Mora Bagaichari Chara and Rangapani are smajor drainage systems of

the watershed. Most of the river lining habitats have been converted (e.g., to rice paddies) or are degraded (e.g., by heavy grazing).

110. *Aquatic life.* there are 12 fish species encountered in the subproject area, along with other aquatic life such as shrimp, mud crab *Scylla serrata,* snakes and frogs. Apart from the mud crab, the other 'species' are generic names for groups of species, as 35 frog species and 78 snake species are known from Bangladesh.

Figure 10. Rangapani chara (right) and Mainee (Maini) River (left)

Figure 11. Existing condition of the Ban Chara during environmental assessment of Dighinala Watershed.

C. Socio-economic Information

C.1. Population

111. Watershed consists of 29 paras with 2,690 households (HHs) made up of 9,869 villagers. There are 4,945 men and 4,924 women. Infants up to age 5 years make 9.2% of the population, whereas school going children (above 5 to 19 years), active working force (age between 19 to 49 years), weak working force (age between 49 to 65 years) and senior population (age above 65 years) make 17.5, 39.1, 26.6 and 7.6 % respectively, see Table 2.2 for details.

112. All HHs in the watershed are SECs. Out of 2,690 HHs, 2681 (99.7%) belong the Chakma community, 6 are Marma and 1 is Tripura.

Table 18. Population of 29 paras in Dighinala Watershed

Age category	Male	Female	Total	Percentage
0-5 Children	445	463	908	9.2
5-19 year School going age	837	892	1729	17.5
19-49 year - working force	1,926	1,929	3,855	39.1
49-65 - working force	1,335	1,294	2,629	26.6
65 and above - retired group	402	346	748	7.6
Total	**4,945**	**4,924**	**9,869**	**100.0**
Percentage	**50.1**	**49.9**	**100**	

Source: Feasibility Study Dighinala Watershed Management

C.2. Employment

113. Agriculture and livestock are main livelihoods of the population in the watershed, with 77% of the population engaged in this sector. Of the remainder 6.4 % of the HHs are service holders, whereas 5.5% of HHs have a shop, and 3.2 % run a business. The balance HHs work as laborers. While, 25 heads of HHs find employment as autorickshaw drivers.

C.3. Economic status

114. Based on discussions during community consultations, about 78% of the population is considered are poor and very poor, and about 22% of population as better off, ref. Table 7.3 for details and definitions of these categories.

Table 19. Summary of socio-economic status

Category	# of HHs	%	Remarks
Very Poor	895	33	*Household:* Landless means they only have a small piece of land for their homestead but no valley land for rice cultivation or jhum land.

Category	# of HHs	%	Remarks
			Type of house material: Jhupri (bamboo and straw) Growing food from their own lands sufficient for less than 3 months
Poor	1,204	45	*Household:* Have some cultivable land and may get some income from livestock and cash crops. *Type of house material:* Kutcha house (bamboo wall, corrugated iron roof and earthen floor) Growing food from their own farmlands sufficient for 6 months
Better Off	589	22	*Household:* Having adequate level of paddy fields and good income from agriculture, livestock, and cash crops. *Type of house material:* Pucca house (brick wall, cement floor, reinforced cement concrete roof) to semi pucca house (brick wall, corrugated iron roof and cement floor) Growing food on their own farmlands sufficient for 12 months and more

Source: Feasibility Study Dighinala Watershed Management

C.4. Food Sources

115. Landless households are at 8.8% of the population in the watershed. Although 77% of the total households are agriculture-based, households produce food at different levels. There are 26% of households produce food for less than 3 months only, while 24 % of the households produce food enough for 3 to 6 months. The other 22 % of households are producing food sufficient for 6 to 9 months. At a higher level, 18 % of the households produce food sufficient for 9 to 12 months, and only 11 % produces surplus food.

116. These findings indicates that almost 89% of households will be looking for more land to cultivate or they have to earn additional income by other means to meet their food requirements, such as migratory labour.

117. Livestock is the second major asset after land. It not only is a source of protein, but also a savings asset and provides compost required for maintaining soil fertility. The villagers in the watershed own 999 heads of cattle, 501 goats and sheep, and 754 pigs.

118. Availability of fodder for animals is good only in one para, whereas for 18 paras the status is moderate and for 10 paras it is poor. This indicates pressure on the natural resource for grazing.

As there is very little area under the grass land, most of the animal fodder is from agriculture waste and from grazing in forests.

C.5. Village Infrastructures

119. Irregular precipitation with uneven intensity causes difficulty to production system and soil erosion on steeper hill slopes. Shortage of water is experienced during dry season, but an abundance of water in the rainy season. Rivers, ponds and reservoirs are the major sources of water. Ponds and reservoirs construction to harvest the rainwater for irrigation, fishery and human use has been a common practice in the CHT area. There are more than 70 ponds and reservoirs for harvesting rainwater to provide water for household use, fisheries and irrigation. Out of 6 irrigation canals, 4 require improvement.

120. Wells are main source of drinking water in the watershed. There are 708 tube wells, 12 dug wells and only one spring in the watershed. Rainfall during four months of monsoon is the main source of water to these wells and spring. Shortage of drinking water is experienced during the dry season. During the rainy season dug wells get polluted. As there is lack of safe drinking water, the community suffers from water borne diseases such as diarrhea, worm infestation and skin diseases. Out of 29 paras, there are 4, 20 and 5 paras that have reasonably good, medium and poor drinking water facilities, respectively. Mainly women are involved in fetching water for domestic purpose. During the water scarcity period, women's drudgery increases.

121. For types of houses, 16.5% of HHs have jhupri house and 51.2% of HHs have katcha house. Whereas, 21% and 2.5% of HHs have semi-pucca and pucca houses for living. While, 8.8% of HHs are landless.

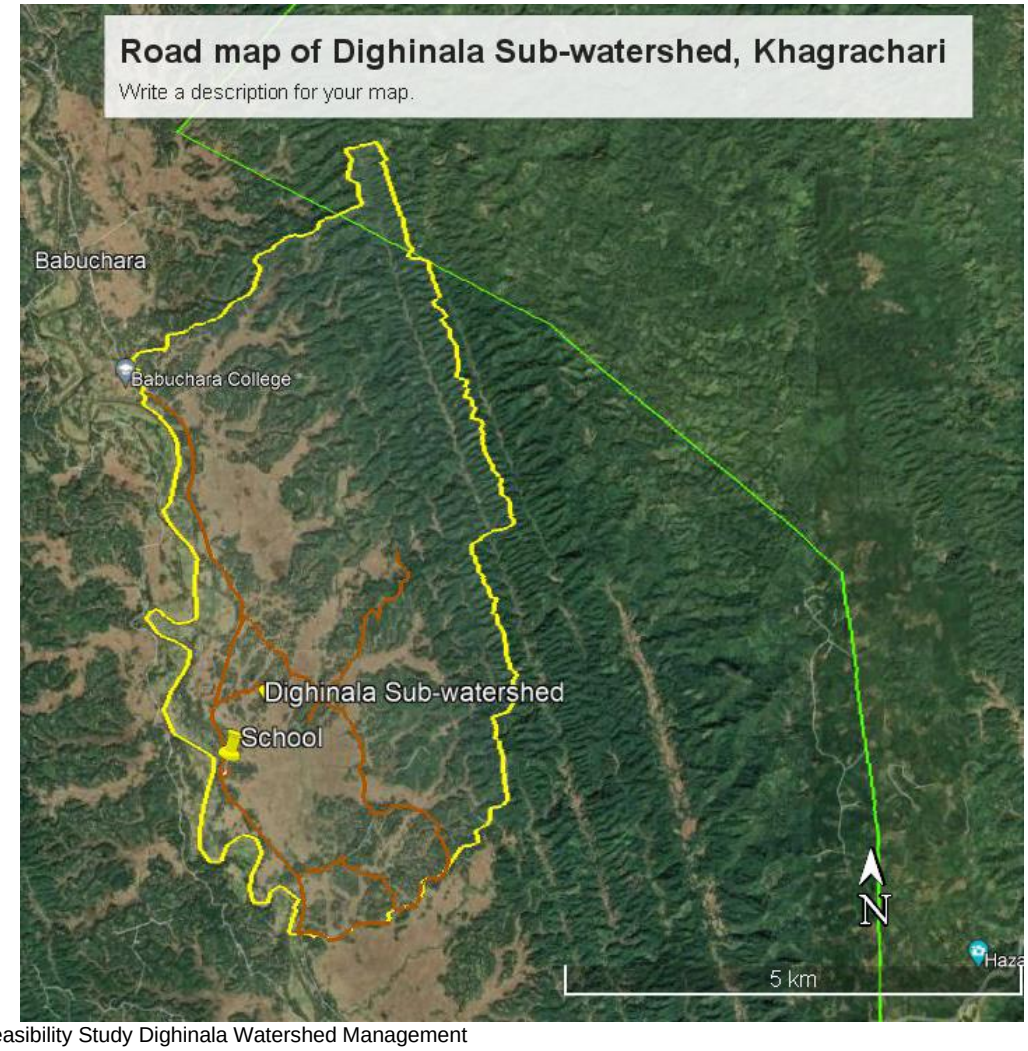
122. Table 7.4 gives an overview of the existing public infrastructure and the community facilities.

Table 20. Public infrastructures and the community facilities in Dighinala watershed.

Description	Comments
Road	Watershed is accessed through an asphalt road from the district headquarter. All paras can be access through Katcha motorable village access roads (Figure 12). Out of 29 Paras, accessibility facilities are good in 5 paras, medium in 21 Paras and poor in 3 paras.
Mobile towers	Mobile network in 6 paras is good, whereas it is medium in 20 paras and poor in 3 paras.
Electricity	26 paras are connected to the grid while 3 paras only have PV solar panels.
Medical facilities	Medical facilities within the para or close by para is medium in 25 paras and poor in 4 paras. No para has good medical facility
School	There are 19 primary schools and 3 secondary high school.

Description	Comments
	Out of 29 total paras, 18 paras have good, 2 have medium and 4 have poor primary school facilities, whereas 5 paras have good, 17 paras have medium and 7 paras have poor secondary school facilities.

Source: Feasibility Study Dighinala Watershed Management



Source: Feasibility Study Dighinala Watershed Management

Figure 12. Map of existing key roads in Dighinala Watershed

C.6. Cultural Heritage

123. The communities of the Dighinala Watershed belong to the Chakma SEC and are Buddhist by faith. They speak their own Chakma language, with the Chittagonian dialect of Bangla functioning as the second language. There is a *Kiyang*, a Buddhist temple in each village. Traditional leadership is provided at village level by the *karbari* . Weaving is a traditional handicraft

with women wearing *phinon* lower part and *hadi* upper woven cloth as dress. The Chakma have their own music and dance traditions.

124. The people of the Dighinala Watershed celebrate major Chakma festivals: Bizu, Alphaloni, and major Buddhist festivals, especially Buddha Purnima. The major socio-religious festival in the annual calendar is the three-day Bizu, which coincides with the Bengali New Year's Day, begins one day before the last day of the month of Chaitra, or the middle of April. This is celebrated with much enthusiasm, houses are decorated with flowers, young children pay special attention to the elderly to win their blessings, festive dishes are prepared for guests, and special dances are performed. House cleaning and decorating it with flowers on the first day, a ritual bath in the river on the second day different socio-religious rituals on the last day, are the core of the festival. The festival coincides with the first major rains when jhum land is being sown. Bizu is believed to contribute to a rich harvest. The second major Chakma festival, Alphaloni, is likewise linked to the agricultural cycle. It coincides falls in the harvest season when everyone takes a break from farming, and animals and weapons are also rested. On this day villagers eat new food, fruits harvested from their jhum land, and offer and share with each other.

CHPATER 7. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURE

A. Positive Impacts

125. The watershed interventions are not likely to adversely affect the environment, rather it creates positive impacts on the deteriorating watershed, particularly, stabilizing unstable slopes and stream banks, sustainable management of the natural resources mainly land and forests, and harvesting and conservation of rain water during mosoon season and its efficient use for irrigation growing crops, vegetable and household use such as drinking, washing and bathing thus reducing women drudgery.

126. Enrichment plantation in the degraded forest, forest cultural operation, rehabilitation of degraded land and buffer strip plantation reduce severe erosions in upstream hill slopes and sedimentations in the downstream. The bio-engineering measures along the stream bank protect the fertile agriculture lands from the flood and erosion.

127. Water source enhancement and ground water recharge pits improve water availability for drinking and household use and reduce women's drudgery on collecting water. Harvesting of rainwater and conservation can be achieved through improvement and construction of ponds and reservoirs. Erosion control measures reduce water induced disasters such as landslide and gully formation and flood protecting fertile lands and habitation.

128. To summarize, the following environmental benefits will accrue from the interventions:

- Improved water availability in the valleys during dry period from improved irrigation
- Improved water availability for the water-starved communities for household use,
- Improved production, income and livelihood,
- Stabilization of very steep slopes of homesteads keeping the land intact for production activities, and
- Soil and water resources will be conserved.

B. Negative Impacts

129. This section presents analysis to identify environmental impacts and risks associated with the implementation of watershed interventions. Identification of impacts and risks commence by understanding the subproject interventions in consultation with the engineers and technical consultants of CHTRC. Corresponding interaction of these general components with specific environmental aspects (e.g., physical, biological, and socio-economic) are identified through environmental impact analysis (see Table 21), and a series of discussions with stakeholders, including community stakeholders, and relevant government departments.

130. As subproject under CRLIWM-CHT Sector Project, the process of the environmental assessment for the Dighinala Watershed Subproject will be duplicated for upcoming subprojects for project readiness and implementation. The EARF will provide guidance for other environmental safeguards requirements of the proposed Project.

C. Environmental Analysis

131. Identification of potential impacts needs to define the environment based on the physical, biological, and social aspect of the subproject's area of influence. These components may be affected due to the implementation of watershed interventions in all of the target paras. The environmental components for the Dighinala Waterhsed Management Subproject are drawn from the environmental baseline as follows:

- *Physical environment* – This is defined by the geographic area and abiotic components that influence the condition and define the characteristics of a location. These factors include the land use, air quality, noise levels, water resources and soil. Impacts on physical environment are examined in terms of activities of the subproject changes and/or damages on abiotic components.
- *Biological environment* – Presence of flora and fauna within the target areas of the project.
- *Social environment* – Immediate physical and social setting in which there are people interactions, and something develops such as public infrastructures, occupational health and safety and cultural resources.

132. A risk assessment is used to define the level of potential environmental risks by considering the magnitude, extent and duration. This is developed based on the professional judgement and experience of experts, who prepared the IEE for the subproject. Through these, risks are defined by minor, moderate and major. This is a simple mechanism to assess risks and assist in preparing mitigation measures. The assessment of potential environmental impacts requires classifications of environmental risks associated with the watershed interventions in terms of the following categories.

(i) *Magnitude (Mag):* The potential risks of a particular project component refers to the level of disruption to the environment. Three levels have been defined:
   (a) *Low (L)*: No or minimal change in the characteristics and conditions of the environment;
   (b) *Medium (M)*: There is noticeable change in certain characteristics and conditions of the environment;
   (c) *High (H)*: Significant change in the environment.

(ii) *Extent (Ext)*: This describes the coverage of the potential risks caused by construction activity to the environment. It refers to the distance and area covered by an impact. The terms regional, local and limited are used to describe the scope:
   (a) *Site specific (SS)*: Only within or immediate the project components' site boundaries or no impact at all;
   (b) *Local (Lc)*: beyond project components' site boundaries (<500m).
   (c) *Regional*: when an action affects beyond subproject area and reaches nearby districts.
   (d) *National (Na):* impacts are national concern.
   (e) *Cross boundary (CB):* nearby countries expect to be affected by such actions.

(iii) *Duration (Dur):* This is the time aspect of the potential environmental risks. The terms permanent, temporary and short are used to describe the period (or time):

(a) *Short term (ST)*: the effect disappears promptly or even no impact at all;
(b) *Medium term (MT)*: limited during construction period and few months in the operation stage;
(c) *Long Term (LT)*: change and/or impact on the environment throughout the life of the infrastructure or component.

(iv) *Significance of impacts (Sig)*. Three classifications are incorporated into the impact matrix, thus defines the potential environmental risks into one of three categories below.

(a) Minor (Mi): Impacts are minimal or does not affect the environmental component in any observable or quantifiable way, and that it is related to a randomly occurring natural effect.
(b) Moderate (Mo): Potential impacts are less adverse on particular environmental component and/or not irreversible.
(c) Major (Mj): Signifies an effect that is severe and that affects the integrity, diversity and sustainability of the environment. Such an effect substantially or immediately alters the quality of the environment.

133. A matrix for identification of potential environmental impacts is provided below in Table 21. It comprises the analysis of interventions under (i) sustainable land-use, (ii) forest land conservation, (iii) degraded land improvement, (iv) stream bank protection, (v) water resource management, (vi) demonstration, and (vii) community infrastructures. Type of interventions are analyzed with environmental risk categories, as mentioned above, based on the key activities.

Table 21. Matrix for identification and analysis of potential environmental impacts.

Symbol	Watershed Intervention	Key Activity	Possible impacts	Type of Impact			
				Mag	Ext	Dur	Sig
Improved appropriate / sustainable land use							
Atj	Transforming Jhum into agro-forestry	- Contour terracing, hedge row planting. - Replacing annual crop with fruit trees and perennial crops	Soil disturbance during implementation	L	SS	ST	Mi
			Introduction of invasive and/or inappropriate species	M	Lc	LT	Mo
Afp	Fruit tree planting	Planting of the fruit trees at sloping agriculture lands, which are affected by the surface erosion	Workers' health and safety	L	SS	MT	Mo
Adi	Drainage improvement	Construction and protection of drainage canals	Soil disturbance during implementation	L	SS	MT	Mo
			Air quality risks	L	SS	MT	Mo

Symbol	Watershed Intervention	Key Activity	Possible impacts	Type of Impact			
				Mag	Ext	Dur	Sig
			Water quality decline	M	Lc	MT	Mo
			Workers' health and safety	L	SS	MT	Mo
Aom	Orchard management support	- Training on orchard management - Inputs to orchard management such as saplings, fertilizer, tools, etc.	Workers' health and safety during operations	L	SS	LT	Mo
Forest / Shrub Land Conservation							
Fmp	Support community forest management plan preparation		No environmental impact but need to consider biodiversity conservation	L	SS	ST	Mi
Fep	Forest Enrichment plantation	Planting in the gaps	Soil disturbance during implementation	L	SS	MT	Mi
			Introduction of invasive and/or inappropriate species	M	Lc	LT	Mo
			Workers' health and safety	L	SS	MT	Mo
Fco	Forest Cultural operation	Thinning and silvicultural operation	Loss of natural vegetation	L	SS	MT	Mo
			Loss of wildlife	L	SS	ST	Mi
			Workers' health and safety	L	SS	MT	Mo
Degraded Land improvement							
Dcp	Rehabilitation of degraded lands	Planting and protection of bamboo and tree species	Soil disturbance during implementation	L	SS	ST	Mi
Drd	Reclamation of disaster affected riverbed and agriculture lands	Planting and protection of bamboo, tree species, and grass	Introduction of invasive and/or inappropriate species	L	Lc	LT	Mo
Dlt	Landslide treatment	- Construction of retaining wall, drainage, check dams, palisade and fascine					
Dgt	Gully Treatment	- Planting of grass and tree species	Workers' health and safety	L	SS	MT	Mo
Stream Bank Protection							
Sbs	Buffer strip management	Planting and protection of grass and tree species	Soil disturbance during implementation	L	SS	ST	Mi
Spw	Stream / riverbank Protection	- Construction of protection wall, embankment, spurs, - Planting and protection of bamboo and tree seedling - Piling of poles	Introduction of invasive and/or inappropriate species	L	Lc	LT	Mo
			Workers' health and safety	L	SS	MT	Mo

Symbol	Watershed Intervention	Key Activity	Possible impacts	Type of Impact			
				Mag	Ext	Dur	Sig
		- Riprap in the blank slopes with sod and soil filled bags					
Water resource management							
Wci	Irrigation canal improvement	- Canal improvement - Safe disposal of runoff water - Implementation of bio-engineering erosion control measures	Soil disturbance during implementation	L	SS	MT	Mo
Wdw	Drinking water source improvement	- Protection of water source - Planting and protection of vegetation on the barren/exposed area - Implementation of bio-engineering erosion control measures - Construction of safe water flow mechanism	Introduction of invasive and/or inappropriate species	L	Lc	LT	Mo
Whr	Water harvesting reservoir with dam construction / improvement	- Building and improving barrier (dam) across the water channel/ drainage - Planting of bamboo and vegetation (grass) in the dam and periphery - Construction of flow control mechanism	Water quality decline	L	Lo	LT	Mo
Whp	Water harvesting pond construction and Improvement	- Digging of the soil - Planting of grass and trees on the surroundings	Air quality risks	L	SS	MT	Mo
Wpi	Conservation pond/reservoir improvement	Vegetative and structural measures applied to reduce damage to the existing irrigation channel caused by erosion and to enhance efficient irrigation service to improve the production	Noise level increase from construction machines	L	SS	MT	Mo

Symbol	Watershed Intervention	Key Activity	Possible impacts	Type of Impact			
				Mag	Ext	Dur	Sig
		function of the agriculture lands	Workers' health and safety	L	SS	MT	Mo
Wgr	Groundwater recharge pits/ trench	- Digging and protection of the pits - Construction of water diversion bunds					
Wli	Wetland conservation	- Construction of structures to protect sediment going to the wetland - Planting of grass and trees surrounding the wetland	Community health and safety	L	SS	MT	Mo
Demonstration							
Arf	Regenerative farming	- Collection of waste biomass and use for composting and application in the farm to maintain fertility - Multiple cropping - Conservation tillage	Worker's health and safety	L	SS	ST	Mi
Aci	Drip irrigation	Efficient management of the available water for growing vegetable and fruits	Soil disturbance during implementation	L	SS	MT	Mo
			Air quality risks	L	SS	MT	Mo
			Water quality decline	L	Lc	MT	Mo
			Noise level increase from construction machines	L	SS	MT	Mo
			Workers' health and safety	L	SS	MT	Mo
			Community health and safety	L	SS	MT	Mo
Ahi	Homestead improvement	Integrated management of the soil, water and vegetation within the homestead garden	Soil disturbance during implementation	L	SS	ST	Mi
			Introduction of invasive and/or inappropriate species	L	Lc	LT	Mo
			Workers' health and safety	L	SS	MT	Mo
Sci	System of Rice Intensification	Efficient use of available water for growing paddy	Workers' health and safety	L	SS	LT	Mo
Community Infrastructure Component							

Symbol	Watershed Intervention	Key Activity	Possible impacts	Type of Impact			
				Mag	Ext	Dur	Sig
Nir	New Line Irrigation Canal	Construction of canal	Soil disturbance during implementation	L	SS	MT	Mo
			Air quality risks	L	SS	MT	Mo
			Water quality decline	L	Lc	MT	Mo
Dtw	New tube well installation	Installation of tube well by digging of soil.	Noise level increase from construction machines	L	SS	MT	Mo
PL	Installation of low-cost Pit Latrine	Low-cost pit latrine should be installed with proper sanitation system or by covering of the pit points.	Workers' health and safety	L	SS	MT	Mo
SL	Sanitary toilet including water supply	Sanitary toilet installation with required water supply with proper sanitation	Community health and safety	L	SS	MT	Mo
PT	Supply of power Tiller	Power tiller supply by the selected supplier.	Workers' health and safety during operations of equipment	L	SS	LT	Mo
PP	Supply of Power Pump	Power pump supply by the selected supplier.					

CHAPTER 8. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

A. Principles

134. Disclosure, consultation, and participation involving persons interested in or affected by project activities forms a critical part on best practice project planning and environmental assessment. Active participation of stakeholders in all stages of project preparation and implementation is essential for the success of the project, ensuring that subprojects reflect stakeholder needs, have community acceptance, and are beneficial to the people.

135. SPS of 2009 requires meaningful consultation with affected people and other concerned stakeholders including civil society. Meaningful consultation:

- Begins early in project preparation and continues throughout the project cycle.
- Provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people.
- Is undertaken in an atmosphere free of intimidation or coercion.
- Is gender inclusive and responsive and tailored to the needs of disadvantaged and vulnerable groups.
- Enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.[24]

136. Consultation is to be commensurate with impacts on affected communities, and its results documented and reflected in the environmental assessment report.

B. Subproject Stakeholder Consultations

137. Consultation meetings and focus group discussion were organized for preparation of the Dighinala Watershed Management feasibility study. At all the stages, meaningful consultations have been done following the free, prior, informed consent (FPIC) norms. The Technical Assistance (TA) consultants team consulted the communities in the watershed on the selection of interventions and on requirements during subproject implementation, and arrangement on O&M. The team also discussed ADB's SPS requirements on environment, land acquisition and resettlement (LAR) and SEC. Communities were requested to follow all the safeguard policies and issues with utmost care.

138. On 19th September 2021, a stakeholder consultation meeting was held in Uttar Pukurghat Para, attended by about 25 – 30 participants. All from Chakma ethnic group (see Annex 4.1 for the list of attendees, photographs and minutes of the meeting). In this meeting, the outline for the watershed management subproject was presented, as the need to address gender and safeguarding issues. The participants reflected upon the recently complete CHTRDP-II project, the watershed subproject was met with much enthusiasm.

[24] Paragraph 19, Safeguards Requirement: 1 Environment, Appendix 1 of ADB SPS 2009.

139. On 20th September 2021, a stakeholder consultation meeting was held in Madya Banchara Para, attended by about 70 – 75 participants, all from the Chakma ethnic group (see Annex 4.2 for the list of attendees, photographs and minutes of the meeting). In this meeting, outline for the watershed subproject was presented, as was the need to address gender and safeguards issues.

140. Points raised by the participants included: (i) women expressed interest in also working as day laborers during project implementation, (ii) desire to include more knowledgeable elderly person as representative of the PDC team to support the field surveys, (iii) list of items the community would like to see included on the subproject, such as safe drinking water (current water supply contains too much iron), more power tillers and pumps, and more extensive irrigation canals. These points were addressed during the meeting and in general agreed to by the project representatives. Generally, the subproject was met with much enthusiasm.

141. During the ADB fact-finding mission of June 2022, another stakeholder consultation meeting was held on the 8th June 2022 at Rangapani Chara, attended by community leaders (village heads or karbari) representing their paras together with at least 100 community members, mostly farmers from 29 paras. All were from the local Chakma ethic group (see Annex 3.3 for minutes, photographs and list of participants). At the meeting the aim of the watershed subproject was explained, and further discussions included the availability of female labor and the negative impacts of planting teak monoculture on the watershed. The Union chairman described the present condition of his union area and what could be undertaken to improve the condition of the watershed based on consultation meetings held earlier. He especially mentioned the need for improvement of riverbank protection, landslide treatment, and improvement of drainage, irrigation and drinking water facilities which together would improve environmental conditions and the livelihood of the people of the area. The ADB and consultant's team responded by underlining these elements were indeed included in the interventions proposed in the feasibility study and that the project's agroforestry approach would help to reduce the negative impact of current monoculture teak plantations.

Figure 13. Fact-finding Mission consultation with community people.

C. Disclosure Framework

142. PMO, with support from PISC, will disclose safeguards information through public consultation and making available relevant documents in public locations. The following documents will be submitted to ADB for disclosure on its website:

- subproject IEEs (including EMPs)
- EARF before project appraisal
- Semi-annual environmental monitoring report during project implementation until ADB issues project completion report
- updated IEE of subproject and corrective action plan prepared during project implementation, if any.

143. The PMO will provide relevant safeguards information in a timely manner, in an accessible place and in a form and language understandable to subproject stakeholders/ affected people and other stakeholders. For illiterate people, other suitable communication methods will be used. Specifically, summary safeguards information translated into Bengali and other languages as required, will be made available to each Upazila and CHTRC District office.

D. Adaptive Mechanism

144. Adaptive mechanisms will be used to address limitations on environmental safeguard activities and consultations due to government restrictions and COVID-19 risks. Surveys and data collection will be conducted through online platforms, brochures, questionnaires, and other forms of media as applicable to provide information and receive feedback from the people, beneficiaries, government agencies and other stakeholders.

CHAPTER 9. GRIEVANCE REDRESS MECHANISM

145. A dedicated multi-tier grievance redress mechanism (GRM) will be established to receive, evaluate, and facilitate the concerns and complaints of the affected people, if any, about the social and environmental performance at the project level. The GRM aims to ensure:

- basic rights and interests of every person affected by poor environmental or social performance of the project are protected; and
- concerns arising from the poor environmental or social performance of the project during the conduct of pre-construction, construction and operation activities are addressed.

A. Principles of GRM

146. The GRM is anchored on the following principles that guide the CRLIWM-CHT Sector Project:

147. *Transparency.* The Project will keep the affected person informed about the progress made in resolving the grievances and provide sufficient information about the mechanism's performance to build confidence in its effectiveness and meet any public interest at stake. The small ethnic communities (SEC) especially the *karbaris* must be (i) made aware of the complaints and issues reported, (ii) involved in their redress, and (iii) informed on progress made in resolving grievances. Confidentiality of the dialogue between parties and of individuals' identities should be provided where necessary.

148. *Empowering and participatory.* SEC, *karbaris*, affected persons, beneficiaries, INGOs and other stakeholders are encouraged to participate and bring complaints, issues and comments to the attention of Project management. More importantly, communities should be involved in problem solving.

149. *Socially inclusive.* The whole community is given the opportunity to raise concerns and the right to be accorded a response. The grievance system will allow anyone, especially the SEC, poor, the disadvantaged groups, the women, to raise grievance or complaints, be heard and involved on redressal process.

150. *Culturally appropriate.* Alternative dispute resolution forum (ADRFs) will be constituted for land dispute resolution where the *karbaris* and PDC in SEC will be members in grievance redress council.

151. *Simple and accessible.* Procedures to file complaints and seek redress are kept simple and easy to understand by the SEC and affected people. Complaints and queries may be sent through different accessible means such, as but not limited to, installation of grievance box in subproject areas, walk-in to district offices, para development committee (PDC) representatives, *karbari*, message or call to grievance hotline, or an email to the Project website.

152. *Confidentiality.* The identities of affected people and other stakeholders are kept confidential upon request. This encourages people to voluntarily participate in the GRM process, and file complaints and/or comments.

B. Functions of GRM

153. Response to grievance and comments is ensured within an acceptable timeline. The corresponding action is responsive and commensurate to complaint or issue. The GRM entails objective and independent practice to promote fair procedures and encourages people to use. Thus, GRM will enhance the proposed Project's contribution to participatory development. In all instances, conflict of interest or perceptions of it will be investigated and avoided.

154. The GRM will establish multiple channels by which grievances can be received by the PMO. The procedures will be easy for all the diverse groups of affected persons to understand and be made known to them and consider the many facets involved in making the mechanism accessible including affected people's (AP) access to transportation and roads and their literacy and education levels, as well as their access to such communications facilities as telephones, mail, and the internet. The project will ensure consultation is organized in a congenial environment without intimidation and should be culturally appropriate and acceptable to SEC and gender sensitive.

155. To ensure the GRM is in line with the ADB SPS, the GRM will be a time-bound, simple, transparent, gender- and culturally- responsive in addressing feedback, concerns and suggestions of, and facilitation of solutions for, all the relevant stakeholders of the project (i.e., local community, contractors, and other members in the value chain, including from SECs, women, and other vulnerable groups). The GRM will include service standards and an implementation modality by assigning a grievance redressal officer (GRO) at each IA to handle specific matters related to public grievances / complaints flagged to their respective offices.

156. Accessibility will be facilitated through provision of the following services: (i) grievance boxes in subproject areas, (ii) walk-in to district offices, (iii) speak to PDC representatives or karbari, (iv) message or call the grievance hotline, or (iv) email the Project website. The PMO is to establish a GRM hotline and project website for APs to contact. A phone number and web address will be defined during project readiness. Complaints received through the hotline and website will be documented and fed to the correct level of GRM for facilitation. Awareness of grievance redress procedures will be created through public awareness, outreach campaigns and clear signage with a grievance focal person's contact details and procedure on how to file a complaint, including in Bangla or major SEC dialects on project sites. Redress through the GRM does not impede access to the country's judicial or administrative remedies.

157. Gender- and cultural- responsiveness will be supported through: (i) use of local issue resolution methods, (ii) membership of the SECs or their representative at the first tier GRM at field/village level; (iii) availability of the GRM form in local/SEC dialects or languages to the extent these have a written form and on information signage.

158. For any grievance filed by a marginalized or vulnerable person, such as a SEC member or poor person, extra attention will be paid to ensuring the following: (i) complainant will be aided in recording their grievance (field staff to write up verbal complaint verbatim), (ii) complainant can be represented and supported by a local leader (such as an SEC leader), (iii) the outcome of the grievance will be delivered in writing and in person by the GRO responsible, to ensure comprehension of the outcome and any follow up actions. All grievances shall be recorded in

grievance register (including in Bengali or local language), and entire process shall be tracked and reported through quarterly and annual progress reports and semi-annual social and environmental safeguards monitoring reports. The GRM process shall include the following stages.

C. Levels of GRM

159. Before any grievances are brought to the GRM, efforts will be made to solve queries and complaints at village (*para*) level by involvement of the headman (or *karbari*) through traditional conflict resolution methods.

160. The GRM has three tiers. There are two types of tier one. Tier 1, type A refers to the ADRF, which will be located at subproject level and will address land disputes for output 5 (rural roads component). Tier 1, type B refers to the para development committee or PDC, which will serve as tier one for all other social and environmental safeguards concerns raised across project outputs 1 - 5 (i.e., Community Infrastructure, Watershed Management, Agriculture Production and Rural Roads). Tier two is represented by a Grievance Redress Committee (GRC) which is established at Hill District Council (HDC). At the apex of this structure is the Regional Advisory Council (RAC) at CHTRC level.

161. If the ADRF under Tier 1, type A or the *karbari* under Tier 1, type B is unable to resolve the issue at para level to the satisfaction of the affected person, the issues can be forwarded to the GRC level in tier 2. If dissatisfaction remains at GRC level, the affected person can elevate the issue to tier 3 to the RAC level. The PMU will ensure the redressal of complaints, including anonymous complaints, and issues of non-compliance, in accordance with national regulations and the ADB Accountability Mechanism Policy 2012. However, the affected person has every right to bring their issue to a court of law. The overall model of GRM for this project is summarized in Figure 14.

C.1.1. Tier 1: Community level Type A (Alternative Dispute Resolution Forum or ADRF)

162. ADRFs will be constituted for land dispute resolution. In Bangladesh, *Shalish* and *Mimangsha* are when the community takes the leading role in resolving disputes. These are usually undertaken through mediation, negotiation, and reconciliation. In the *Shalish* and *Mimangsha*, the community leaders delve deep into the root cause/s in the presence of both parties, hear viewpoints of disputants, and try to find a solution agreeable to the parties concerned.

163. Resolving disputes through community initiatives with the above tools are commonly known as alternative dispute resolution (ADR). As proposed, INGOs will be involved in the GRM process, and constitute ADRFs at subproject level for the Rural Road component. In Bangladesh, traditional *Shalish* agreements were enforced through village peer pressure. Agreements were announced and publicly proclaimed. Families would lose face if they do not comply with agreements. The reformed village mediation system, with support of INGOs, relies on traditional compliance mechanism and succeeds despite the lack of formal court enforcement. Not only does this conform with the traditions of the region, but use of a panel of mediators helps limit systematic corruption or bias. Measures for ADR in Bangladesh have been provided in the Code of Civil

Procedure 1908 which allows for the settlement of disputes outside the courts: the court may formulate the terms of a possible settlement and refer the same for arbitration, conciliation, mediation, or judicial settlement.

164. An Executive Order will be issued by MoCHTA for setting up ADRFs for the Rural Road component (i.e. Output 5) covering membership, authority and responsibilities, and rules of business of the ADRF. Its membership will reflect the composition of the affected peoples of subprojects by incorporating members of SEC proportionately. Membership will be drawn from traditional and informal local leaders from the main subproject paras, thus guaranteeing that customary methods of conflict resolution will be applied where feasible. Before land issues are submitted to the ADRF an effort will be made to resolve them with the para through the *karbari.*

165. ADRFs will be composed of 3-5 members with the mouza headman as its Chair, with a minimum of four members for each mediation. In cases where appropriate, the headmen may be replaced by the UP Chairman. The remaining members of the ADRFs will be drawn from the community elders, traditional leaders (e.g. the village *karbari)* or representatives of local government institutions (e.g. UP Ward Members). At least one of the ADRF members will be a woman. The INGO responsible for the resettlement plan will facilitate the identification of the ADRF members in consultation with the mouza Headman and DPMO. The NGO will further be responsible for facilitating the conduct of the ADRF's meetings and act as its Member Secretary. The grievance redressal and resolution at this stage is within seven days.

166. At any time, any affected person can submit a grievance/complaint in writing (and other means mentioned above) to the concerned UP Chairman, Headman or *Karbari* or the PDC, using the grievance redress form (GRF) with support from NGOs or Social Development Organizers. At the time of registering the complaint, a copy will be given to the affected person making the complaint for their record. The PMO will make sure that sufficient GRF is available in the site office and in the office of the concerned UP Chairman/Mouza Headman, Headmen or *karbari* and other local community leaders. Some cases may just require provision of required information or clarification and may thereafter not be required to be referred to Step 2. The GRF is in Annex 5.

167. The ADRF is composed of:

- Mouza Headman as Chairperson
- Union Parishad Chairman as Alternate Chairperson
- Karbari as Member
- One female local leader as Member
- Resettlement INGO as Member Secretary
- Contractor's site engineer or representative (will take part when there is grievance on construction)

C.1.2. Tier 1: Community level Type B (Para Development Committee or PDC)

168. The PDC will be the first tier of the GRM for all social and environmental concerns, excepting land dispute resolution, caused by project components: community infrastructure, watershed, skills training, agriculture production outputs and the rural roads. The complaints resolution should be within seven days and will follow the same steps in filing the complaint as

mentioned above. Any affected person can approach the *karbari* or any member of the PDC. The Social Development Organizers and NGOs will ensure to provide support throughout the grievance problem-solving process. The PDC will convene weekly to address all complaints lodged at the PDC level. If PDC is unable to resolve the issue at para level to the satisfaction of the affected person, the issues can be forwarded to the GRC level in tier 2 within seven days.

169. The PDC is composed of:

- Karbari as Chairperson
- Two representatives from PDC as Members
- One female local leader as Member
- Representative from contracted NGO as Member
- Social Development Organizer as Member Secretary
- Contractor's site engineer or representative (will take part when there is grievance on construction)

C.2. Tier 2: Grievance Redress Committee (GRC) - Hill District Council Level

170. For environmental or social safeguards related complaints that cannot be settled at the community level through the ADRF or PDC, the GRC at District level will provide a simple process for the affected person to raise their objection and get them resolved within seven days. The affected persons will be informed of their right to file complaints to the GRC.

171. The GRC will receive unresolved grievances of the affected persons through the ADRF and/or Resettlement INGO for the rural road output or through the concerned NGO or Social Development Organizer for community infrastructure, watershed, and agriculture production outputs. The ADRF and Resettlement INGO will assist the affected person in lodging their resettlement claims in a format acceptable to the GRC at Hill District Council. All complaints will be received at the office of the INGO, or by the GRC, with a copy to the Union Parishad representative. The INGO will operate through village consultation meetings and explain the process of grievance resolution, including the distribution of information booklet. The concerned INGO will explain the GRF in indigenous dialect and ensure that the affected person understands.

172. The GRC at Hill District Council level will settle the issues within seven days after receiving complaints. The Resettlement INGO, as member secretary of the GRC, upon receipt of complaints, will organize a GRC meeting. The GRC at Hill District Council level will pass a resolution which will be formally conveyed to the concerned affected persons through the Resettlement INGO. The key functions of a GRC will be as follows:

- Record, categorize and prioritize any grievances;
- Settle grievances in consultation with affected persons/representatives, project staff and other stakeholders;
- Inform the aggrieved parties about the resolutions; and
- Forward any unresolved complaints to the Regional Advisory Committee.

173. The authorities and responsibilities of the GRC and its rules of business will be part of the MoCHTA Executive Order.

174. The GRC is composed of:

- Chairman of Hill District Council as Chairperson
- Deputy Project Director of PMO as Member
- Deputy Project Director of LGED PMU as Member
- Representative from the District Commissioner's Office as Member
- Land Officer of Hill District Council as Member
- Representative, Headmen Association
- Representative, Union Parishad as Member
- NGO representing women in the Hill Districts
- Resettlement INGO or the contracted NGO will provide as Member Secretary

175. If not resolved at the GRC level within seven days, the matter will be referred immediately to the Regional Advisory Committee.

C.3. Tier 3: Regional Advisory Committee – Regional Council Level

176. Complaints that cannot be settled at the GRC level should be elevated to the Regional Advisory Council (RAC) at the Regional Council level for grievance redressal and resolution within 15 days. The RAC will meet whenever a case is brought to its attention and determine the merit of each grievance brought to their level. The authorities and responsibilities of the RAC and its rules of business will be part of the MoCHTA Executive Order. The RAC secretary will provide feedback to the affected person.

177. The RAC is composed of:

- Chairman or Representative of Chittagong Hill Tracts Regional Council as Chairperson
- Representative from the Ministry of Chittagong Hill Tracts Affairs as Member
- HDC Chairmen of the three Hill Districts or their nominated councilor as Member
- Deputy Commissioners of the three Hill Districts or their nominated representatives as Member
- Circle Chiefs of the three Hill Districts Circles as Member
- Project Director LGED PMU or nominated representative as Member
- Project Director PMO as Member Secretary

178. None of the three levels of the GRM possess any legal mandate or authority to resolve land issues, they rather act as an advisory body or facilitator to try to resolve issues between the affected household/person and the CRLIWM-CHT Sector Project. Any complaints of ownership or other suits, to be resolved by judicial system, will not be resolved by project's GRM. The affected person always has other recourse through the Government legal channels. However, every effort will be made to avoid this by applying traditional conflict resolution procedures in negotiating resolutions to complaints. Should an affected person wish to pursue legal recourse at any point prior to approaching, during interaction with, or after interacting with the GRM, the PMO,

DPMO and Implementation NGOs (INGOs) will ensure that support is given to the affected person to prepare a case. No fees will be charged to the affected person for such assistance.

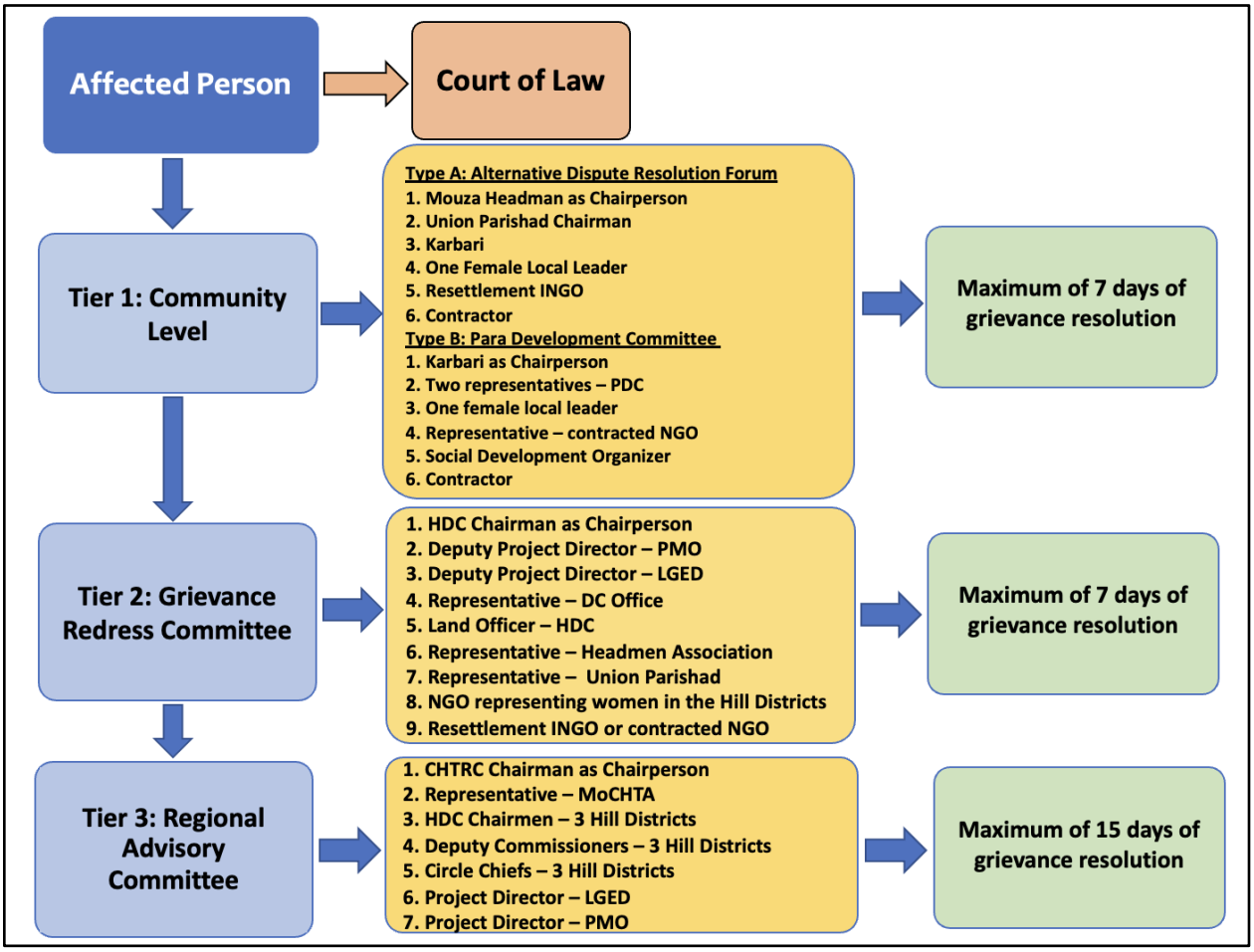


Figure 14. Framework of the GRM for BAN:CRLIWM-CHT Sector Project

C.4. Relevant GRM Activities

179. *Court of Law.* The GRM notwithstanding, an aggrieved person will have access to Bangladesh Legal System at any stage, Accessing the court of law is not dependent on the outcome of the GRM.

180. *ADB Accountability Mechanism.* If the established GRM is not able to resolve the issue, the affected person can use the ADB Accountability Mechanism through directly contacting (in writing) the Complaint Receiving Officer at ADB headquarters. Before submitting a complaint to the Accountability Mechanism, it is recommended that affected people make good faith effort to resolve their issues by working with the Bangladesh Resident Mission. Only after doing that, and if they are still dissatisfied, they could approach the Accountability Mechanism. The ADB

Accountability Mechanism information will be included in the project-relevant information to be distributed to the affected communities.

181. *Consultation and Information Dissemination.* Consultation will include group meetings, and one-on-one discussion with affected persons, to be announced in advance and conducted at the time and day agreed on with the affected persons or their representatives. Non-literate affected persons will be assisted to understand the grievance redress process. The GRM process will be explained to them in indigenous dialects by the Resettlement NGO, contracted INGOs, or the Social Development Organizers. The public especially the SEC and affected persons will be made aware of the GRM through consultation meetings, focus group discussions and inclusion of the GRM hotline and relevant details in the Project information booklet.

182. *Record Keeping.* A grievance database system will be established by CHTRC. Records of all grievances received, including contact details of affected person, date of complaint/grievance received, nature of grievance, agreed actions and measures, dates of meetings conducted and resolutions with linked documentation are recorded in the database. The number of grievances recorded and resolved, and the outcomes will be displayed/disclosed in the PMO office, and on the website of PMO (to be developed in project readiness), as well as reported in the semiannual environmental, IR and IP safeguards monitoring reports to be submitted to ADB. The PMO, with support from the GROs composed of the Environmental Management/Climate Adaptation Expert, Land Acquisition Expert, and SEC Expert, will be responsible for maintaining the grievance database system.

183. *Costs.* All costs involved in resolving the complaints (meetings, consultations, communication, and reporting/information dissemination) will be borne by the PMO. Cost estimates for grievance redress are included in resettlement cost estimates.

CHAPTER 10. ENVIRONMENTAL MANAGEMENT PLAN

A. Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP)

184. The implementation of EMP is necessary to mitigate the potential impacts of interventions of watershed, while EmoP is an instrument to check and document effectivity of mitigation measures of the EMP. Environmental Monitoring Report (EMR) will document and disclose EMP implementation and other safeguard activities on a periodic interval. Due to the diversity nature of the Dighinala Watershed Management Subproject, there are two types of EMPs in line with level of impacts, scope of works and procurement process.

185. Table 23 provides the EMP that will be used for less complicated interventions. These interventions will be implemented by local contracting society (LCS) and facilitated by an INGO. EMP for these interventions is shown below.

Table 23. EMP for watershed management interventions under (i) sustainable land-use, (ii) forest land conservation, (iii) degraded land improvement, (iv) stream bank protection, and (v) demonstration.

Activities	Impacts	Mitigation Measures	Responsibility for mitigation measures	
			Implementation	Monitoring/ Support
Physical				
Contour terracing, hedge row planting. Construction and protection of drainage canals. Planting in forest gaps Planting and protection of bamboo, tree species, and grass Construction of retaining wall, drainage, check dams, palisade and fascine Efficient management of the available water for growing vegetable and fruits Integrated management of the soil, water and vegetation within the homestead garden	Soil disturbance	Residues from previous crop, grass, shrubs, farmyard manure, compost, by products of agro-based products can be used for mulching which helps in reduce amount of soil loss. Vegetative barriers or vegetative hedges should be used to reduce soil erosion and conserving moisture. New terraces should be protected carefully maintained, especially during the first two years. Use fibrous rooted shrubs and grasses as hedges along the contour of land to slow down runoff, weaken the erosive power of water and cause to deposit its load of valuable soil behind the hedgerows. Ensure that material required for construction is procured on -site or from authorized quarries. When planting trees, a 2 to 4-m spacing between trees is adequate for erosion control depending on species as most species become effective sediment traps about two to three years after planting. Ensure safe disposal of desilted and/or excavated materials from water bodies for use on farmlands with consent from farmers (i.e. letter). Ensure that desilting and/or excavation works does not leave deep pits. Restoration of degraded lands should preferably be done through diverse set of local indigenous species.	LCS INGOs	PDC DPMO PISC

Construction and protection of drainage canals Efficient management of the available water for growing vegetable and fruits	Air quality risks	Dust suppression measures like water sprinkling, will be applied in all dust prone locations. Manual labour will be prioritized instead of machines Only if needed, community irrigation scheme should utilize energy efficient pumps. Avoid burning of wastes (crop residues, leaf litter, plastic wastes, etc.). Ensure that all vehicles and machineries are within government standards.	LCS INGOs	PDC DPMO PISC
Efficient management of the available water for growing vegetable and fruits	Noise level increase from construction machines	Adopt prescribed safety practices, including use of personal protection equipment for handling any machinery. Manual labour will be prioritized instead of machines. Only if needed, community irrigation scheme should utilize energy efficient pumps. Ensure that all vehicles and machineries are within government standards.	LCS INGOs	PDC DPMO PISC
Drainage improvement Efficient management of the available water for growing vegetable and fruits	Water quality decline	Location of interventions will be selected based on agreement of community and DPMO. Ensure safe disposal of excavated materials and avoid leaving excavated materials close to waterways. Ensure that any piped system connected to water sources has strainers/screens in place to block debris. Ensure that there are no latrines within 30 metres, particularly upstream of the source of water for drip irrigation. No household pollution sources and from livestock should not directly discharge within any drip irrigation area. Training local village in basic hydrogeology to support identification of water sources and recharge techniques. Drainage should not be dumped with farm wastes. Promote traditional knowledge on organic farming.	LCS INGOs	PDC DPMO PISC
Biological				
Replacing annual crop with fruit trees and perennial crops Planting in forest gaps Planting and protection of bamboo, tree species, and grass Integrated management of the soil, water and vegetation within the homestead garden	Introduction of invasive and/or inappropriate species	Community will not deliberately introduce any alien species with a high risk of invasive behavior or any known invasive species Exercise diligence to prevent accidental or unintended introductions of invasive species No species will be planted on a large-scale until local trials and/or experience have shown that these are ecologically well adapted to the site, not invasive, and do not have significant negative ecological impacts. Exotics and non-natives species will not be allowed in the interventions.	LCS INGOs	PDC DPMO PISC

Thinning and silvicultural operation	Loss of natural vegetation	Site investigations should be conducted while undertaking vegetation cover in sensitive areas. Ensure that there is no over-harvesting of local plant species during thinning process. Avoid open burning of biomass during thinning operations. Sensitize community regarding forest fire and its negative impacts on forest and other natural resources.	LCS INGOs	PDC DPMO PISC
Thinning and silvicultural operation	Loss of wildlife	In case of undertaking works in sensitive areas- all work must be done by manual means. All recognized habitats in the immediate vicinity of the activity must not be damaged or exploited. No poaching and hunting. In case there are wildlife conflict in the area, inform immediately the District Project Management Office of CHTRC on such occurrence.	LCS INGOs	PDC DPMO PISC
Replacing annual crop with fruit trees and perennial crops Planting in forest gaps Planting and protection of bamboo, tree species, and grass Integrated management of the soil, water and vegetation within the homestead garden	Introduction of invasive and/or inappropriate species	Community will not deliberately introduce any alien species with a high risk of invasive behaviour or any known invasive species Exercise diligence to prevent accidental or unintended introductions of invasive species No species shall be planted on a large-scale until local trials and/or experience have shown that they are ecologically well adapted to the site, are not invasive, and do not have significant negative ecological impacts. Tree and/or plant species selection should consider multiple benefits of meeting food and other requirements of the villagers, and also suit the needs of wildlife. Encourage planting of fodder yielding trees for increased biomass on homesteads, degraded forestlands, and community lands. In case of enrichment planting, there should not be too much of age difference between the old and new plants.	LCS INGOs	PDC DPMO PISC
Socio-economic				
All interventions	Workers' health and safety	Avoid open burning of biomass during site preparation, field operations, and post-harvest. Wear appropriate protective clothing, such as a long-sleeved shirt, long pants, hat, gloves, and boots. Inspect and shake out any clothing, shoes, or equipment before use. Remove or reduce tall grasses, debris, and rubble from around the outdoor work areas. Train workers hazardous product management and storage. Include training on how to read labels to understand the risks associated with all hazardous products, including pesticides, fertilizers, and crop-processing products. Ensure hygiene practices are followed to avoid exposure of personnel or family members to pesticide or chemical residues.	LCS INGO	PDC DPMO PISC

		No procurement of WHO banned Class I & Class II A and II B[25]		
Efficient management of the available water for growing vegetable and fruits	Community health and safety	Regulating movement of works only at designated areas. Disinfect equipment and machines regularly. No activities will use pesticides that are in Classes Ia, Ib and II of the WHO Recommended Classification of Pesticides by Hazard. Adopt prescribed safety practices, including use of personal protection equipment for handling any machinery. Plantations raised under the project must be protected against fire incidences.	LCS INGO	PDC DPMO PISC

186. Local contractor(s) will implement more complex civil works. The execution of design and scope works will entail construction vehicles and machines. Higher level of impacts is expected from these interventions. Thus, an EMP intended for contractors is shown below.

Table 24. EMP for interventions under water resource management and community infrastructures.

Activity Type of Interventions	Potential Negative Impact	Specific Environmental Impact	Mitigation Measures	Responsibility for mitigation measures	
				Implementation	Monitoring/ Support
Pre-Construction Phase					
Physical Environment					
Mobilization of construction	Disturbance at target sites due to mobilization of construction equipment and vehicles	Dust and noise pollution	Regulating movement of construction vehicles only at designated routes. Spraying of water to minimize dust emission. Construction period will only be at designated time as approved by District Project Management Office in CHTRC and consultation from community.	Contractor	Monitoring: CHTRC PDC Support: PISC
	Risk from storing of petrol, diesel and grease for vehicle and machines	Water source and soil pollution	Establish dedicated fuel, oil, and chemicals stores on impermeable bunded area to avoid spills and leaks Avoid storage of fuel, oil, and chemicals in areas ideally within 500m to water sources (surface water and groundwater wells, springs etc.) to avoid direct contamination or contamination through run off, if this is not possible minimum distance is to be 100m. Undertake refueling only on areas of hard protected soil, preferably bunded, ideally 500m from water sources (surface water and groundwater wells, springs etc.) but if this is not possible minimum distance to be 100m, with all drainage directed through oil interceptors. Undertake mobilization during the dry season as much as possible to minimize exposed	Contractor	Monitoring: CHTRC PDC Support: PISC

[25] The WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification 2019

Activity Type of Interventions	Potential Negative Impact	Specific Environmental Impact	Mitigation Measures	Responsibility for mitigation measures	
				Implementation	Monitoring/ Support
			areas subject to erosion by surface water runoff. Do not allow washing of equipment or vehicles near surface water and ensure all washing water is discharged to sedimentation basin and oil interceptor instead of directly to surface water. Petrol, diesel and grease for vehicle and machines should be stored in storage facilities, enclosed and not exposed to weather elements.		
Land temporarily required for site offices, material storage, equipment parking, labour accommodation & occupational safety measures for workers	Loss or degradation of farmland and productivity	Reduced production, hardship, food shortage	A suitable location will be selected for site office which will have a negligible impact on environment. Proper care will be taken for not disturbing natural living beings and avoiding of uprooting trees. Healthy accommodation for the laborers, sufficient drinking water supply, and sanitary arrangement will be provided in the sites. Necessary precautionary measure will be taken which may include the building of temporary barricades to isolate the boundaries of the education/hospital/ religious institutes from the construction site, restriction on movement of heavy machinery and avoiding disposal or tipping of earth near those institutes. Signages that will reflect (i) key information of the scope of works, and (ii) GRM access and process.	Contractor	Monitoring: CHTRC PDC Forest Department Support: PISC
Biological Environment					
Mobilization of construction	Change in local topography from establishment of (i) camp site and (ii) construction material storage areas	Loss of vegetation	Cutting trees at the proposed sites will be kept to an absolute minimum, and only be permitted when trees/vegetations are obstruction to campsite and other facilities. Tree cutting permit is obtained prior to the start of land clearing works where cutting tree cannot be avoided. Before land clearing and/or site preparation, perform a detailed survey of the number and species of trees in order to calculate the compensatory tree replacement. If there will be removal of vegetation, important tree species to be retained as identified by Forest Department. Felled trees recovered after cutting will be handed over for use according to the national laws and regulations.	Contractor	Monitoring: CHTRC PDC Forest Department Support: PISC
Socio-economic					
Mobilization of construction	Change in local topography	Encroachment of agricultural land	Location, layout and basic facility provision of camp site will be submitted to District Project	Contractor	Monitoring: CHTRC PDC

Activity Type of Interventions	Potential Negative Impact	Specific Environmental Impact	Mitigation Measures	Responsibility for mitigation measures	
				Implementation	Monitoring/ Support
	from establishment of (i) camp site and (ii) construction material storage areas		Management Office in CHTRC prior to its construction. Construction campsites will be located away from any local human settlement and properties preferably located on barren areas. The campsites will be provided with adequate water supply, sanitation and all requisite infrastructure facilities. Agreement with the landowner for use of space for camp site and material storage areas prior establishing.		Support: PISC
	Disturbance at target sites due to mobilization of construction equipment and vehicles	Health and safety risks of workers and village people	Regulating movement of construction vehicles only at designated routes. Construction period will only be at designated time as approved by District Project Management Office in CHTRC. Inform village people on the construction period. Workers will use proper personal protective equipment against dust and high noise levels.	Contractor	Monitoring: CHTRC PDC Support: PISC
	Risk from storing of petrol, diesel and grease for vehicle and machines	Affect health of workers	Workers will use proper personal protective equipment when working on chemicals. Inform Environment, Health and Safety Officer of contractor when spillage occur. Petrol, diesel and grease for vehicle and machines should be stored in storage facilities, enclosed and not exposed to weather elements.	Contractor	Monitoring: CHTRC PDC Support: PISC
Construction Phase					
Physical environment					
Site clearance	Alteration of local surrounding	Change in land use	Consult and seek agreement with local communities and District Project Management Office in CHTRC on the location of interventions. Limit use of heavy equipment and machineries to minimize further impact on the landscape. Manual labors would be promoted. Cutting trees at the target sites will be kept to an absolute minimum, and only be permitted when trees/vegetations are obstruction. The material to be used for water harvesting should prioritize whatever is available locally.	Contractor	Monitoring: CHTRC PDC Support: PISC
Operation of constructions vehicles for hauling and unloading of construction materials	Water pollution due to spills and leakage of oils and chemicals to water bodies.	Risk of water contamination	Do not allow washing of equipment or vehicles near surface water and ensure all washing water is discharged to sedimentation basin and oil interceptor instead of directly to surface water. Regular checks, and maintenance of construction equipment and vehicles to keep them in good working.	Contractor	Monitoring: CHTRC PDC Support: PISC

Activity Type of Interventions	Potential Negative Impact	Specific Environmental Impact	Mitigation Measures	Responsibility for mitigation measures	
				Implementation	Monitoring/ Support
Biological environment					
Site clearance	Change in land use	Loss of vegetation	Cutting trees at the proposed sites will be kept to an absolute minimum, and only be permitted when trees/vegetations are obstruction to interventions. Tree cutting permit is obtained prior to the start of land clearing works where cutting tree cannot be avoided. Before land clearing and/or site preparation, perform a detailed survey of the number and species of trees in order to calculate the compensatory tree replacement. If there will be removal of vegetation, important tree species to be retained as identified by Forest Department. Felled trees recovered after cutting will be handed over for use according to the national laws and regulations.	Contractor	Monitoring: CHTRC PDC Support: PISC
Operation of constructions vehicles for hauling and unloading of construction materials	Increased vibration at target sites	Disturbance to local wildlife	Regulating movement of construction vehicles and works only at designated areas. In case there are wildlife conflict in the area, the contractor will inform immediately the District Project Management Office of CHTRC on such occurrence. With the help of local Forest Department, the District Project Management Office of CHTRC will provide awareness on wildlife and habitat protection to Contractor. A record of wildlife sighting shall be kept.	Contractor	Monitoring: CHTRC PDC Forest Department Support: PISC
Socio-economic environment					
Site clearance	Alteration of local surrounding	Change in land use	Consult and seek agreement with local communities and District Project Management Office in CHTRC on the location of WASH. Limit use of heavy equipment and machineries to minimize further impact on the landscape. Manual labors would be promoted. Cutting trees at the WASH sites will be kept to an absolute minimum, and only be permitted when trees/vegetations are obstruction.	Contractor	Monitoring: CHTRC PDC Support: PISC
	Health and safety issue	Injury and outbreak of diseases	Provide worker training on health and safety on site clearance at WASH sites. Workers will use proper personal protective equipment against dust and high noise levels. Ensure all equipment and vehicles used are routinely disinfected. Prepare health and safety plan to manage risks in construction works. Prepare COVID-19 health and safety plan to manage risks.	Contractor	Monitoring: CHTRC PDC Support: PISC

Activity Type of Interventions	Potential Negative Impact	Specific Environmental Impact	Mitigation Measures	Responsibility for mitigation measures	
				Implementation	Monitoring/ Support
			Provide regular briefing/training on disease prevention to workers. Maintain COVID-19 and construction related injuries weekly monitoring and reporting mechanism at the worksite, including any necessary actions to be taken.		
Operation of constructions vehicles for hauling and unloading of construction materials Boring of ground for deep tube wells Excavation of pits for latrines	Increased noise levels and vibration at target sites	Disturbance to local people	Regulating movement of construction vehicles only at designated routes. Avoid nighttime construction works Construction period will only be at designated time as approved by District Project Management Office in CHTRC. Inform village people on the construction period.	Contractor	Monitoring: CHTRC PDC Support: PISC
	Air pollution due to vehicle movement and machine operations	Effect on local people and workers health	Dust suppression measures like water sprinkling, will be applied in all dust prone locations. Construction vehicles and machineries will be periodically maintained. Require construction equipment and vehicles to meet national emissions standards. Regular checks, and maintenance of construction equipment and vehicles to keep them in good working order to meet emission standards.	Contractor	Monitoring: CHTRC PDC Support: PISC
	Occupational health and safety issue	Injury and outbreak of diseases	Provide worker training on health and safety. Workers will use proper personal protective equipment against dust and high noise levels. Ensure all equipment and vehicles used are routinely disinfected. Prepare health and safety plan to manage risks in construction works. Prepare COVID-19 health and safety plan to manage risks. Provide regular briefing/training on disease prevention to workers. Maintain COVID-19 and construction related injuries weekly monitoring and reporting mechanism at the worksite, including any necessary actions to be taken.	Contractor	Monitoring: CHTRC PDC Support: PISC
	Community health and safety issue	Injury and outbreak of diseases	Regulating movement of construction vehicles and works only at designated areas. Regulating entry of village people into campsites. Workers to always use facemask during civil works at construction sites. Disinfect equipment and machines regularly.	Contractor	Monitoring: CHTRC PDC Support: PISC
Electrical works for submersible water motor pump	Occupational health and safety issue	Injury from installation	Provide worker training on health and safety.	Contractor	Monitoring: CHTRC PDC

Activity Type of Interventions	Potential Negative Impact	Specific Environmental Impact	Mitigation Measures	Responsibility for mitigation measures	
				Implementation	Monitoring/ Support
			Workers will use proper personal protective equipment against dust and high noise levels.		Support: PISC
Solar panel installation	Occupational health and safety issue	Injury from installation	Installation should be done by the experts. Provide worker training on health and safety. Workers will use proper personal protective equipment against dust and high noise levels.	Contractor	Monitoring: CHTRC PDC Support: PISC
Operation Phase					
Physical environment					
Closure of equipment yards and camps	Community health and safety issues	Disturbance to locals	Regulating movement of construction vehicles only at designated routes. Avoid nighttime works Demobilization period will only be at designated time as approved by District Project Management Office in CHTRC. Inform village people on the demobilization.	Contractor	Monitoring: CHTRC PDC Support: PISC
Operation of vehicles and machines for repair and maintenance	Occupational health and safety issue	Workers injury	Workers will use proper personal protective equipment against dust and high noise levels.	Contractor	Monitoring: CHTRC PDC Support: PISC
	Air, noise and water pollution	Disturbance and annoyance around institutions	Regulating movement of vehicles only at designated routes. Construction period will only be at designated time as approved by District Project Management Office in CHTRC. Inform village people on the maitenance period.	Contractor	Monitoring: CHTRC PDC Support: PISC
Socio-economic environment					
Operation of pumps, tillers, tube-wells	Water pollution	Health issues relevant with contaminated water	Water sources must be always protected to meet water quality standards. Disposal of solid and liquid wastes are strictly prohibited. With the community, DPMO and PISC to establish restrictions of activities that can pollute water. Periodic monitoring of water quality. Periodic awareness raising to users on water resources protection and conservation.	DPMO and PISC NGOs PDC	CHTRC PDC
	Health and safety issues	Increase in accidents	Periodic training of beneficiaries on the proper use and maintenance of tillers and water pumps Record of any injuries caused by using tillers and water pumps Use of appropriate personal protection equipment Accessing grievance redress mechanism whenever there is safeguard concerns	DPMO and PISC NGOs PDC	CHTRC PDC

Table 25. Budget for EMP for interventions under water resource management and community infrastructures.

Environmental Impact/Issue	Mitigation Measures	Responsibility		Budget (BDT)
		Implementation	Supervision	
Pre-operations Phase				
Land Temporarily Required for Site Offices, Material Storage, Equipment Parking, Labor Accommodation & Occupational safety measures for workers and road side institutions etc	A suitable location will be selected for site office which will have a negligible impact on environment. Proper care will be taken for not disturbing natural living beings and avoiding of uprooting trees.	Contractor.	CHTRC	**2,50,000/-** (Included in the estimated cost)
	Healthy accommodation for the laborers, Sufficient drinking water supply, and sanitary arrangement will be provided in the sites.	Contractor.	CHTRC	**75,000/-** (Included in the estimated cost)
	Necessary precautionary measure will be taken which may include the building of temporary barricades to isolate the boundaries of the education/hospital/ religious institutes from the construction site, restriction on movement of heavy machinery and avoiding disposal or tipping of earth near those institutes. Signages that will reflect (i) key information of the scope of works, and (ii) GRM access and process.	Contractor	LGED	**1,50,000/-** (Included in the estimated cost)
Operations Phase				
Air pollution by creating Dust	Spraying of water in quarrying areas and proper covering of vehicles carrying quarried materials.	Contractor	CHTRC	**30,000/-** (Included in the estimated cost)
Noise and Other Nuisances	All activities during construction will be conducted in a manner which minimizes nuisance to the general public and to the occupiers of premises. Proper measure will be taken to minimize noise pollution due to construction.	Contractor	CHTRC	**30,000/-** (Included in the estimated cost)
Soil and Water Pollution	The washing of vehicles and construction equipment will be carried out at designated washing areas in order to avoid soil and water pollution.	Contractor	CHTRC	**20,000/-** (Included in the estimated cost)
Disposal of Waste/ Construction debris	Necessary care will be taken to avoid any kind of waste/ construction debris disposal in water bodies. All necessary measures will be taken while working close to cross drainage channels to prevent congestion by earth, stone etc.	Contractor	CHTRC	**20,000/-** (Included in the estimated cost)
Post-operations Phase				
Closure of equipment yards and camps	Remove all temporary structures and clean up construction camp debris, backfill work camp latrines and vegetate the area with tree planting.	Contractor	CHTRC	**50,000/-** (Included in the estimated cost)

Table 26. Environmental Monitoring Plan (EMoP)

Impact	Monitoring Parameter	Method of Monitoring	Indicator	Location	Frequency of Monitoring	Responsibility
Water Pollution	pH, BOD, COD, TSS	Laboratory analysis as per Standard Methods	Test results should be comply with national standards	Nearby water channels	Two times in subproject duration (i.e. 50% and 90% of progress of works)	Contractor, LGED
Air Pollution	SPM		Test results should be comply with national standards and/or WHO levels	Project site		Contractor, LGED
Noise Pollution	Noise Level			Project site		Contractor, LGED
Soil Pollution	Oil & Grease, Organic Matter		Test results should be comply with national standards	Campsite		Contractor, LGED

B. Environment Safeguard Responsibilities of Project Proponents

187. The PMO is responsible for the full compliance of the project on ADB loan agreement and SPS 2009, and all applicable laws and rules of the government. The PMO will be headed by a Project Director from CHTRC. The PMO will:

- Comply with the government Environment Conservation Act (1995) and Environment Conservation Rules (1997), and other environment-related statutory requirements of the project.
- With the support of the PISC, DPMOs and LGED, review and approve subproject IEEs and EMP(s), and environmental safeguard related clauses and sections to be included in tender documents and civil works contracts of contractor(s).
- Be responsible for application and forwarding of key documents to government agencies for processing of permits including, but not limited to Environmental Clearance Certificate (ECC) for the rural roads, any tree cutting activities in subproject sites, and other relevant permits and license prior to awarding any works contracts for civil works.
- Ensure preparation, review, and submission of semi-annual EMRs for disclosure on ADB's website.
- Disclose IEEs, EMRs and other environment safeguards documents on MOCHTA and LGED websites.
- Ensure compliance of the project on the EARF. Take the lead on updating the EARF when needed.
- Conduct training and workshops on environment, health and safety of all staff and workers involved in the project implementation. The staff and workers will include all engineers, and staff and laborers of contractors.
- Implement effective environmental monitoring during pre-construction, construction, and operation phases. This includes, but is not limited to, inspections, review of monitoring forms prepared by the contractors, and documentation of the issues received through GRM.
- Take proactive and timely measures to address any environment safeguards related

challenges at the national or division/district levels such as (a) delays in processing of clearances during pre-construction stage and (b) significant grievances during construction and operation stages).
- Review and approve corrective action plans (CAPs) for environment safeguard non-compliance.
- Inform ADB on any unanticipated environmental impact/s occurred during project implementation phase.
- Participate and/or lead public consultations and GRM processes.
- Ensure GRM is in place and fully operational from the onset of project implementation.

188. There will be three DPMOs headed each by a Deputy Project Director (DPD). Each DPMO will be managed by the DPD, who will report to PD-PMO on district-wise subproject related activities under outputs 1–4. The DPMO will:

- conduct environmental screening of interventions by using REA checklist(s) with the support from PISC;
- support the PMO and LGED in the preparation of IEEs and EMPs of subprojects through, but not limited to, reconnaissance survey, collecting data from the proposed subproject sites, government requirements and public consultations;
- ensure that the project, and all contractors obtain permits, licenses, etc. before the implementation of the respective construction activity;
- Carry-out regular field verification and review of environmental compliances by contractors, in coordination with the PISC and the contractors' environmental focal person;
- with PISC's support, provide and record environmental impact observations during any site visits;
- participate and/or lead public consultations and grievance redress mechanism processes; and
- in case of potential risks and hazards to health, environmental quality, and properties that may result from poor EMP implementation, immediately instruct the contractor to cease the construction activities that pose risk and conduct immediate containment and mitigation activities.

189. Comprising with international and national experts, the PISC will support the capacity and operational effectiveness of the PMO, DPMOs and LGED (PMU and PIUs) including for environment safeguard matters. The Environment and Climate Specialist and Junior Environmental Engineers[26] under the PISC will support the project on supervision, compliance and monitoring of environmental safeguards. Particularly, the PISC will:

- ensure subprojects will conform to national policies and ADB's requirements for environmental safeguards;
- ensure subprojects are following social, technical, environmental and economic criteria;

[26] There will be a Junior Environmental Engineer for each CHT district, who will be led by the Environment and Climate Specialist.

- provide support to PMO for the collection of environmental information to be used in the feasibility assessment of proposed subprojects;
- provide technical expertise to PMO to implement environmental safeguard requirements;
- assist on the preparation of IEEs and EMPs of subprojects;
- support the PMO, DPMOs and LGED (PMU and PIUs) to implement EMPs, the recommendations of the IEEs and guidance in the EARF;
- assist the project to comply with the procedures and requirements indicated in the EARF;
- support the project on monitoring of environmental safeguards at subproject sites;
- provide technical expertise to PMO, DPMOs and LGED (PMU and PIUs) in the preparation of environmental safeguard requirements;
- support PMO to conduct environmental site inductions to contractors, LGED (PMU and PIUs) and DPMOs to ensure understanding of EMPs, government's environmental laws and requirements, and ADB SPS 2009 requirements;
- assist the PMO to prepare the environmental monitoring reports for timely submission to ADB; and
- provide support on any environmental management and safeguards matters of the project.

190. CHTRC will engage services of Implementing NGOs to support PMO in the implementation of the watershed management (Output 2) subprojects. The Implementing NGOs will carry out consultations, public information campaigns, and use various participatory planning methods (village/watershed resource map, village/watershed profiles, focus group discussions) to identify all SEC in the subproject areas and its boundaries that may be negatively impacted. The INGOs will also conduct socio-economic baseline surveys and impact assessments, and other activities related to the preparation and implementation of SEC frameworks and indigenous peoples plan.

191. The contractor(s)[27] is the principal agent to implement EMP and environmental quality monitoring for structural works. Specifically, the contractor/s will:

- appoint the contractor's environment, health and safety focal person and attend the trainings organized by the PMO and DMOs;
- obtain necessary environmental license(s), permits etc. from relevant agencies as specified in the IEE(s) prior to commencement of works;
- prepare and implement environment, health and safety measures;
- implement and document all mitigation measures in the EMP and environmental quality monitoring plan;
- ensure that workers and site supervisors participate in all environmental safeguard related training events;

[27] Includes any subcontractor(s) of the contractor.

- ensure compliance with environmental statutory requirements and contractual obligations;
- participate in resolving issues relevant to safeguards;
- respond promptly to grievances from local community or any stakeholder and implement environmental corrective actions or additional environmental mitigation measures as necessary;
- provide information to DPMOs and LGED (PMU and PIUs) on the status of EMP implementation, environmental quality monitoring and other safeguarding matters; and
- based on the results of EMP monitoring, cooperate with the DPMOs and LGED (PMU and PIUs) to implement corrective action plans, as necessary.

192. ADB is responsible for the following:

- review IEEs including EMPs and disclose the final reports on ADB's website;
- review EMRs, and disclose the final reports on ADB's website;
- explain policy requirements and safeguard covenants in the loan and project agreements to PMU, SMOs and PMU;
- monitor implementation of the EMP through due diligence missions;
- assist PMU, if required, in carrying out its responsibilities and in building capacity for safeguard compliance;
- monitor overall compliance of the subprojects to this PAM; and
  if necessary, provide further guidance on the format, content, and scope of the periodic monitoring reports for submission to ADB.

CHAPTER 11. CONCLUSION AND RECOMMENDATION

193. CRLIWM-CHT Sector Project is categorized as “B” in line with ADB SPS 2009. The project is a sector loan, where IEE is required particularly for Dighinala Watershed Management Subproject under Output 2. The conclusions and recommendations are the following:

- The IEE for has been prepared in accordance with ADB SPS 2009. This IEE serves as compliance to environmental due diligence requirement of Output 2 for board approval. Further, this IEE serve as sample for upcoming watershed management subprojects during project readiness and implementation.

- Different types of interventions will be implemented within the watershed covering an area of 2,329 hectares with a population of 9,869 villagers. The watershed management interventions will implement: (i) agricultural land conservation, (ii) forest/shrub land conservation, (iii) degraded land improvement, (iv) stream bank protection, (v) water resource development, (vi) demonstration, and (vii) community infrastructure.

- The proposed interventions under the subproject are not within environmentally sensitive area. Although the subproject area is within Dighinala Watershed, there will be positive impacts on the environment and community. The subproject will: (i) reduce food and water security issues in 29 paras, (ii) rehabilitation of degraded lands, (iii) improving natural drainage, and (iv) enhancing biodiversity.

- There will be minor to moderate negative impacts however the extent of these impacts is expected to be site-specific and localized. With the EMP in place, the potential impacts will either be eliminated or minimized to insignificant levels. Two types of EMPs are prepared. One EMP is for subproject interventions, where the beneficiaries in the paras will be the implementor with the support of INGO. The other EMP is for more complex interventions that would require local contractors.

- Based on the specific conditions of areas and final designs, EMPs will be updated by the PMO, with support from DPMO of Khagrachari and PISC, when the actual sites are defined.

- Throughout the implementation, relevant environmental safeguard requirements of ADB SPS 2009 and by the Government of Bangladesh must be complied through PMO and DPMO of Khagrachari.

- Semi-annual EMRs will be prepared and submitted until project completion report is issued by ADB.

- In the event of any unanticipated environmental impact(s) during implementation, PMO, with PISC's, support will update the IEE and EMP, or alternatively prepare an environmental due diligence report including EMP for ADB review and disclosure on the ADB website.

CHAPTER 12. ANNEXES

Annex 1. Outputs under the CRLIW-CHT Project and corresponding indicators based on the Fact-Finding Mission on June 2022.

Outputs	Performance Indicators with by 2029
1. Community infrastructure developed	1a. 1000 paras supported with small scale climate resilient community infrastructure facilities in which, on average, small ethnic community households represent at least 65% of total households. 1b. 2,950 completed small scale climate resilient community infrastructure facilities managed by Para Development Committees (of which 30% are Para Nari Development Group).
2. Watershed management strengthened	2a. 9 sub-watersheds with an average surface of 1450 Ha restored and managed by Village Common Forest Committees (of which 30% of members are women) 2b. 540 small scale climate resilient water resource management infrastructure facilities constructed and managed by Para Development Committees (of which 30% are Para Nari Development Group)
3. Agriculture production, processing, and marketing improved	3a. At least 21,000 new farmers in the project assisted areas (65% representing small ethnic communities and 30% women) adopt climate-smart and good agriculture practices. 3b. At least 1,200 farmers (65% representing small ethnic communities and 30% women) in the project supported areas undertake primary processing of an agricultural product. 3c. At least 4,200 farmers (65% representing small ethnic communities and 30% women) are linked with new buyers of an agricultural product.
4. Rural non-farm skills improved	4a. At least 8,000 people (of which at least 65% are from small ethnic communities and 30% are women) receive training and at least 75% them are certified in a non-farm vocational practice.
5. Rural roads rehabilitated	5a. 130 km of roads in the CHT area are climate proofed, upgraded and maintained, using labor-based contracts (where at least 65% of the contracted laborers are from small ethnic communities and at least 20% are women)

Annex 2. Description of interventions under the Dighinala Watershed Management Subproject

Symbol / Title	Conservation Measure's Name	Description	Unit of Measure
Agriculture Land Conservation			
At	Transforming jhum into agroforestry	Integrated packages of various conservation interventions such as (i) agroforestry, (ii) contour terracing, (iii) replacing the annual crop with perennial crops such as fruit trees, (iv) contour hedge row planting, (v) contour wattling, (vi) water harvesting pits, (vii) boundary plantation, etc. to improve the degraded steep hill of jhum cultivation area affecting soil erosion, gullies and landslides. Justification. Overexploitation of vegetation and use of steep sloped jhum land without proper conservation practices has been degrading its productivity due to top soil erosion, and gullies and landslides formation. This has been the major source of sediment to downstream lands and reservoirs. So, different site-specific conservation measures need to be applied in the jhum lands. Expected outcomes: • Soil erosion will be reduced, • run-off water during monsoon will be regulated, • Soil fertility will be gradually improved, and • Productivity of jhum land will be rejuvenated in the long run and enhancement of farm income. Consideration. Individual households motivated in transformation of Jhum area into agroforestry will be the target group in the implementation. Species for planting in the area will be choice of the farmers.	Hectare
Afp	Fruit tree planting	Development of fruit tree plantations along with vegetative and small structural erosion control measures such as contour hedgerows planting, wattling, applied on the steep agriculture land which is not suitable for growing annual crops. Justification. Sloping agriculture lands, which are affected by the surface erosion degrading its fertility, thus production due to annual plowing. Such land needs to be brought under the perennial crops such as fruit trees. Expected outcomes: • Soil erosion will be reduced, • Run-off water during monsoon will be regulated, and • Productivity of steep slope agriculture lands will be rejuvenated in the long run and enhancement of stable farm income.	Hectare

Symbol / Title	Conservation Measure's Name	Description	Unit of Measure
		Consideration. Species of fruit tree for planting will be choice of farmers with marketing potential.	
Adi	Drainage improvement	Valley agriculture land requiring drainage improvement will target improvement of the drainage waterways to safely reduce water logging affecting crop production due to rainwater. Justification: Lack of drainage in the plain agriculture land reduce the production potential due to long time water logging condition. This requires drainage improvement. Expected outcomes. • Reduced the water logging, • Run-off water during monsoon will be regulated, • Productivity of the valley land will be enhanced supporting farmers income. Consideration: Safe disposal of the runoff water needs to be secured.	Hectare
Aom	Orchard management support	Integrated support of enrichment planting of fruit sapling, management support like training on the orchard management, subsidy support on orchard improvement such as nutrient management, silvicultural operation. Justification. Proper cultural operation of orchard increased its production potential. Orchard demands proper training and application of the compost/fertilizer to the fruit crops. Expected outcomes: • Increase fruit production and enhance the farmer's income.	Hectare
Degraded Land improvement			
Dcp	Rehabilitation of degraded lands	Vegetative and structural measures such as (i) planting with suitable species of community's choice and (ii) protection applied to maintain or reestablish the productive function of the degraded land. In this manner, degraded lands may improve land cover to reduce erosion and improving water conservation including ground water recharge. Justification. Erosion on the degraded lands devoid of vegetation is the main source of sedimentation downstream. Such lands demand rehabilitation to reduce erosion and rejuvenate its production capacity. Expected outcomes: • Soil erosion will be reduced,	Hectare

Symbol / Title	Conservation Measure's Name	Description	Unit of Measure
		• Run-off water during monsoon will be regulated, • Degraded barren hill slopes will be productively used. Consideration. It will be difficult to vegetate the degraded lands only through planting trees. It demands moisture conservation techniques to be applied along with planting for survival of sapling. There is emphasis on the choice of different species of sapling to promote biodiversity.	
Drd	Reclamation of disaster affected riverbed side and agriculture land	Refers to vegetative and structural measures applied to maintain or reestablish the productive function of agriculture and adjoining grasslands, shrublands or barren riverbeds affected by floodings, river cuttings and sedimentations. Justification. Due to sediment deposition and shifting of river, sand dunes are formed on riverbanks. Rejuvenate soil fertility of such lands requires to adding of fertile soil and compost in case of agriculture lands and planting of grass, bamboo and other tree sapling on non-agriculture lands. Sometimes irrigation with flood water may rejuvenate the soil productive capacity. Expected outcomes. • Productivity of flood affected agriculture lands will be rejuvenated in the long run, • Riverbed will be vegetated protecting the adjoining lands, • Protect the stream banks from erosion, and • Generate extra income from the sale of bamboo and tree products. Consideration. Protection of such lands from free grazing and washing of saplings from river/flood need to be secured.	Hectare
Dlt	Landslide treatment	Vegetative and structural measures applied in landslide areas within catchment/watershed to treat landslides. Justification. Treatment of landslides became essential to reduce disasters causing damage to habitation, infrastructures, reservoirs and different types of lands such as agriculture, forests, etc. and protect human lives and livestock. Expected outcomes. • Establish the landslide, • Protect adjoining area from slope failure • Reduce the sedimentation of the downstream area	No.

Symbol / Title	Conservation Measure's Name	Description	Unit of Measure
		Consideration. Complete treatment of the landslide is essential for the success. Managing water and promoting greenery plays critical role in treating landslide.	
Dgt	Gully treatment	Vegetative and structural measures in catchment to prevent gullies to develop into landslides. These measure will slow down flow of storm water, enhance seepage into ground, reduce cutting of riverbed, and retaining sediments to promote vegetative growth along water course. Justification. Gully is the initial stage of the landslide and major source of the sediment downstream. Gully treatment is important to reduce the erosion, and stopping it growing to the landslide, which is more harmful and costly. Expected outcomes. • Reduced deepening and widening of gullies that may result in further landslides and later become unrecoverable, • Slow down flow of storm water and helps in retaining the sediments • Produced green and woody mass Consideration. Use sprouting cuttings of the local species in the vegetative gully plugging. Palisade techniques could be used in the small gullies. The small gullies in jhums area will be targets for vegetative gully plugging.	No.
Forest / Shrub Land Conservation			
Fep	Forest Enrichment plantation	Planting activity of suitable species of community's choice and protection will be applied to increase forest biodiversity and canopy density. Justification. The village forest has long been the main source for fuel wood, and being exploited for community use without much effort for any replenishment. As a result, forest degradation is continuously increasing soil erosion, drying of water source and creating scarcity of forest products. A thin-walled bamboo called *Parua* or *Ora* bamboo *(Bambusa polymorpha*) has good market demand. It is fast growing species, covers the land very fast, thick root systems hold soil, and becomes harvestable within 3 to 4 years after planting. Bamboo planting is suitable for boundary plantation especially along the stream banks and steep slopes.	Hectare

		Expected outcomes. • Reduce erosion and regulate runoff • Productive and protective functions of the forest will be restored, and • Biodiversity will be enhanced, Consideration. Enrichment planting of the suitable species of community's choice became essential. Also developing vision of cutting one tree and planting 10 trees needs to be promoted in the community.	
Fco	Forest cultural operation	Activities such as weeding, thinning and pruning to enhance productivity of tress stands, and promote underground vegetation coverage to improve biodiversity. Justification. Forest areas in Dighinala Watershed is diminishing due to human activities. Expected outcomes. • Reduce erosion and regulate runoff • Biodiversity will be enhanced, and • Increase forest production and enhance the community income. Consideration. While performing thinning and pruning practices, it is suggested to keep crown opening between 50-75% to promote undergrowth for reducing surface erosion. Also, emphasis must be given to maintain multi-story of mixed tree stand.	Hectare
Sli	Shrub land improvement	Refers to fodder and grass planting along with other vegetative and structural measures applied on the grass/shrub lands to increase the bio-diversity, conserve soil/water and increase underground seepage. Justification. Shrubland is basically a degraded forest. Improvement of shrublands give opportunity to into productive sites. Expected outcomes. • Reduce erosion and regulate runoff • Shrub land will be rejuvenated into a forest, and • Increase forest production and enhance the community income. Consideration. Forests on the steep slope, especially in wet conditions may trigger the landslide. Under such condition vegetation need to be kept as shrub only to reduce the risk of slope failure.	Hectare

Glm	Grazing land management	Vegetative and management measures applied to maintain and reestablish productive function of degraded grazing lands. Justification. Lands are used without any control and regulation of grazing practices based on availability of grass. No improvement on grass will result to continuous degradation and erosion. Expected outcomes. • Reduce erosion and conserve moisture, • Increase productive capacity of the grazing lands. Consideration. Introduction of rotational grazing practices based on its carrying capacity and introduction of grass improvement operations like manuring, planting improved varieties of grass, weeding of weeds must be applied as package.	Hectare
Stream Bank Protection			
Sbs	Buffer strip plantation / Bio-engineering methods	Planting of a permanent belt against erosion generally across slope to protect riverbanks. Buffer strip helps to trap sediment and enhance filtration of pollution (air, soil and water). Justification. Due to lack of protection measures, flash flood water generally erodes stream banks and damages nearby agriculture lands. Planting of the suitable species of community's choice on both sides of the streambanks and integrated with other conservation measures such as bamboo/pole piling, soil bag filling, and wattling for establishment of vegetative measures are essential to protect lands from stream bank erosion. Runoff from the slope carrying damage the downslope area or reservoir or lakes by sediment deposition. Establishment of vegetative buffer strip interrupting the flow and trapping the sediment became essential. Conservation buffers will be established by planting strip of suitable forest bamboo, grass and timber species along the bank of the river/stream, reservoir/lake and across the slope interrupting the flow. Expected outcomes: • Reduces water runoff energy, • Regulate run-off water from the hillslopes and prevented soil erosion and landslides, • Retains the sediment and soil pollutants from the hillslopes and stabilized soil, and • Generation of extra income from the buffer strip Consideration. For effective sediment trap, buffer strips should have grass as ground cover along with trees and bamboo. Construction of path along stream banks and buffer strip on both	Meters

		sides of the path could be very effective measure for trapping the sediment as well as promote aesthetics.	
Spw	Stream / River Bank Protection: Protection wall / Embankment / Retaining wall / Spurs	Refers to the bio-engineering stream bank protection measures to protect fertile agriculture lands from stream bank erosion and improve vegetation. Justification. Due to lack of protection measures, flash flood water generally erodes stream banks, and damages nearby habitations and agriculture lands. Construction of suitable structures such as protection wall, embankment, or spurs on both sides of the stream banks integrated with other conservation measures such as bamboo/pole piling, soil bag filling, and wattling for establishment of vegetative measures are essential to protect the land from stream bank erosion. Expected outcomes: • Protected the stream banks from erosion • Protect adjoining agriculture lands and habitation • Generate extra income from the sale of bamboo and timber trees Considerations. Stream bank protection measures must not narrow waterway size. Also, construction of protection measures must not hamper opposite side of rivers. Stream bank protection measures should be implemented on both sides of the banks.	Meters
Water Resource Development			
Wdw	Drinking Water spring improvement	Refers to integrated package of conservation measures applied to protect drinking water sources and recharge areas. This intervention will enhance ground seepage to improve water availability for household purposes. Justification. Springs in Dighinala Watershed are drying due to environmental degradations. In the dry period, scarcity of drinking water is one of the key problems. Therefore, necessary infrastructures to protect springs must be constructed in affected areas. Expected outcomes. • Water for household and drinking will be available during dry periods, • Women drudgery for fetching water will be reduced, • Availability of clean water will improve the hygienic conditions of the community. Considerations. Water fetching mechanism and increasing recharge need to be carried out as a package.	Number

Whr	Water harvesting reservoir with dam construction/ improvement	Construction of dam for harvesting and storing of surface run-off during monsoon through construction of cross dams. This will reduce excess runoff causing erosion and floods, and reduce sedimentation of the reservoir. Water will be harvested for agriculture, fish farming, and household use during the scarcity period. Justification. Excess runoff water causes erosion during monsoon and farmers suffers from lack of water for agriculture during the dry periods. Harvesting of run-off water during the monsoon and its' proper use during dry periods by constructing water harvesting dam is one of the means to manage the water properly. Construction of the dam with permanent overflow outlet as well as water flow mechanism will constructed. Expected outcomes. • Store water during monsoon reducing flood by regulating runoff, • Water is made available for agriculture and household use, and • Fisheries will be promoted in order to generate extra income for the community Considerations. Foundation of the dam needs to be protected from scouring. Dimensions of dam must be sufficient so that seepage line does not cross the toe of down side slope of dam. It must be well inside the base of the foundation. Permanent overflow and flow control mechanism will be provided, and foundation of dam must be protected from the scouring. Overflow channel must be sufficient for calculated flow. Excavation of soil for the dam construction must be emphasized to increase the capacity of the pond, not to dig the side of the pond especially when the side slope is the toe of the slope.	Number
Whp	Water harvesting pond construction / improvement	All necessary vegetative and structural measures applied in ponds (new or old) and its catchment for storage of run-off water during excess rain to reduce erosion and for later use for production purpose. Pond improvement activities includes seepage reduction, pond wall improvement, inlet and outlet improvement, etc. of existing pond/reservoir. Justification. Dug out pond is a part of the indigenous water management technique using local resources. Run-off water harvested during rain in the pond is usually used for household use including bathing, fisheries, and irrigation especially vegetable	Number

		farming. It also helps in ground water recharge and reducing flash floods. Expected outcomes. • Improvement will increase water storage capacity, • Helps in storing water during monsoon reducing flood by regulating runoff • Water is made available for agriculture and household use, and • Fisheries will be promoted in order to generate extra income for the community Consideration. Water inlet to fetch water from ponds and overflow outlet must be an integral part of the pond improvement and safely designed and constructed. Vegetative measures around ponds periphery adds the safety and aesthetic value of the pond.	
Wci	Irrigation canal improvement	Vegetative and structural measures applied to reduce damage to the existing irrigation channel caused by the erosion and to enhance efficient irrigation service to improve the production function of the agriculture lands. Justification. Proper functioning of the irrigation canal without causing any environmental degradation to the surrounding due to overflow and supplying water as and when require is essential for better production. Expected outcomes: • Reduce erosion and regulate water flow in the canal • Regulate water availability in the agriculture lands, • Increase production thus enhanced farmer's income. Consideration. Along with irrigation canal improvement, flow control and proper water distribution mechanism to the field must be an integral part of the overall irrigation canal improvement. Efficient and economical use of water must be emphasized to make activity more focus on livelihood improvement.	Number
Wgr	Ground water recharge pits/trenches	Activities to recharge groundwater mainly through increasing infiltration. Dugout pond, pit or trench run-off water will be collected, and infiltration into soil will recharge groundwater. Justification. Construction of percolation pits in foot slopes and gently sloped watershed helps in retaining runoff water thus reduced flood and recharged the ground water. Expected outcomes. • Increase groundwater recharge thus increasing water availability in the springs such as tube well	Number

		• Reduce women drudgery in fetching water for household Considerations. Percolation pits of 3 – 4 meters deep are advised to construct at the foot slope only. Along slopes, such pits must not have depth more than a meter. Over saturation of the soil along slopes may trigger landslides. Construction of such pits are not recommended to build along slopes above 45%. Security arrangement needs to be integrated if pits are deep. Old car tyres could be used in order to avoid the collapse of the pit.	
Wli	Wetland conservation	Refers to integrated package of different conservation measures such as buffer strip, management of sediment measures going to wetland, cleaning, etc. to improve the wetland. Expected outcomes. • Improved water quality in the wetland, • Increased bio-diversity, • Water made available for different purpose, • Regulate water reducing flood impacts downstream	Number
Demonstration			
Arf	Regenerative farming	Any farming system or practice which aims to conserve soil and water to minimize runoff and erosion and improve conditions for better crop establishment and growth. This includes the activities such as multiple cropping, composting to add the organic matter on the soil, conservation tillage, multi layers cropping, increase bio-diversity, etc. Justification. Proper farming practices aim to improve productivity. Integration of different farming practices regenerate the farmland's capacity to produce more thus improve the environment as well as famer's income. Expected outcomes. • Improved land's productive capacity thus income of the adopters • Promotion of organic farming practice Consideration. While demonstrating different farming practices, INGO will explain rationale behind practices to promote importance of techniques. Farmer's school approach among the farmers must be emphasized to scale up the techniques within the community.	No of farm household
Aci	Drip irrigation	Refers to irrigation method that applies water slowly to roots of plants, by trickling water either on the soil surface or directly to root zones, through a network of valves, pipes, tubing, and emitters to increase the efficient water use in vegetable farming in scarcity areas.	No of farm household

		Justification. Growing vegetable is one the income source of farmers. Drip Irrigation is one of the efficient water-use techniques for growing vegetable, where water is scarce. Efficient use of the water while water is scarce is essential for getting better return from the available water. Drip Irrigation is one of the techniques for efficient water use and will be piloted in horticulture including vegetable farming. Expected outcomes. • Cultivation area will be increased for same amount of water. • Crop will be ripened earlier due to efficient water availability • Nutrient leaching will be reduced. • Improved productivity of vegetable crops Consideration. Drip irrigation is more suitable for young fruit trees. Pit irrigation with mulching could be effective for grown fruit trees. For vegetables, use drip irrigation technique where water is really scarce.	
Ahi	Homestead improvement	Integrated package of conservation measures based on potential activities and problems of the homestead area, different conservation measures such as fruit tree and bamboo planting, roof water harvesting, hedge row planting, drainage improvement, composting etc. around the homestead are applied to reduce erosion around the housing area and increase productivity of the area supporting the family income. Justification. Homestead gardening gives extra income and fulfill many basic needs to most o farmers in the watershed community. Integration of different conservation techniques such as roof water harvesting, drip irrigation, composting, and kitchen gardening in order to optimize the production from limited resources. Homestead agroforestry plots need to maintain its productivity. Erosion control measures such as half-moon terraces reinforced with grass hedge in the rim of the terraces will control erosion from the fruit trees and conserve nutrients. Expected outcomes. • Reduced erosion and regulate runoff from homestead area, • Lively environment around the homestead area, and • Improved growth and productivity of soil. Consideration. This activity aims to improve overall environment of homestead. Identification of different activities to improve living environment as perceived by an owner must be considered as the package for implementation.	No of farm household

Sci	System of rice intensification	SRI as a method to reduce water consumption, while increasing rice and biomass yield and reducing methane gas. It is an agronomic practice of growing rice with efficient water use for better production. When water is the major constraints, the system is very appropriate with better yield. Justification. Agronomic practice of growing rice with less water popularly known as SRI for better production has been practiced in many rice growing countries. Demonstration of the system for better production is important for livelihood improvement. Expected outcomes. • Increased grain and biomass yield • Reduced water requirement • Reduced methane gas production, therefore support in reducing greenhouse effect • Reduce production of green house Consideration. Provision of irrigation facility whenever required as per the technique must be secured for the better production. Mechanize weeding must be considered as an integral part for the successful promotion of the technique, otherwise this could be the key constrain.	

Annex 3.1. Dighinala Watershed Consultation Meeting: 19th Sept. 2021

Date: 21/09/2021
Time: 10:30 am
Venue: Uttar Pukurghat Para
Watershed Name: D-76 Dighinala, Khagrachari
Union: 4 no. Dighinala
Upazila: Dighinala
District: Khagrachari Hill District
Participants: Mr. Sushamoy Chakma, Karbari Tila, President, Karbari Council, Karbari's including at least 3-4 people from 6 paras
Total Participants: 25-30 person
Participants Ethnicity: 100% Chakma
Female participants: 50% of the total participants

The meeting was presided over by Mr. Sushamoy Chakma, Karbari Tila (President, Karbari Counci). At the outset, he welcomed the TA team and participants of the respective para community. Then he requested Mr. Rupan Kumar Chakma, National Watershed Management Specialist to proceed with the agenda of the meeting. Mr. Rupan introduced himself and request the TA team for self-introduction to the participants. After that, he wants to know the participants if they are aware of the recently completed CHTRDP-II project, everyone exclaimed enthusiastically that they were aware.

Then, Mr. Rupan informed them about the new CRLIWM-CHT Sector project and that there is a new component for watershed component. He tells them what this component will do, its area of work (improvement of dead chara /stream, steam bank/river bank protection, community forest management plan preparation, forest enrichment plantation, forest cultural operation, fruit tree planting, irrigation canal improvement, water harvesting reservoir with dam construction, water harvesting pond construction, etc., in brief) and how it will benefit them and nature.

After that Mr. Rupan requested the Gender Specialist and IP Specialist accordingly to discuss gender issues and IP & safeguard issues.

As there were no more agenda/topics, the consultation meeting closed with thanks and some members of TA- team went out for field visit and Para mapping, watershed profiling, problem identification work start simultaneously.

Participant list

TA- team member:

Sl#	Name	Designation
1)	Mr. Rupan Kumar Chakma	Watershed Management Specialist
2)	Rani Yan Yan	Indigenous People Specialist
3)	Ms. Krajai Chowdhury	Gender Specialist
4)	Mr. Jashoda Binay Chakma	District Assistant Engineer, Khagrachari
5)	Mr. Rupam Chakma	District Sub-assistant Engineer, Khagrachari
6)	Mr. Bisshomoni Chalma	Lead Supervisor, Khagrachari
7)	Mr. Bakul Chakma	Social mobilizer, Khagrachari
8)	Mr. Tarun Chakma	Social mobilizer, Khagrachari
9)	Mr. Kisholoy Chakma	Social mobilizer, Khagrachari

Community Participants list:

Sl#	Participant Name	Para Name	Occupation/Designation
1)	Mr. Sushamoy Chakma	Karbari Tila	President, Karbari Council
2)	Mr. Dipangkar Karbari	Dipangkar Karbari Para	Karbari
3)	Mr. Jiban Shanti Chakma	Uttar Pukurghat Para	Karbari
4)	Mr. Sararindu Chakma	Banchara Para	Karbari
5)	Mr. Tridip Chakma	1 No. Nowa Para	Karbari
6)	Mr. Gopal kricchna Chakma	2 No. Nowa para	Karbari
7)	Mr. Sathya Jit Chakma	Maddya Banchara	Karbari
8)	Note: 25-30 community people, mostly farmers from 6 paras attended the meeting.		

Consultation Meeting

Para mapping and problem identification

Annex 3.2. Dighinala Watershed Consultation Meeting: 20th Sept. 2021

Date: 20/09/2021
Time: 10:30 am
Venue: Madhya Banchara Para
Watershed Name: D-76 Dighinala, Khagrachari
Union: 4 no. Dighinala
Upazila: Dighinala
District: Khagrachari Hill District

Participants: 4 no. Dighinala UP Chairman, Karbari's including at least 3-4 people from 17 paras (details in the annexure-1)
Total Participants: 70 – 75 person
Participants Ethnicity: 100% Chakma
Female participants: 50% of the total participants

The meeting was presided over by Mr. Pragyan Jyoti Chakma, 4 no. Dighinala UP Chairman. At the outset, he welcomed the TA team and participants of the respective para community. Then he requested Mr. Rupan Kumar Chakma, National Watershed Management Specialist to proceed with the agenda of the meeting. Mr. Rupan introduced himself and request the TA team for self-introduction to the participants. After that, he wants to know the participants if they are aware of the recently completed CHTRDP-II project, everyone exclaimed enthusiastically that they were aware.

Then, Mr. Rupan informed them about the new CRLIWM-CHT Sector project and that there is a new component for watershed component. He tells them what this component will do, its area of work (improvement of dead chara /stream, steam bank/riverbank protection, community forest management plan preparation, forest enrichment plantation, forest cultural operation, fruit tree planting, irrigation canal improvement, water harvesting reservoir with dam construction, water harvesting pond construction, etc., in brief) and how it will benefit them and nature. He further said that it would need the help of the community to carry out these works, especially in the preparation of the para map, profile, land de-gradation mapping, potential activities selection, Gender issues, SEC issues, etc. He then asks them if they understand what this component will do, what benefits they think they will get from this, and whether they are willing to engage with it and reap the benefits. Everyone present shouted with enthusiasm that they understood, and they were all eager to help and reap the benefits.

After that, Mr. Rupan requested the Gender Specialist and IP Specialist accordingly to discuss gender issues and IP & safeguard issues.

The agenda-wise discussion, feedback, and decisions taken in the meeting:

Sl#	Agenda	Discussion	Feedback from the Community	Decisions
1)	CRLIWM-CHT Sector Project and the watershed component introduction	Details about the CRLIWM-CHT Sector Project and watershed component, its area of work, benefits (improvement of dead chhara /stream, steam bank/river bank protection, community forest management plan preparation, forest enrichment plantation, forest cultural operation, fruit tree planting, irrigation canal improvement, water harvesting reservoir with dam construction, water harvesting pond construction, etc., in brief)	• Villagers expressed their interest in participating the project works during the implementation of the project. Women participants also expressed their interest in joining the project work and working as day laborers. • They want more Irrigation canals, Power tiller & Power Pumps. • They want Goda/ earthen Dams to store water so that they can that water for irrigation during the lean period. • Asutosh Karbari of Dakkin Pukur Ghat informed that there is too much iron consisting in the water they fetch from their existing Para Tube well. They requested to get rid of this problem and provide safe drinking water.	• Agreed with the community • Need Management decision. • Agreed • • Need management decision
2)	Para mapping	In the sub-watershed area, there are many paras and it will be finalized after the field survey. Para mapping will be done by the TA-team of Khagrachari with the	PDC of respective para/ Community will support properly during the field survey team as required.	• Agreed

		help of PDC members by using GPS.		
3)	Watershed profile	As the watershed profile is an informative session, so the survey team should be very careful to fill up the information.	Old person who has knowledge/ information as representative of PDC will prefer to support the survey team.	• Agreed
4)	Land degradation mapping and identification problem and selection of potential activities.	Field survey work will up to continue or will be done within 21 days.	At least one PDC member from the respective para will support the field survey team.	• Agreed
5)	Gender	Disclosed ADB Gender Policy. Discussion was Involvement of women participation during planning of proposed physical activities like agricultural, forest enrichment, fruit tree planting, and household water use, water demand for irrigation water, toilet, and women labour. Separate discussion were made with Men & Women.	• Women active participation were done in CHTRDP-II and will do future project also. • Women will work as a labour (widow, most venerable) also as they are benefitted economically as a result they are accepted in the community.	• Agreed
6)	IP & safeguards	Disclosed ADB IP Safeguard Policy. Resettlement issues, their rights etc.		

As there were no more agenda/topics, the consultation meeting closed with thanks.

Participant list

TA- team member:

Name	Designation
Mr. Rupan Kumar Chakma	Watershed Management Specialist
Rani Yan Yan	Indigenous People Specialist
Ms. Krajai Chowdhury	Gender Specialist
Mr. Jashoda Binay Chakma	District Assistant Engineer, Khagrachari
Mr. Rupam Chakma	District Sub-assistant Engineer, Khagrachari
Mr. Bisshomoni Chalma	Lead Supervisor, Khagrachari
Mr. Bakul Chakma	Social mobilizer, Khagrachari
Mr. Tarun Chakma	Social mobilizer, Khagrachari
Mr. Kisholoy Chakma	Social mobilizer, Khagrachari

Community Participants list:

Participant Name	Para Name	Occupation/Designation
Mr. Pragyan Jyoti Chakma	4 no. Dighinala Union	UP Chairman
Mr. Sushamoy Chakma	Karbari Tila	President, Karbari Council
Mr. Shukracharjyo Chakma	Udal Bagan	Karbari
Mr. Himangshu Chakma	Dilchan Karbari Para	Karbari
Mr. Bimal Kanti Dewan	Kathal Bagan	Karbari
Mr. Kingsha Joy Karbari	Baghaichari Mukh	Karbari
Mr. Nilkamal Chakma	Nila Kamal Karbari Para	Karbari
Mr. Arabindu Karbari	Indramoni Karbari Para	Karbari
Mr. Sarbanga Sundar	Dikkin Baradam	Karbari
Mr. Milan Kanti Karbari	Uttar Baradam	Karbari
Mr. Ashutosh Karbari	Dakkin Pukurghat	Karbari
Mr. Pruna Ranjan Karbari	Boddyo Para	Karbari
Mr. Juddha Mohan Karbari	1 No. Uttar Banchara	Karbari
Mr. Shanti Rup Karbari	Mura Para	Karbari
Mr. Rajani Kumar Karbari	Khamar Para	Karbari
Mr. Dipangkar Karbari	Dipangkar Karbari Para	Karbari
Mr. Supantor Chakma	Supantor Karbari Para	Karbari
Mr. Sukh Shanti Chakma	Nandeshwar Karbari Para	Karbari
Mr. Subodhi Chakma	Lal Sing Karbari Para	Karbari
Note: 50-55 community people, mostly farmers from 17 paras attended the meeting but unfortunately we couldn't be able to collect their name and contact no.		

Photographs of the consultation meeting

Rani Yan Yan, IP Specialist during the consultation meeting.

Rani Yan Yan, IP Specialist during the consultation meeting.

Gender Specialist during the consultation meeting

Social mobilizer team, collecting information during completing watershed profile

Social mobilizer team, collecting information during completing watershed profile

Social mobilizer team, during para mapping

Watershed Management Specialist during identification proposed location of Irrigation Canal in the map

Annex 3.3. Dighinala Sub-watershed Consultation Meeting during Fact Finding Mission, 8th June 2022

Date: 08/06/2022
Time: 11:00 am
Venue: Rangapani Chara
Watershed Name: D-76 Dighinala, Khagrachari
Union: 4 no. Dighinala
Upazila: Dighinala
District: Khagrachari Hill District

Participants: 4 no. Dighinala UP Chairman, Karbari's including at least 3-4 people from 29 paras (details in the annexure-1)
Participants Ethnicity: 100% Chakma
Female participants: 50% of the total participants

The meeting was presided over by Mr. Pragyan Jyoti Chakma, 4 no. Dighinala UP Chairman. At the outset, he welcomed the FFM team and participants of the respective para community and he gave his gratitude to ADB and GoB for the successful completion of CHTRDP-II. Then he describes the present condition of his union area and what needs to be done for the development of the area base on the previous watershed management consultation meeting perspective, especially the improvement of riverbank protection, Landslide treatment, Drainage improvement, Irrigation improvement, Drinking water improvement, etc. which will improve the overall environment as well as the livelihood of the people of the area. Then he requested Mr. Sanath Ranawana, Mission leader of the Fact-Finding Mission, to introduce him and his team members.

Mr. Sanath Ranawana, Mission Leader introduced himself and other mission members to the participants. Then FFM team asked some questionnaire from the female participants such as – women group, their profession, and availability of women labor, knowledge on bad impact of Teak trees and the participants replied positively. Then mission leader requested Mr. Rupan Kumar Chakma, National Watershed Management Specialist to describe the project work in their own language. Mr. Rupan tells them what this component will do, its area of work (improvement of dead chhara /stream, steam bank/riverbank protection, community forest management plan preparation, forest enrichment plantation, forest cultural operation, fruit tree planting, irrigation canal improvement, water harvesting reservoir with dam construction, water harvesting pond construction, etc., in brief) and how it will benefit them and nature.

As there were no more agenda/topics, the consultation meeting closed with thanks and FFM team went out for field visit.

Fact Finding Mission - Team member:

Name	Designation
Mr. Sanath Ranawana	Principal Water Resources Specialist / Mission Leader, SAER
Mr. Mohammed Sayeedul Haque	Associate Portfolio Management Officer, BRM
Ms. Nasheeba Selim	Senior Social Development Officer (Gender), BRM
Ms. Kazi Aklima	Safeguards Officer (Resettlement), BRM
Ms. Rayhalda Susulan	Safeguards Officer (Resettlement), SAOD
Mr. Sunit Pokhrel	Climate Change/Environment Specialist, SAER
Mr. Brando Angeles	Associate Environment Officer, SAER
Ms. Urmee Bhattacharjee	Associate Project Analyst, BRM

TA- team member:

Name	Designation
Mr. Bernerdus Gerardus Maria Witjes	Team Leader, TA Team
Mr. Rupan Kumar Chakma	Watershed Management Specialist
Mr. Paban Kumar Chakma	Agriculture Specialist
Mr. Saroj Kumar Dey	Deputy Team Leader
Mr. Shishir Kumar Shil	Procurement Specialist
Mr. Jashoda Binay Chakma	District Assistant Engineer, Khagrachari
Mr. Rupam Chakma	District Sub-assistant Engineer, Khagrachari
Mr. Bisshomoni Chalma	Lead Supervisor, Khagrachari

Community Participants list:

Participant Name	Para Name	Occupation/Designation
Mr. Pragyan Jyoti Chakma	4 no. Dighinala Union	UP Chairman
Mr. Sushamoy Chakma	Karbari Tila	President, Karbari Council
Mr. Shukracharjyo Chakma	Udal Bagan	Karbari
Mr. Himangshu Chakma	Dilchan Karbari Para	Karbari
Mr. Bimal Kanti Dewan	Kathal Bagan	Karbari
Mr. Kingsha Joy Karbari	Baghaichari Mukh	Karbari
Mr. Nilkamal Chakma	Nila Kamal Karbari Para	Karbari
Mr. Arabindu Karbari	Indramoni Karbari Para	Karbari
Mr. Sarbanga Sundar	Dikkin Baradam	Karbari
Mr. Milan Kanti Karbari	Uttar Baradam	Karbari
Mr. Ashutosh Karbari	Dakkin Pukurghat	Karbari
Mr. Pruna Ranjan Karbari	Boddyo Para	Karbari
Mr. Juddha Mohan Karbari	1 No. Uttar Banchara	Karbari
Mr. Shanti Rup Karbari	Mura Para	Karbari
Mr. Rajani Kumar Karbari	Khamar Para	Karbari
Mr. Dipangkar Karbari	Dipangkar Karbari Para	Karbari
Mr. Supantor Chakma	Supantor Karbari Para	Karbari
Mr. Sukh Shanti Chakma	Nandeshwar Karbari Para	Karbari
Mr. Subodhi Chakma	Lal Sing Karbari Para	Karbari

Mr. Priyatom Chakma	Takku Karbari Para	Karbari
Mr. Jiban Shanti Chakma	Uttar Pukurghat Para	Karbari
Mr. Sararindu Chakma	Banchara Para	Karbari
Mr. Tridip Chakma	1 No. Nowa Para	Karbari
Mr. Gopal kricchna Chakma	2 No. Nowa para	Karbari
Mr. Sathya Jit Chakma	Maddya Banchara	Karbari
Mr. Fani Bhusan Chakma	Basu Kumar Para	Karbari
Mr. Chiro Jyoti Chakma	Kuduk Para	Karbari
Mr. Progya Jyoti Chakma	Axshoy Para	Karbari
Mr. Smriti Bikash Chakma	Manikya Para	Karbari
Mr. Cnandra Bahan Chakma	Cnandra Bahan Karbari Para	Karbari
Mr. Sattyo Jite Karbari	Sattyo Jite Karbari Para	Karbari
Note: 100-115 community people, mostly farmers from 29 paras attended the meeting.		

Fact finding Mission field visit

Question and answer session

During field visit at streambank stabilization

During field visit at proposed dam reservoir improvement

Annex 4.1. Grievance recording form (English version)

GRIEVANCE RECORDING FORM

Ministry of Chittagong Hill Tracts Affairs

Climate Resilient Livelihood Improvement and Watershed Management in Chattogram Hill Tracts Sector Project

<table>
<tr><td>SL</td><td colspan="4">GRIEVANCE RECORDING FORM</td></tr>
<tr><td>1.</td><td colspan="2">Date of Grievance Reporting</td><td colspan="2"></td></tr>
<tr><td>2.</td><td colspan="2">Full Name of AP / Complainant</td><td colspan="2"></td></tr>
<tr><td>3.</td><td colspan="2">Gender of AP/ Complainant</td><td colspan="2">Male | Female</td></tr>
<tr><td>4.</td><td colspan="2">ID of AP (voters ID/passport number/driving license/any other ID</td><td colspan="2"></td></tr>
<tr><td>5.</td><td>Address of AP/ Complainant</td><td colspan="3"></td></tr>
<tr><td>6.</td><td>Contact Information</td><td colspan="2">Phone:</td><td>Email:</td></tr>
<tr><td>7.</td><td colspan="4">Mode of communicating grievance (circle the number below)</td></tr>
<tr><td rowspan="2">8.</td><td>Oral</td><td>Oral (but not AP)</td><td>Written</td><td>Written (by other)</td></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td></tr>
<tr><td rowspan="3">9.</td><td colspan="4">Mode of Contact (circle the number below)</td></tr>
<tr><td>Phone</td><td>Email</td><td>UP Chairman/ Mouza Headman/ UP Member/ Karbari/ Local Community Leader</td><td>Others (specify)</td></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td></tr>
</table>

10.	Type of Grievance (*circle as many reported*)			
Unaware of project component boundary		1	Safety of women	7
Parcel missed in measurement		2	Damage to crops due to construction	8
Parcel measurement error		3	Inappropriate livelihood restoration scheme	9
Disagreement over rates used for valuation		4	Loss of access	10
Mistakes in compensation agreement/ID reference		5	Others (Specify)	11
Delay in compensation payment		6		

11.	Description of Grievance:		
12.	Frequency of Grievance (*circle the number*):		
	• One time incident	1	
	• Happened more than once	2	
	• On-going	3	
13.	Expected resolution to stated grievance:		
14.	Signature/Thumb impression of AP/Complainant	Date:	
15.	Name and Signature of the Official recording grievance	Date:	
16.	Has AP been handed a copy of the grievance form	Yes	No
Status of Resolution			
17.	**By GRC**	Date:	
Resolution details:			
Has AP/ Complainant been notified?		Yes	No

Is Grievance resolved/closed?		Yes	Not resolved. Referred to Provincial Administrator
If case is closed, then Signature of AP/ Complainant to show agreement		Date:	
Name and signature of the Official		Date:	
18	**By Hill District Council**	Date:	
Resolution details:			
Has AP/ Complainant been notified?		Yes	No
Is Grievance resolved/closed		Yes	Not resolved. Referred to IPMU/WAF
If case is closed, then Signature of AP/ Complainant to show agreement		Date:	
Name and signature of the Official		Date:	
19.	**BY Regional Council**	Date:	
Resolution details:			
Has AP/ Complainant been notified?		Yes	No
Is Grievance resolved/closed?		Yes	Not resolved. Referred to Court
If case is closed, then Signature of AP/ Complainant to show agreement		Date:	
Name and signature of the Official		Date:	
20.	**By Court**	Date:	

Resolution details:		
Is Grievance resolved/closed?	Yes	No
Name and signature of the Official	Date:	
DECISION OF THE COURT IS FINAL		

Annex 4.2. Grievance recording form (Bengali Translation)

পরিশিষ্ট ৪

অভিযোগ সংরক্ষণ ফরম
পার্বত্য চট্টগ্রাম বিষয়ক মন্ত্রণালয়
পার্বত্য চট্টগ্রাম জলবায়ু স্থিতিস্থাপক জীবিকা উন্নয়ন ও জলাধার ব্যবস্থাপনা সেক্টর প্রকল্প

ক্রমিক	অভিযোগ সংরক্ষণ ফর্ম			
১.	অভিযোগ প্রতিবেদনের তারিখ			
২.	এপি /অভিযোগকারীর পুরো নাম			
৩.	এপি/অভিযোগকারীর লিঙ্গ		পুরুষ | নারী	
৪.	এপি আইডি (ভোটার আইডি / পাসপোর্ট নম্বর / ড্রাইভিং লাইসেন্স / অন্য কোনও আইডি)			
৫.	এপি/অভিযোগকারীর ঠিকানা			
৬.	যোগাযোগের তথ্য	ফোন:		ইমেল:
৭.	যোগাযোগের অভিযোগ করার পদ্ধতি (*নীচের নম্বরটি বৃত্তাকার করুন*)			
৮.	মৌখিক	মৌখিক (কিন্তু এপি নয়)	লেখা	লেখা (অন্যের দ্বারা)
	১	২	৩	৪
৯.	যোগাযোগের মোড (*নীচের নম্বরটি বৃত্তাকার করুন*)			
	ফোন	ইমেইল	ইউপি চেয়ারম্যান/মৌজা হেডম্যান/ইউপি সদস্য/কারবাড়ি/স্থানীয় কমিউনিটি লিডার	অন্যান্য (নির্দিষ্ট)
	১	২	৩	৪

১০.	অভিযোগের ধরণ (*বৃত্ত হিসাবে অনেক রিপোর্ট করা হয়েছে*)			
প্রকল্পের কম্পোনেন্ট সীমানা সম্পর্কে অবগত নয়		১	নারীর নিরাপত্তা	৭
পরিমাপে পার্সেল মিস হয়েছে		২	নির্মাণের কারণে ফসলের ক্ষতি	৮
		৩	অনুপযুক্ত জীবিকা পুনরুদ্ধার প্রকল্প	৯

পার্সেল পরিমাপ ত্রুটি			
মূল্যায়নের জন্য ব্যবহৃত হারের বিষয়ে মতানৈক্য	৩	অ্যাক্সেস হারানো	১০
ক্ষতিপূরণ চুক্তি/আইডি রেফারেন্সে ভুল	৫	অন্যান্য (নির্দিষ্ট করুন)	১১
ক্ষতিপূরণ প্রদানে বিলম্ব	৬		

১১.	অভিযোগের বিবরণ:	
১২.	অভিযোগের ফ্রিকোয়েন্সি (*সংখ্যাটি বৃত্তাকার করুন*):	
	• একবারের ঘটনা	১
	• একাধিকবার ঘটেছে	২
	• চলমান	৩
১৩.	অভিযোগ বিবৃত করার প্রত্যাশিত সমাধান:	
১৪.	এপি/অভিযোগকারীর স্বাক্ষর/থাম্ব ইমপ্রেশন	তারিখ:

১৫.	অফিসিয়াল রেকর্ডিং অভিযোগের নাম এবং স্বাক্ষর	তারিখ:	
১৬.	এপিকে কি অভিযোগ ফর্মের একটি অনুলিপি দেওয়া হয়েছে	হ্যাঁ	না
রেজোলিউশনের বিস্তারিত:			
১৭.	**জিআরসি দ্বারা**	তারিখ:	
রেজোলিউশনের বিস্তারিত:			
এপি/অভিযোগকারীকে কি জানানো হয়েছে?		হ্যাঁ	না
অভিযোগ কি সমাধান/বন্ধ হয়ে গেছে?		হ্যাঁ	সমাধান হয়নি। প্রাদেশিক প্রশাসক

যদি কেস বন্ধ হয়ে যায়, তাহলে চুক্তি দেখানোর জন্য এপি/অভিযোগকারীর স্বাক্ষর	তারিখ:
কর্মকর্তার নাম ও স্বাক্ষর	তারিখ:

a. ১৮	**পার্বত্য জেলা পরিষদ**	তারিখ:	
রেজোলিউশনের বিস্তারিত:			
এপি/অভিযোগকারীকে কি জানানো হয়েছে?		হ্যাঁ	না
অভিযোগ কি সমাধান করা হয়েছে/বন্ধ করা হয়েছে		হ্যাঁ	সমাধান হয়নি। উল্লেখিত IPMU/WAF
যদি কেস বন্ধ হয়ে যায়, তাহলে চুক্তি দেখানোর জন্য এপি/অভিযোগকারীর স্বাক্ষর		তারিখ:	
কর্মকর্তার নাম ও স্বাক্ষর		তারিখ:	
19.	**আঞ্চলিক পরিষদ**	তারিখ:	
রেজোলিউশনের বিস্তারিত:			
এপি/অভিযোগকারীকে কি জানানো হয়েছে?		হ্যাঁ	না
অভিযোগ কি সমাধান/বন্ধ হয়ে গেছে?		হ্যাঁ	সমাধান হয়নি। আদালতে রেফার করা হয়েছে
যদি কেস বন্ধ হয়ে যায়, তাহলে চুক্তি দেখানোর জন্য AP/অভিযোগকারীর স্বাক্ষর		তারিখ:	
কর্মকর্তার নাম ও স্বাক্ষর		তারিখ:	
২০.	**আদালত দ্বারা**	তারিখ:	
রেজোলিউশনের বিস্তারিত:			

অভিযোগ কি সমাধান/বন্ধ হয়ে গেছে?	হ্যাঁ	না
কর্মকর্তার নাম ও স্বাক্ষর	তারিখ:	
আদালতের সিদ্ধান্তই চূড়ান্ত		

Annex 5. Guide for preparing Occupational Health, and Safety Plan

I. Introduction

Occupational health, and safety (OHS) plan contain measures that are generally considered to be achievable. The applicability of the OHS plan should be tailored to the hazards and risks established for rural roads on the basis of the results of this environmental assessment. The OHS plan for rural roads include information relevant to construction, operation and maintenance, including associated bridges.

Health and safety issues during the construction and operation of roads are similar to those of other infrastructure projects involving earth moving and civil works. These impacts include, among others, construction site waste generation; soil erosion and sediment control from materials sourcing areas and site preparation activities; fugitive dust and other emissions (e.g. from vehicle traffic, land clearing and movement, and materials stockpiles); noise from heavy equipment and truck traffic; and potential hazardous materials and oil spills associated with heavy equipment operation and fueling activities.

Guidance on the prevention and control of constriction hazards common to most rural road constructions and facilities is presented in the following sections.

II. Integrity of Workplace Structures

Permanent and recurrent places of work should be designed and equipped to protect OHS.

1. Surfaces, structures and installations should be easy to clean and maintain, and not allow for accumulation of hazardous compounds.
2. Campsites should be structurally safe, provide appropriate protection against the climate, and have acceptable light and noise conditions.

Lavatories and showers.

1. Adequate lavatory facilities (toilets and washing areas) should be provided for the number of people expected to work in the facility.

First aid for workers.

1. The contractor should ensure that qualified first-aid can be provided at all times. Appropriately equipped first-aid stations should be easily accessible throughout the place of work
2. Eye-wash stations should be provided close to all workstations where immediate flushing with water is the recommended first-aid response

III. Physical Hazards

Physical hazards represent potential for accident or injury or illness due to repetitive exposure to mechanical action or work activity. Single exposure to physical hazards may result in a wide range of injuries, from minor and medical aid only, to disabling, catastrophic, and/or fatal. Multiple

exposures over prolonged periods can result in disabling injuries of comparable significance and consequence.

Road construction and maintenance personnel can be exposed to a variety of physical hazards, principally from operating machinery and moving vehicles but also working at elevation on bridges. Other physical hazards (e.g. exposure to weather elements, noise, work in confined spaces, trenching, contact with overhead power lines, falls from machinery or structures, and risk of falling objects) are issues on rural road project.

Moving equipment and traffic safety along rural roads

1. Establishment of work zones to separate workers on foot from traffic and equipment by:
    a. Routing of traffic to alternative roads when possible
    b. Closure of lanes and diversion of traffic to the remaining lanes if the road is wide enough (e.g. rerouting of all traffic to one side of a multi-lane highway
    c. Where worker exposure to traffic cannot be completely eliminated, use of protective barriers to shield workers
    d. from traffic vehicles, or installation of channeling devices (e.g. traffic cones and barrels) to delineate the work zone
    e. Regulation of traffic flow by use of flaggers if possible
2. Reduction of maximum vehicle speeds in work zones;
3. Training of workers in safety issues related to their activities, such as the hazards of working on foot around equipment and vehicles; and safe practices for work at night and in other low-visibility conditions, including use of high-visibility safety apparel and proper illumination for the work space (while controlling glare so as not to blind workers and passing motorists).

Elevated and overhead work for bridges

1. The area around which elevated work is taking place should be barricaded to prevent unauthorized access. Working under personnel on elevated structures should be avoided;
2. Hoisting and lifting equipment should be rated and properly maintained, and operators trained in their use. Elevating platforms should be maintained and operated according to established safety procedures including use of fall protection measures (e.g. railings); equipment movement protocols (e.g. movement only when the lift is in a retracted position); repair by qualified individuals; and installation of locks to avoid unauthorized use by untrained individuals;
3. Ladders should be used according to pre-established safety procedures for proper placement, climbing, standing, as well as the use of extensions.

Fall protection

1. Implementation of a fall protection program that includes training in climbing techniques and use of fall protection measures; inspection, maintenance, and replacement of fall protection equipment; and rescue of fall-arrested workers, among others;
2. Installation of fixtures on bridge components to facilitate the use of fall protection systems;
3. Safety belts should be not less than 16 millimeters (mm) (5/8 inch) two-in-one nylon or material of equivalent strength. Rope safety belts should be replaced before signs of aging or fraying of fibers become evident;
4. When operating power tools at height, workers should use a second (backup) safety strap.

IV. Chemical Hazards

Chemical hazards in road construction, operations, and maintenance activities may be principally associated with exposures to dust during construction and paving activities; exhaust emissions from heavy equipment and motor vehicles during all construction and maintenance activities (including during work in tunnels or in toll collection booths); potentially hazardous dust generated during bridge paint removal; herbicide use during vegetation management; and diesel fuel used as a release and cleaning agent for paving equipment. Recommendations specific to road projects include:

1. Use of the correct asphalt product for each specific application, and ensuring application at the correct temperature to reduce the fuming of bitumen during normal handling;
2. Maintenance of work vehicles and machinery to minimize air emissions;
3. Reduction of engine idling time in construction sites;
4. Avoiding the use of lead-containing paint and using appropriate respiratory protection when removing paints (including those containing lead in older installations) or when cutting galvanized steel.

V. Noise and Vibration

Construction and maintenance personnel may be potentially exposed to extremely high levels of noise from heavy equipment operation and from working in proximity to vehicular traffic. As most of these noise sources cannot be prevented, control measures should include the use of personal hearing protection by exposed personnel and implementation of work rotation programs to reduce cumulative exposure.

1. No employee should be exposed to a noise level greater than 85 dB(A) for a duration of more than 8 hours per day without hearing protection. In addition, no unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(C).
2. The use of hearing protection should be enforced actively when the equivalent sound level over 8 hours reaches 85 dB(A), the peak sound levels reach 140 dB(C), or the average maximum sound level reaches 110dB(A). Hearing protective devices provided should be capable of reducing sound levels at the ear to at least 85 dB(A).
3. Prior to the issuance of hearing protective devices as the final control mechanism, use of acoustic insulating materials, isolation of the noise source, and other engineering controls should be investigated and implemented, where feasible
4. Periodic medical hearing checks should be performed on workers exposed to high noise levels

Exposure to hand-arm vibration from equipment such as hand and power tools, or whole-body vibrations from surfaces on which the worker stands or sits, should be controlled through choice of equipment, installation of vibration dampening pads or devices, and limiting the duration of exposure.

VI. Personal Protective Equipment (PPE)

PPE provides additional protection to workers exposed to workplace hazards in conjunction with other facility controls and safety systems. Table 1 presents general examples of occupational

hazards and types of PPE available for different purposes. Recommended measures for use of PPE in the workplace include:

1. Active use of PPE if alternative technologies, work plans or procedures cannot eliminate, or sufficiently reduce, a hazard or exposure
2. Identification and provision of appropriate PPE that offers adequate protection to the worker, co-workers, and occasional visitors, without incurring unnecessary inconvenience to the individual
3. Proper maintenance of PPE, including cleaning when dirty and replacement when damaged or worn out. Proper use of PPE should be part of the recurrent training programs for employees
4. Selection of PPE should be based on the hazard and risk ranking described earlier in this section, and selected according to criteria on performance and testing established

Table 1. Summary of recommended PPE according to hazard

Objective	Workplace Hazards	Suggested PPE
Eye and face protection	Flying particles, molten metal, liquid chemicals, gases or vapors, light radiation.	Safety Glasses with side-shields, protective shades, etc.
Head protection	Falling objects, inadequate height clearance, and overhead power cords.	Plastic Helmets with top and side impact protection.
Hearing protection	Noise, ultra-sound.	Hearing protectors (ear plugs or ear muffs).
Foot protection	Falling or rolling objects, pointed objects. Corrosive or hot liquids.	Safety shoes and boots for protection against moving & falling objects, liquids and chemicals.
Hand protection	Hazardous materials, cuts or lacerations, vibrations, extreme temperatures.	Gloves made of rubber or synthetic materials (Neoprene), leather, steel, insulating materials, etc.
Respiratory protection	Dust, fogs, fumes, mists, gases, smokes, vapors.	Facemasks with appropriate filters for dust removal and air purification (chemicals, mists, vapors and gases). Single or multi-gas personal monitors, if available.
	Oxygen deficiency	Portable or supplied air (fixed lines). On-site rescue equipment.
Body/leg protection	Extreme temperatures, hazardous materials, biological agents, cutting and laceration.	Insulating clothing, body suits, aprons etc. of appropriate materials.

VII. Monitoring OHS

OHS monitoring programs for rural roads should verify the effectiveness of prevention and control strategies. The selected indicators should be representative of the most significant occupational, health, and safety hazards, and the implementation of prevention and control strategies. The occupational health and safety monitoring program should include:

1. *Safety inspection, testing and calibration*. This should include regular inspection and testing of all safety features and hazard control measures focusing on engineering and personal protective features, work procedures, places of work, installations, equipment, and tools used. The inspection should verify that issued PPE continues to provide adequate protection and is being worn as required. All instruments installed or used for monitoring and recording of working environment parameters should be regularly tested and calibrated, and the respective records maintained.
2. *Training*. Training activities for employees and visitors should be adequately monitored and documented (curriculum, duration, and participants).

VIII. Accidents and Diseases monitoring

The contractor should establish procedures and systems for reporting and recording of (i) occupational accidents and diseases and (ii) dangerous occurrences and incidents. These systems should enable workers to report immediately to their immediate supervisor any situation they believe presents a serious danger to life or health.

The contractor should further enable and encourage workers to report to management all:

1. Occupational injuries and near misses
2. Suspected cases of occupational disease
3. Dangerous occurrences and incidents

All reported occupational accidents, occupational diseases, dangerous occurrences, and incidents together with near misses should be investigated with the assistance of a person knowledgeable/competent in occupational safety. The investigation should:

1. Establish what happened
2. Determine the cause of what happened
3. Identify measures necessary to prevent a recurrence

Annex 6. Health and Safety Plan to manage risks of COVID-19 in construction sites. (Source:file:///Users/B2A/Downloads/construction_site_safety_recommendations_in_light_of_covid-19.pdf)

HEALTH SECTOR COX'S BAZAR

SHELTER/NFI SECTOR Cox's Bazar, Bangladesh

Guidance note - Construction site safety recommendations
Minimize spread of infections in light of COVID-19

Some critical construction activities such as building health facilities or erecting emergency shelters are likely to continue during the restrictions in place due to COVID-19. Partners overseeing construction sites operating during the COVID-19 pandemic should ensure all possible steps are taken to protect their workforce and to minimize the spread of the infection. This guidance is based on WHO's key messages for infection prevention and control, and illustrates some basic measures and principles to be followed in this scenario. It mostly focuses on construction and repurposing of facilities, appreciating the greater limitations occurring while working on individual shelters. Acknowledging the complex, challenging and fast-paced operating environment, partners are invited to adopt the recommendations when applicable and to the most possible extent, embracing a "good enough" approach. This guidance does not encompass all aspects of health and safety and should be seen a complement of standard health and safety policy in place for all construction projects, rather than a standalone document. It must be updated as the situation evolves globally and specifically in the Rohingya Response.

The main underlying approaches are:

- ✓ Reduce access to site
- ✓ Adapt work plan and activities to reduce close contact
- ✓ Increase overall level of hygiene of the site
- ✓ Prioritize health and safety of staff, workers and their surrounding communities
- ✓ Increase awareness of the workforce

Planning phase

- Plan construction phases avoiding large group of workers and unnecessary overlap of crews. If the work plan was developed prior to COVID-19 outbreak, consider reviewing and adapting when necessary;
- Basic Personal Protective Equipment (PPE) related to construction safety such as gloved and glasses should be provided to workers depending on the tasks they are assigned to. In addition, each worker should be provided with two or more reusable masks (not surgical/medical graded masks);
- Additional hand washing stations including provision of clean water and soap, together with cleaning and disinfection products may be required for construction sites opened prior to the outbreak. For new construction site, plan and budget provision of these items;
- Preferably, every worker should be provided with a basic set of tools needed for the tasks they are assigned to. Using of the same tool by multiple workers should be avoided. If tools are shared or stored for later use by another person, they need to be disinfected/cleaned;[1]
- Plan to engage workers coming from the close proximity of the facility been built (possibly from the same block) and avoid involving labour from farther away camps or villages;
- Supervision should be strengthened including COVID-19 prevention principles, and supervisors oriented on their new responsibilities;

[1] More instructions for safe disinfection - Cox's Bazar WASH Sector technical guidance on disinfection procedures for COVID-19 response (non-health settings) - v. 02: https://drive.google.com/open?id=1gM8OwM4d7Y3ZEXcJiM07wRorVwAetrhd

1

- If possible, prior to start construction work coordinate with Health partners to check the site and ensure appropriate measures are adopted;

Prepare your workforce

- An orientation on COVID-19 should be provided to all workers, including description of the disease, symptoms, transmissibility, severity and WHO's key prevention messages to be followed on site, public spaces as well as in their homes;
- Prevention messages should be printed and clearly displayed on site. Consider providing an additional printed copy of the key prevention messages for all workers to disseminate in their families (and communities);
- Workers should be clearly informed on protocols to follow in case they or their family members get sick;
- Workers should be requested to maintain physical distance of 2 meters (6') from others as much as possible and to adhere to the other suggested practices for infection prevention and control, in particular:
  - Wash your hands regularly with clean water and soap for at least 20 seconds, or clean them with a hand sanitizer;
  - Avoid touching your eyes, nose and mouth with unwashed hands;
  - When coughing or sneezing, cover your mouth with tissue and throw it into closed bin immediately. If you do not have a tissue, cough or sneeze into your flexed elbow;
  - Do not spit.
- Working gloves are sometimes worn to protect against injuries during some activities, but they do not offer any protection against transmission of COVID-19 and should be considered as unwashed hands in terms of minimizing touching one's face;
- Workers should not greet each other with handshakes or embraces at any point during the day;
- If workers are operating in an area where sick or suspected infected people are currently or recently transited (in the previous 3 days), they should wear mask and disposable gloves at all times;
- If masks are not available, workers should be encouraged to prepare handmade ones using household items or clothes materials;[2]
- Advice workers to wash their clothes frequently (daily if possible).

Access to site

- Only essential visitors (workers, supervisors, and managers) should be allowed on site;
- Programme/monitoring visits should be reduced to the minimum and should be planned when workers are not on site (i.e. lunch or prayer time);
- Fence off the construction site to ensure no one can enter or approach the workers without authorization;
- Entry and exit gates should be clearly marked and guarded;
- Body temperature should be measured for all persons entering the site;
- Allow enough space for people to queuing in a safe manner at the entrance of the site while they wash their hands and get screened;

[2] More instructions can be found at https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/diy-cloth-face-coverings.html, https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public/when-and-how-to-use-masks and https://drive.google.com/open?id=1JbI73nC8Q_HwtrTfqCdT5UaE8rzYAgLJ

- A trained staff should be designated to guard the access, checking temperature of workers and visitors and enquiring about overall health condition and vulnerability;
- Ensure there are sufficient hand washing stations at the entrance and that they have water and soap, as well as clearly display signs requesting persons entering to wash their hands;
- Anyone falling in one of the following categories should not be allowed on site:
  - Has a family member suspected COVID-19 patient living in the same household or self-isolating, or if s/he has got in close contact with a confirmed COVID-19 patient in the previous two weeks. S/he should not report on site and self-quarantining at home for two weeks;
  - Is showing one or more symptoms related to COVID-19 (high temperature, new persistent cough, shortness of breath). S/he should not report on site, stay home and self-isolate or seek medical care in case of severe symptoms;
  - Is a vulnerable person (by virtue of age, clinical/health condition or pregnant).
- All persons should wash or clean their hands before entering and leaving the site;
- Workers should be encouraged to reach the site using individual modes of transportation and avoid public transport when possible.

<u>During construction</u>

- To the most possible extent, workers should maintain physical distance of 2 meters (6') from others at all times. Performing activities that must be conducted in close proximity should be avoided when possible. If these activities must take place, workers should wear masks;
- If possible, construction crews should be segregated and tasks allocated so they do not overlap. It is suggested to establish crew shifts to be also applied for break, lunch and pray time;
- If a worker develops COVID-19 symptoms on site, the following actions should be followed:
  - Avoid touching anything;
  - Cough and sneeze into a tissue and put it in a closed bin, or in their flexed elbow in case they don't have tissues;
  - Return home and self-isolate, or seek medical care in case of severe symptoms;
  - All surfaces and tools s/he may have recently touched should be cleaned and disinfected.
- In spaces where queuing may happen (including latrines and hand washing stations), consider marking safe distance of 2 meters (6') on ground or railings;
- Meetings on site should be avoided at all times. Instruction to workers should be given in open spaces and maintaining physical distance;
- If construction activities happen in an enclosed space, the site should be ventilated as much as possible, for example leaving doors and windows open during the working day;
- Due to potential sudden access restrictions, all materials and equipment should be carefully and safely stored before leaving the site at the end of every day;
- When receiving and unloading goods and construction materials, workers should keep distance from the drivers at all times. When possible, drivers should remain in their vehicles. If drivers must unload the goods for safety reasons, they should do so without the help of the workers and they should wash or clean their hands before and after. Any contact between deliverers and receivers should be avoided (including delivery papers and pens for signature, etc.). It is recommend that everyone needing to sign paperwork have their own pen or wash their hands after.

Hand washing, hygiene and cleaning

- Provide adequate hand-washing station with water and soap or an alcohol-based hand sanitizer (min. 60% alcohol). Ensure water and soap are topped up regularly;
- Clean the hand washing facilities regularly during the day, establishing a clear cleaning plan;
- Tools, reusable PPE and frequently touched surfaces should be cleaned and disinfected frequently (at least daily);
- If possible, appropriate latrine facilities should be made available inside the compound and be kept cleaned. In any case, workers should be encouraged to wash their hands before and after using the latrines;
- Dedicated eating, break and prayer areas should be identified on site and access should be staggered to reduce risk of congestion. Workers should keep physical distance while eating, praying and having a break;
- Provide safe drinking water dispensers and one-time cups, or encourage workers to carry an individual cup;
- All solid waste (excluding construction materials) should be put immediately in closed bins or closed bags and not left for someone else to clear up;
- Separate and collect all solid waste that could serve as transmission vector. To avoid contact with waste bags, use double plastic bags (for instance when removing a filled waste bag, cover tightly and wrap with a second plastic bag). Store the waste for at least 72 hours before disposing;
- Store leftovers construction materials for at least 72 hours before disposing.

Upon completion

- The facility should be carefully cleaned and disinfected prior to the handover;
- All waste, construction materials, tools and equipment should be removed from the site and disposed safely.

References

- CDC - "Use of Cloth Face Coverings": https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/diy-cloth-face-coverings.html
- CwC WG CXB - "Strategy, Key Messages and IEC Materials for COVID-19" (host and Rohyingya communities): https://drive.google.com/open?id=1Wjng-27m9QB5qZo9OKDdcdIAQoltkdIe
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- WHO Bangladesh – "Guidance on wearing homemade cloth masks": https://drive.google.com/open?id=1JbI73nC8Q_HwtrTfqCdT5UaE8rzYAgLJ
- WHO - "Coronavirus disease (COVID-19) advice for the public: When and how to use masks": https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public/when-and-how-to-use-masks
- WHO – "Rational use of personal protective equipment for coronavirus disease 2019 (COVID-19)": https://drive.google.com/open?id=1W6_4fT5FhgFwsjAPZRhouVx8Mlv0Z9cC