

DIGO JAL BIKAS (DJB) PROJECT



DESIGN AND CONSTRUCTION IMPLEMENTATION MANUAL FOR SELECTED SMALL-SCALE CONSTRUCTION

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Submitted by:

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ACRONYMS AND ABBREVIATIONS

CGI	Corrugated Galvanized Iron
EIA	Environmental Impact Assessment
EMMP	Environmental Mitigation and Monitoring Plan
EPA	Environment Protection Act, 1997
EPR	Environment Protection Rules, 1997
GI	Galvanized Iron
GoN	Government of Nepal
HP	Horse Power
HDPE	High Density Polythene
IEE	Initial Environmental Examination
IWMI	International Water Management Institute
Km	Kilometer
LPS	Liter per second
NRs	Nepali Rupees
NS	Nepal Standard
USAID	United States Agency for International Development

CHAPTER 1: INTRODUCTION

1.1 Background

The Digo Jal Biaks (DJB) Project is funded by United States Agency for International Development (USAID) and implemented by a consortium of International Water Management Institute (IWMI), Duke University (DU), and Kathmandu University (KU). IWMI is the lead partner to implement this project. This project focuses on developing scientific knowledgebase to support decision-makers in devising policies and plans for sustainable development and management of water resources in Western Nepal. It ultimately contributes towards balancing economic growth, social justice, and healthy and resilient ecosystems. The project objective will be achieved through six core work packages (WPs), including basin characterization (WP-1), environmental flow assessment (WP-2), basin scale development scenarios (WP-3), watershed/village water management and governance (WP-4), gender and social inclusion (WP-5), and integrated policy and practice guidelines (WP-6).

As part of the larger DJB Project, WP-4 aims to develop a strategy to optimally utilize available water resources and related ecosystem services for the sustainable socio-economic development of the local community. The goal is to explore the biophysical environment of water access and availability, analyse institutional arrangements for water governance at local/community level and develop practical technologies and approaches to increase farm productivity and improve livelihoods.

Physical interventions such as construction of ponds; rehabilitation of existing ponds; laying of PVC pipes for water conveyance; water source protection; installation of shallow tube wells; and introducing technologies for on-farm irrigation water management such as drip, sprinkler and furrow can be done in selected watersheds and villages to achieve the goal of WP-4. The pilot interventions are aimed at:

- (i) Enhancing understanding of opportunities for more efficient use of existing technology and new technologies, which can contribute to agricultural productivity improvement and thereby the food security;
- (ii) Enhancing understanding of the willingness of farmers to engage in pioneering models of collective land and water management to overcome structural constraints to water access.

This project seeks to construct a variety of structures in order to address specific project-related needs to enhance the agricultural productivity through improved water management and agricultural practices in conjunction with a range of collective farming models. The interventions identified for this are:

- (i) Construction of shallow tube wells in the Terai region with small solar (sunflower) pump/electric pump.
- (ii) Construction and rehabilitation of water storage pond
- (iii) Installation of micro irrigation tool kits like drip and sprinkler.
- (iv) Protection of water source
- (v) Plastic lining on earthen ponds
- (vi) Construction of polyhouses for off-season production

The aforementioned interventions were identified following several rounds of fieldwork conducted by the DJB research team between December 2016 and October 2017. The research explored potential social and gender equality tradeoffs of different types of interventions based on focus group discussions (FGDs), participatory mapping and key informant interviews (KIIs).

1.2 Objective

The objective of this manual is to provide a set of specific guidelines for a range of small scale constructions related to water and agriculture. This manual is designed to meet USAID procedural and quality requirements.

It is important to note that a specific manual of this nature can only be indicative and site-based and implementing-agency specific modifications to suit technical and management requirements are expected.

CHAPTER 2: CONSTRUCTION PLANNING PROCESS

2.1 Planning Process

The planning process for any construction activity is carried out to understand the existing situation of a community and then process the prioritization of their needs in line with project objectives. Through the participatory and inclusive planning process, IWMI is facilitating the communities to identify and prioritize community needs. The following planning processes are mandatory before finalizing the intervention sites and types. The planning process also looks into the resources and skills required and whether they are available to deliver a quality structure that is durable and useful. In some cases, the planning process includes rehabilitation or replacement of an existing structure that has ceased to function or is poorly functioning.

We follow inclusive planning process that includes a series of consultations with all the stakeholders including women and disadvantaged groups. Based on social studies using participatory methods and the secondary information on landholding size, composition of ethnic and disadvantaged groups, ecological zones, basin characteristics, preliminary water availability information, the pilot intervention villages are selected. Three pilot intervention sites were selected based on bio-physical (5 indicators), socio-economic (6 indicators), and logistical (6 indicators) factors. The selected sites are Mellekh (Doti, Upper catchment of project area), Punebata (Doti, Middle catchment), and Kuti (Kailali, Lower catchment) were selected as shown in Figure 1.0.

Site-specific construction processes are discussed as per the identified interventions in pilot intervention sites. This project aims at finding the most cost-effective small structures that will benefit farmers in the long-term without furthering existing social and gender inequalities or degrading natural resources. Therefore, the prioritized schemes incorporate light and flexible structures, which use locally available resources and indigenous skills to the greatest extent possible. Most importantly, schemes that contribute to biodiversity conservation, disaster risk reduction and climate change adaptation through an eco-system based approach to enhance the livelihood of local people through improved agriculture and irrigation techniques are prioritized.

The planning process, stakeholder's roles and responsibility matrix are briefly outlined in Table 1.

Table 1: Planning process for the intervention sites

Activities	Methods	Major responsibility	Minor responsibility	Remarks
Identification of intervention sites	KII with local government, FGD in different hamlets of identified village	IWMI	Local stakeholders and community	
Problem identification	FGD with local people, problem tree analysis, detailed socio-economic survey	IWMI and NWCF	Local stakeholders and community	
Prioritization of problems and needs	FGD with local people and participatory approach	IWMI	Local stakeholders and community	
Identification of possible interventions	FGD, consultation with local stakeholders, review of previous reports in similar interventions in project site	IWMI	Local stakeholders and community	
Pre-feasibility and Feasibility study of identified intervention	Consultation with concerned stakeholders, review of reports, site visit, IWMI's experience on similar type of interventions on similar geo-physical setting	IWMI	Local stakeholders and community	
Finalization of interventions	Based on the several field visits, Technical report, community willingness, resources availability, expert and stakeholder input	IWMI	Local stakeholders and community	USAID approval required.

After finalizing the interventions, the construction activities will be mainly carried out by IWMI in close consultation with local stakeholder and farmers. The general approach of construction activities and general requirement of construction materials are outlined as below. The specific construction methods for specific types of structures is described in subsequent chapters.

A. Formation of farmers group

The farmers' group plays an important role in the bottom-up process of needs assessment as well as appropriate interventions. It helps to organize meetings to identify an appropriate scheme that meets the community's requirements. IWMI works with community members to bring together farmers who are jointly willing to partake in a collective farming framework through renting common land to grow vegetables using improved irrigation techniques. IWMI is facilitating the farmers to form a farmers'

group in each site and will finalize the interventions, field sites, and possible crop types for different seasons. Based on the interaction with farmers and survey data, IWMI prepared a list of potential interventions which was refined and prioritized in close consultation with the farmers in respective intervention sites. Farmers and IWMI jointly prepared the possible intervention identification with primary social and environmental information as attached in **Annex-1**.

B. Feasibility of the project

IWMI is responsible for undertaking the feasibility study for the screening of activities, dropping out those prioritized activities during community discussion that are not suitable; and incorporating appropriate measures to ensure that the construction is useful and appropriate for the intended purpose. The feasibility study is mainly based on IWMI's previous experience on similar types of projects under similar geographical and topographical conditions. An ecosystem-based approach is taken into account while selecting the types of interventions and construction processes. A brief feasibility study normally includes the following elements:

- a. Description of the project (location, background, objectives, beneficiary of the project, etc.)
- b. Salient features of the project (technical and social features of the project)
- c. Technical viability of the project (review of technical challenges such as water source adequacy, terrain difficulty, availability of construction material, and level of technical skills required)
- d. Environmental viability (are negative impacts on nature acceptable, and how can they be mitigated)
- e. Financial viability (e.g. are funds available to meet the project costs, including environmental mitigation measures?)
- f. Social viability (e.g. is the project socially acceptable? Will it help disadvantaged people in an equitable manner? Does it take into account the needs of women, elderly, children, and disabled people? Is there any potential conflict? Are farmers willing to participate in collective farming?)
- g. Conclusions and recommendations

2.2 Required Materials

The following materials are required for construction of the structures envisaged by the DJB team and included in this manual:

- Cement
- Sand
- Stone
- Water
- Sand bags
- Bamboo or wooden stakes
- Seedlings for plantation
- Other grass and plant species
- Pipes (Galvanized Iron (GI) and High-Density Polyethylene (HDPE) and fittings)

- Solar installation equipment
- Wire and underground cables
- Plastic tanks for drip irrigation
- Plastic linings for ponds
- Timber for form work
- Pumps
- Metal

The quantities of materials required for each site are identified by IWMI and the tentative market rates are accessed from the local market. Cost estimates and designs of construction work are prepared by IWMI based on specification and norms provided and approved by the Government of Nepal.

2.3 Specification of Materials, Construction Process and Skills

All materials used must meet minimum quality and environmental standards during construction process as specified by the Government of Nepal (GoN). The quality is determined by all possible standard means, including as determined by the Nepal Bureau of Standards and Metrology for related construction items. In this case, stone, sand, cement, water for cement work, bamboo, solar panels, pipes and fittings, cables and wire as listed in Section 2.2 are used for the construction process.

Quality control in small scale community construction is necessary to make sure that the structure functions well, is safe, and is environmentally appropriate. This shall be achieved through regular monitoring by IWMI technical staff and the farmers' group. Most of the materials such as sand, stone, and bamboo are locally available while other materials will have to be purchased from markets in towns neighboring the pilot sites. There should be minimal or no adverse environmental impact while quarrying, collecting and buying construction materials. Material quarrying sites and collection sites should be reinstated properly to minimize adverse environmental effects. Stone, sand, mud, and gravel extraction and collection must be environmentally sound with permission from local authorities. Bamboo is locally available and cement and High Density Polythene (HDPE) and Galvanized Iron (GI) pipes can be purchased from the nearest local/ big market. Solar panels and accessories are supplied by power companies. Poor quality materials lead to frequent maintenance which is costly. It is essential to provide necessary training, and monitor the extraction, procurement and use of these materials at all stages of construction.

This kind of small scale construction requires a range of skilled and un-skilled manpower. In this case experienced masons, plumbers, skilled labor, and unskilled labor is locally available and trained and skilled technicians need to be outsourced for the installation of solar (sunflower pump) panels and drip/sprinkler systems. We will ensure that men and women from different castes/ethnicities with similar skills have equal chances to participate in skilled and unskilled labor and receive equal wages.

2.4 Environmental Impacts and Management Plan

While constructing and implementing small construction activities, the environmental impact needs to be assessed beforehand. It may be either positive or negative in terms of physical, biological, social and economic. Those impacts may be direct or indirect and can be categorized as short-term, medium-term, or long-term in terms of timing and could be high, moderate, or low in terms of magnitude. During the feasibility study phase, an Environmental Impact Assessment (EIA) checklist is completed to identify and predict the impacts and the nature, magnitude, extent and duration of construction activities. A sample checklist is attached in **Annex-2**.

Physical impacts mainly involve soil, topography, water, air, land use, ecosystems and physical infrastructures. Biological impacts include those on flora, fauna and their habitats. Socio-economic and cultural impacts involve gender and social inclusion aspects, indigenous people, religion and culture, and local economy and livelihood issues. Construction and planning activities are obliged to follow the Environment Protection Act (EPA) provided by the GoN. For site specific impact, IWMI is responsible for conducting an environmental assessment such as the Initial Environmental Examination (IEE) and ensuring that mitigation measures are implemented based on the appropriate recommendation. If impacts are not acceptable with mitigation measures and detailed EIA is required, schemes may be cancelled. The environment monitoring checklist will be completed by IWMI during each stage of construction process and is attached in **Annex-3**.

The Environmental Mitigation and Management Plan (EMMP) is prepared to monitor and verify the proposed mitigation measures and implementation. EMMP provides information on impacts, mitigation measures and timings, mitigation and monitoring costs, and responsible agencies. In addition to EMMP, the proposed construction complies with Gender and Social Inclusion (GESI) considerations, child protection and other social considerations, including prohibition of child labor. Structures constructed as part of the interventions need to be easily accessed by all members of community including but not limited to marginalized groups, women, poor, elderly and the disabled. The structures should reduce the workload of the community and allow for efficient water use. At the same time, it is important to ensure the safety of the children around the ponds. A wire around the structure should help prevent any mishaps. The ponds are located in a communal space and the community should therefore be encouraged to view the ponds as a place to congregate. This would ensure maintenance and cleanliness of the ponds and its surrounding areas as well.

In addition, we will pay attention to gender and social inclusion in regards to who is given the opportunity to have a say in the location of the works, the type of work that is to be conducted, who participates in the construction work and who is able to access and benefit from the structure. We will also as much as possible try to rely on existing community groups rather than form new user groups to avoid duplication of memberships for individuals, which might negatively affect the workload of women and the landless, who are engaged in household work and wage labour. This will also support a greater sustainability of the groups by reinforcing existing institutions and relying on existing social capital.

CHAPTER 3: SMALL SCALE CONSTRUCTION TYPES AND REQUIREMENTS

This chapter discusses key types of construction, technical features and requirements undertaken and supported by DJB. The section describes the key technical features and requirements, overall function, design parameter (in brief), implementation processes, health and safety considerations, and potential environmental and GESI impacts and approaches to mitigate them during implementation of the construction process. In this project, all the possible interventions are small scale and can be constructed by local masons, plumbers and carpenters. Solar systems and tube well construction needs to be installed by an outsourced technician. The types of construction and requirements are outlined in matrix form with detailed environmental mitigation measures. The outlined potential intervention on the DJB Project are tabulated in **Table 2 to 6**.

Table 2 Interventions in Kuti, Punebata and Mellekh

Village	Hamlets	Issue	Potential Solution	Possible intervention	Willingness to participate	Challenges	Opportunities for Risk Management
Kuti	Lakhrai Tole	Flooding	Embankment and artificial cutoff (long term)	Sunflower pump with tube well installation, collective farming, farmers' training, improved seed distribution and research plot with different type of irrigation	Farmers from both communities are willing to participate but finding a large parcel of land to rent is slightly difficult since many farmers have small land parcels scattered around the village. At the same time, many have already planted winter crops (wheat, mustard and lentils)	Farmers may not follow collective farming approach after project duration. Farmers may abandon micro irrigation techniques due to non-availability of accessories like laterals and poor maintenance	Provide contacts and link with market to ensure accessories can be purchased, in case of operational damage and training to maintain system intact
	Lobasta Tole	Poor access to water in dry season	Increased water access in dry season (immediate solution)				
Punebata	Gharans Tole	Less water availability during dry season	Source Protection or Effective utilization of available water using improved tools and techniques	Pond rehabilitation, Collective Farming approach, on farm water management and research plot for different type irrigation (micro irrigation, improved seeds)	There are many natural ponds scattered around the village and farmers are highly interested in converting them into concrete ponds. Each pond is used by at least 6-8 households.	. Farmers may abandon micro irrigation techniques due to non-availability of accessories like laterals and poor maintenance Farmers may not maintain and repair ponds which are for communal use which could lead to conflict.	Provide contacts and link with market to ensure accessories can be purchased, in case of operational damage and training to maintain system intact. Ensure farmers group set aside money for repair and maintenance during group formation
Mellekh	Rokainara	Less water availability during dry season	Source Protection and pond rehabilitation with improved irrigation	Collective Farming approach, on farm water management solution (micro	There is a pond located in Rokainara that can be rehabilitated for agricultural use.	Farmers may abandon micro irrigation techniques due to	Provide contacts and link with market to ensure accessories can be purchased, in

			facilities	irrigation, improved seeds)		non-availability of accessories like laterals and poor maintenance Farmers may not maintain and repair ponds which are for communal use which could lead to conflict.	case of operational damage and training to maintain system intact Ensure farmers group set aside money for repair and maintenance during group formation
	Alaitwada			Collective Farming approach, on farm water management solution (micro irrigation, improved seeds)	There is one pond located in each hamlet that can be rehabilitated for agricultural use.	Farmers may abandon micro irrigation techniques due to non-availability of accessories like laterals and poor maintenance Farmers may not maintain and repair ponds which are for communal use which could lead to conflict.	Provide contacts and link with market to ensure accessories can be purchased, in case of operational damage and training to maintain system intact Ensure farmers group set aside money for repair and maintenance during group formation

Table 3: Construction Type: Intake Protection

S.N.	Activities	Locally available material	Available in nearest market	Typical design description	Potential environmental impact	Potential mitigation measures	Potential impact on gender and social equality	Responsible organization	Remarks
1	Identification of water source	NA	NA	NA	NA	NA	Identification of source made with a group of farmers from different age, gender, and caste/ethnicity	IWMI and community members	
2	Design of protection structure	NA	NA	NA	NA	NA	Will rely on existing knowledge on source protection.	IWMI	
3	Clearing of undesired vegetation	Spade and grass cutter	NA	NA	Enhance recharge	NA	Men and women of different caste/ethnicity will be given equal opportunity to participate in various works	Community members	
4	Small source protection work around the source with small hole with HDPE pipe	Stone, Sand, water	Cement	Small V/O shaped around (2m*0.15m*0.4m) with 1/1.5 inch HDPE pipe hole	Enhance recharge and act as small water collection chamber	NA		IWMI and community members	
5	Water conveying from source to pond and pond to command area	Spade	HDPE pipe	HDPE pipe is kept under the ground (with very small trench) and filled back with soil	NA	NA	NA	IWMI and community members	
6	Supervision of works	NA	NA	NA	NA	NA	Supervision will ensure men and women of different caste/ethnicity are treated fairly and equally	IWMI, USAID and community members	

Table 4: Construction Type: Micro irrigation (Drip Kit and Sprinkler)

S.N.	Activities	Locally available Material	Available in nearest market	Typical design description	Potential environmental impact	Potential mitigation measures	Potential impact on gender and social equality	Responsible Organization	Remarks
1	Identification of Existing Ponds and socio-technical problems associated with identified ponds	NA	NA	NA	NA	NA	Identification of users for each pond disaggregated by gender, caste and ethnicity. History of pond use and conflicts.	IWMI and community members	
2	Measurement of Pond size and identification of possible rehabilitation	Tape, spade	NA	NA	NA	NA	NA	IWMI	
3	Clearing of undesired vegetation and excavation	Spade and grass cutter	NA	NA	NA	NA	Men and women of different caste/ethnicity will be given equal opportunity to participate in the works	Community members	
4	PCC work and stone masonry wall as per requirement	Stone, Sand, gravel, water	Cement	5-10 cm PCC at the base of pond and maintenance of stone masonry wall	NA	NA		IWMI and community members	Quantity of material required is in less quantity
5	Water conveying from and pond to command area	Spade	HDPE pipe	HDPE pipe under the ground (with very small trench) and filled back with soil and flexible pipe for irrigation at field	NA	NA		IWMI and community members	
6	Supervision of works	NA	NA	NA	NA	NA	Supervision will ensure men and women of different caste/ethnicity are treated fairly and equally	IWMI, USAID and community members	

Table 5: Construction Type: Shallow Tube well with Sunflower Pump

S.N.	Activities	Locally available Material	Available in nearest market	Typical design description	Potential environmental impact	Potential mitigation measures	Potential impact on gender and social equality	Responsible Organization	Remarks
1	Identification of sites for shallow tube well installation	NA	NA	NA	NA	NA	Identification of users who will have access to the tube wells disaggregated by gender, caste and ethnicity. History of groundwater use and existing institutional arrangements.	IWMI and community members	
2	Design of well, distribution system and selection of appropriate pump and energy source	NA	NA	Based on experience (Hydro-geology suitability, quantity and quality of water, well yield), depth of well, screen length, casing and gravel pack arrangement	NA	NA	Selection of appropriate pump will consider how gender-friendly are different pumps – and how to make them more gender-friendly. The selection of the energy source will consider how accessible it is for men and women of different social groups. Training needs of individuals based on gender will be identified.	IWMI	
3	Installation of Shallow tube well	spade, gravel, etc.	Drill machine with trained technician, GI pipe, strainer	Based on geology and water availability depth of well and screen varies	Utilization of available groundwater resources	Measurement of water table	Men and women of different caste/ethnicity will be given equal opportunity to participate in the works	IWMI and Community members	Abstraction is very low (1-1.5 lps per pump)
4	Installation of Sunflower	Bamboo	Solar panel,	80 kw solar panel with 1 hp pump	Reduce the use of diesel and	NA		IWMI and community	

	pump		wires with trained technician		electric pump			members	
5	Water conveying from pumping station command area		Flexible pipe	Length of pipe based on distance from pumping station to field	NA	NA	NA	IWMI and community members	
6	Supervision of works	NA	NA	NA	NA	NA	Supervision will ensure men and women of different caste/ethnicity are treated fairly and equally	IWMI, USAID and community members	

Table 6: Construction Type: Plastic lining of ponds

S.N.	Activities	Locally available Material	Available in nearest market	Typical design description	Potential environmental impact	Potential mitigation measures	Potential impact on gender and social equality	Responsible Organization	Remarks
1	Identification of water source	NA	NA	NA	NA	NA	Identification of source made with a group of farmers from different age, gender, and caste/ethnicity	IWMI and community members	
2	Design of protection structure	NA	NA	NA	NA	NA	Will rely on existing knowledge on source protection.	IWMI	
3	Clearing of undesired vegetation	Spade and grass cutter	NA	NA	Enhance recharge	NA	Men and women of different caste/ethnicity will be given equal opportunity to participate in various works	Community members	
4	Small source protection work around the source with small hole with HDPE pipe	Stone, Sand, water	Cement	Small V/O shaped around (2m*0.15m*0.4m) with 1/1.5 inch HDPE pipe hole	Enhance recharge and act as small water collection chamber	NA		IWMI and community members	
5	Water conveying from source to pond and pond to command area	Spade	HDPE pipe	HDPE pipe is kept under the ground 9with very small trench) and filled back with soil	NA	NA		IWMI and community members	
6	Supervision of works	NA	NA	NA	NA	NA	Supervision will ensure men and women of different caste/ethnicity are treated fairly and equally	IWMI, USAID and community members	

NA- Not Applicable

ANNEXES

Annex 1: Intervention Identification

Date:

Tick in right alternatives

A. Intervention Introduction

Intervention Name:

District:

Rural/Municipality:

Ward No:

Tole:

B. Intervention Details (Tick more than one if some combination)

- a. Irrigation
- b. Drinking water supply
- c. Source Protection
- d. Check Dam
- e. Dyke
- f. Landslide and soil erosion control
- g. Other

C. Intervention Type

- a. Maintenance work
- b. Rehabilitation work
- c. Conservation work
- d. Reconstruction work

D. Details of Intervention

.....
.....
.....
.....
.....

Nearest road.....Distance in hour

.....

E. Intervention Objective

- 1.
- 2.
- 3.

F. Socio-Economic Condition

.....
.....
.....

G. Identification of Beneficiaries Community/ Group

Group existing prior to the intervention or new group created by the project?

1. Name of Community/ Group
2. Address
3. Number of beneficiaries in household
4. Ethnic composition of beneficiary households
5. Composition of beneficiary households by gender of household head
6. Composition of beneficiary households by wealth category
7. Name of Authorized representative
8. Designation
- 9.

We under listed member/user committee of District
Rural/Municipality.....Ward No.....duly take
 responsibility to undertake the construction work to complete as per the prevailing rules and
 regulations.

S.N	Name	Designation	Contact No.	Signature

Annex-2

A Sample Environmental Assessment Checklist for identified intervention

Intervention Name:

District:

Rural/Municipality:

Ward No:

Tole:

Date :

Prepared by :

Planned activity:

Purpose of the activity:

S No	Categories of Impacts	Potential Impacts	Time scale of Impacts (LT, MT and ST)	Extent of Impacts (Local/ site specific, regional or widespread)	Magnitude of impacts (low medium or high)	Mitigation (not possible, not required, required)
1	Physical					
1.1	Soil and Air					
1.2	Water/wetlands					
1.3	Ecosystem, Processes/functions					
1.4	Physical Infrastructure					
2	Biological					
2.1	Flora					
2.2	Fauna					
2.3	Wildlife habitat					
3	Socio-economic					
3.1	Human and Settlement					
3.2	Gender and social inclusion					
3.3	Rights of indigenous people					
3.4	Occupation and economic activities					
4	Others/Indirect or secondary impacts					

Note : LT- Long-term, MT-Medium-term, ST- Short-term

Annex-3
A reference sample Environmental Monitoring Check list

Intervention Name:

District:

Rural/Municipality:

Ward No:

Tole:

Date :

Prepared by :

S No	Description of components/activities	Present Status	Mitigation Compliance (Compliance, non-compliance or partial compliance)	Actions required
1	Physical Component			
1.1	Top soil and spoil management			
1.2	Discharge of drain/runoff			
1.3	Bioengineering and slope protection measures			
1.4	Change in water quality			
1.5	Existing physical infrastructures			
1.6	Other physical issues, if any			
2	Biological Component			
2.1	Impact on plant species			
2.2	Impact on wildlife and their habitat			
3.	Socio-economic component			
3.1	Participation of local community			
3.2	Employment opportunity			
3.3	Status of GESI, involvement of indigenous people			
3.4	Health and safety issues of farmer's group for construction /workers/builder groups etc.			
3.5	Awareness raising and capacity building activities			
3.6	Compensation issues			