

Environmental and Social Management Framework for Implementation of Building Resilience to Climate Related Hazards

Pilot Programme for Climate Resilience- PPCR

Submitted to
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Final Report

Submitted by
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We also express our thanks to all the members who helped directly or indirectly in making this study success.

Department of Hydrology and Meteorology (DHM)

August, 2012

Executive Summary

The proposed project, "Building Resilience to Climate Related Hazards (BRCRH) is one the five Program Components identified in Nepal's Strategic Program for Climate Resilience (SPCR).

Different components of the project are being supported and implemented by different agencies. The World Bank is supporting BRCRH project. The proposed project aims to increase resilience to climate-related hazards by improving the accuracy and timeliness of weather and flood forecasts and warnings for vulnerable communities; as well as develop agricultural information management system services to help farmers mitigate climate-related production risks.

The BRCRH project includes four components as follows.

Components A: Institutional Strengthening, Capacity Building and Implementation Support of DHM.

This component has three subcomponents: i) Institutional Strengthening, ii) DHM capacity building and training, and iii) Systems design and integration, project management and monitoring.

Component B: Modernization of the observation networks and forecasting

This component has five subcomponents: i) Technical modernization of the observing networks, ii) Modernization of DHM's communication and ICT systems, iii) Improvement of the numerical hydro meteorological prediction system, iv) Design and pilot operation of an environmental monitoring network, and v) Refurbishment / reconstruction of DHM offices and facilities.

Component C.: Enhancement of the Service Delivery System of DHM

The subcomponents of this components are: i) Introduction of a Public Weather Service (PWS) for (DRM, agriculture, media, civil aviation, health, energy, water resources, irrigation), ii) Strengthening of DRM operations including piloting of "end-to-end" early warning systems in two river basins in the western and eastern parts of Nepal, iii) Improvement of service delivery (i.e. warnings and advisories) to communities including introduction of mobile applications, and iv) Establishment of the National Framework of Climate Service

Component D: DHM climate and weather information for users in agriculture – Agriculture Management Information System

It has five subcomponents: i) Agriculture Management Information System – Portal, hardware and software, ii) Information products, iii) Information dissemination, iv) Capacity building, v) Project management, social and communication, monitoring and evaluation of component D.

The Department of Hydrology and Meteorology (DHM) will implement Component A, Component B, and Component C under the coordination of the Ministry of Environment, Science, and Technology (MOEST). Ministry of Agriculture Development (MoAD) will implement Component D of the project.

Environmental and Social Management Framework (ESMF) has been prepared for social and environmental management of project activities during implementation, and is consistent with Nepal's environmental and social policies and requirements as well as policies of the World Bank (WB).

Fragile geology, unstable steep slopes, high topographic variation, frequent change in river course, cloud burst, climate change impacts have put Nepal at high risk to natural hazards. Floods, landslides, droughts, wildfires take place recurrently causing immense damage to property and loss human life. The country losses of properties equivalent to US \$ 8 million, 4000 hectores of fertile land and displacement of 20 thousands and death of around 300 people every year due to hydro meteorological disasters¹. Once River systems reach the Tarai Region, they often overflow their banks onto wide floodplains during the monsoon, shifting course periodically. The rivers are deeply-incised across the east-west structural grain of Nepal and the Himalaya, having eroded with the upliftment of the mountains.

Precipitation is generally concentrated in the regions below 500 m. Precipitation is relatively low in High Mountain and High Himalaya (Sharma, 2003)². It indicates that the occurrence of flooding in the Tarai and Churia is comparatively higher than in high elevation zones. Furthermore, the districts in Tarai are prone to floods (Very high risk-Mahottari; High risk- Rautahat, Chitwan, Parsa, Saptari, Siraha, Sunsari, Dhanusha, Bara)³.

Nepal is divided into three ecological regions: High Mountains (35 % of total area), the Middle Mountains (42% of total area), and the Churiya and Tarai (23 % of total area). The distribution of forest land coverage is as follows: 23 % of total forest land in Mountain, 50 % in Hill and 37 % in Terai. On an average, forest land has decreased at an annual rate of 1.7 %. Soil erosion and flooding are the major causes of land degradation in the country. Nepal ranks at 25th position in terms of biodiversity with 11 bio-climatic zones, 118 ecosystems and 35 natural forests⁴. Sixteen protected areas (17% of the country's total area) including national parks (9), conservation area (3), wildlife reserves (3), and a hunting reserve (1) and six buffer zones have been established for the protection of flora and fauna.

The economy remains heavily dependent on agriculture as approximately 66 percent of the national population is engaged in agriculture. The country has 2.97 million ha gross cultivated land and 2.64 million ha net cultivated land. The cultivated lands have been distributed into: 52% in Terai, 40 % in Hill and 8% in Mountain. With 65% of cultivated land in the slopes of hills and mountains where loss of fertile topsoils due to erosion is common. Loss of topsoil due to erosion, pollutants, improper use of pesticides and insecticides, and deforestation are leading factors of declining soil fertility in the country.

¹ Paudel, D. 2006

² Sharma, 2003

³ GoN 2010. Climate change vulnerability Mapping for Nepal. National Adaptation Programme of Action (NAPA) to Climate Change, Ministry of Environment, Government of Nepal

⁴ Stainton, JD (1972). Forest of Nepal, John Murry, London

Lack of proper resources including means of recycling, infrastructures, equipment is a common problem faced by the concerned agencies in managing solid waste. Haphazard solid waste collection and not handled properly in recycling process and disposal system causes significant adverse impacts on public health and the environment, contamination of surface water, ground water and soils as well. In the absence of proper landfill sites, the collected waste is directly dumped in rivers or forest and agriculture areas. There are no separate arrangements for managing hazardous waste. The scrap battery to be 20-30 metric tons for the year 1998 and projected such battery scrap to 110-190 metric tons for 2008⁵ in the country.

About 1.8 million Population live in mountain, 11.5 million in hills and 13.4 million in Tarai. Multiethnic and multilingual country with as many as 102 ethnic groups and 92 languages is in the country. The country's current poverty level is 25.4 percent. 95.5 per cent of poor people live in rural areas and the incidence of poverty in rural areas (28.5 percent) is almost four times higher than that in urban areas (7.6 per cent). At national level, only 5 % of the population hold 27 % of lands of size 3 ha or more. About 51 % of the population confined 59% of land of size 0.5-3 ha. Likewise, about 44 % of the people hold 14 % of land of size less or equal to 0.5 ha.

The Gender Parity Index for secondary school net enrollment has also increased from 0.87 (2007) to 0.98 (2010). Quota-system brought in over 33 percent of women in the Constituent Assembly. The maternal mortality rate declined from 538 in 1996 to 380 per 100,000 live births. Although the legal age of marriage is 20 for both male and female, it is hardly implemented in Nepal.

Some key programs such as Social mobilization and empowerment, Income generation through micro-enterprise promotion, Community infrastructure, and Capacity building and human resources development have been emphasized to reduce poverty in the country.

Environmental and social concerns (adverse impacts) of the project are not likely to be highly significant. However, minor adverse environmental and social issues/ impacts are likely from the project e and are related to few activities such as upgrading the meteorological stations (if it requires lands on an ideal condition-equivalent to 0.06 ha), installation of Weather Radar System (WRS), utilization of dry-cell battery for power supply system to operate hydrological and meteorological sensor in automated operation mode.

Upgrading of existing hydrological and meteorological stations, installing WRS will include small scale interventions such as surface improvements (removal of vegetation up to 5m x 5 m for Gauge House, 8 m x 8m for Cable House, 25 m x 25 m for automated weather station in an ideal condition 10 m x 7 m in normal condition, and 60-100 m² lands for Radar) and utilization of dry-cell battery of 12 V (170 batteries, 7 kg weight per battery). Use of huge machinery interventions or heavy machines is not-required for any activities of the project.

The likely environmental adverse impacts due to these small scale interventions are s trees/plants/vegetation loss when forest clear, solid waste and pollution which could causes health

⁵ DANIDA/COWI, 2003 Study on Environmentally benign Handling, disposal and recycling of used lead-acid batteries in Nepal

hazards, agriculture/crops damage around the meteorological stations and access to them, and site specific erosion risks.

Some of the devices such as batteries, barometers, thermometer etc may contain hazardous substances. The e-wastes and used batteries, although the quantity is likely to be small, could be source of hazardous substances containing toxic chemical and heavy metals such as lead, mercury, cadmium, nickel, acid that pose direct or indirect risks to environment, wildlife and human health.

Impact of modernization of hydrological stations on river water quality and quantity is non-existent or negligible as no water will be withdrawn and the envisaged improvements/ modernization activities will be very small in scale (activities such as few meter river bank protection around the station, installation of simple flow measuring equipments, construction of steeling wells on the river banks and access to flow measuring station). The environmental beneficial impacts of the project are likely to be expected in several aspects such as improved mitigation and preparedness measures in disaster risk management, promoted scientific understanding through reliable data and information, improved agriculture practices and security.

The social adverse impacts of these small scale interventions are likely to be minimal and varied according to the type of lands (government, and private), type of social groups (marginal farmer, vulnerable groups), and educational status and gender imbalance. Furthermore, disturbances in lands, less opportunity for unskilled workers, health hazards are likely to be happened in terms of social adverse impacts of the project. The land required will be primarily taken on lease or donated voluntarily against a token amount and part time employment. In very few cases land may be acquired which will be very small in size. Although small in size, the lands are of great importance to vulnerable groups in terms of living and livelihood. In this situation, based on the eligibility criteria and type of losses, the affected families/individuals need appropriate compensation as well as resettlement and rehabilitation assistances by adopting land acquisition process of GoN and resettlement policy framework of WB (see below).

Compensation Entitlement Matrix

Loss Category	Entitlement Unit	Description of Entitlement
Loss of Trees and Crop	Landowner	<ul style="list-style-type: none"> At least three months advance notice for crop harvest In absence of advance notice, cash compensation based on annual value of the produce and calculated according to the Department of Agriculture norms (crop compensation) Cash compensation based on annual value of the produce and calculated according to the Department of Forestry (for trees compensation)
Land given on voluntary basis	Registered Owner	<ul style="list-style-type: none"> Onetime payment as grant equivalent to one year of minimum agriculture wages Employment as part time operator to one member of the household preferably to the

Loss Category	Entitlement Unit	Description of Entitlement
		woman of the house
Loss of agriculture land, if any	Registered owner	<ul style="list-style-type: none"> ▪ Cash compensation at replacement cost ▪ Any transfer costs, registration fees or charges ▪ Compensation for crops and trees if any ▪ Subsistence allowance equivalent to one year of minimum agriculture wages
Loss of agriculture land, if any	Non titleholder	<ul style="list-style-type: none"> ▪ Compensation for crops and trees if any ▪ Subsistence allowance equivalent to six months of minimum agriculture wages for loss of livelihood
Loss of House or other property	Property owner (title holder)	<ul style="list-style-type: none"> ▪ Compensation at replacement cost or as settled by users' organization and PAP or committee under District Administration Office. ▪ Shifting allowance of NPR 5000 as one time grant. ▪ Resettlement assistance of NPR 50000
Loss of house or other property	Encroachers / squatters	<ul style="list-style-type: none"> ▪ Compensation for the structure build on government land at replacement value ▪ One time grant of NPR 5000 as shifting allowance. ▪ Resettlement assistance of NPR 50000
Loss of Income or source of income	Eligible household	<ul style="list-style-type: none"> ▪ Subsistence allowance equivalent to one year of minimum agriculture wages

Major issues of vulnerable people including indigenous people are: likelihood of inclusions in the project, involvement in capacity building process, exclusion from information and knowledge etc. The project will adopt policy addressed towards inclusion, greater participation, capacity building through the project.

Key gender issues are: likelihood of less participation of women, powerless and marginalized people in different kinds of trainings and information dissemination program, low level of literacy to understand the information; less chances of job opportunities for unskilled worker, women and the member of marginalized communities etc. ESMF outlines the areas where women need special supports/assistance and ensures women's participation to benefit from project subcomponents.

The social beneficial impacts of the project are likely to be expected in several social issues such as improved employment opportunity (about 87,500 man days will be engaged for short term work), Capacity building of communities, agencies in early warnings, additional supports for marginalized people (relatively remote locations which are the preferred sites for upgrading the hydro meteorological stations and these groups are likely to be more beneficiaries of the project), improved lifestyle (through improved weather and climate information in agriculture production and food security), improved technical knowhow of farmers.

The ESMF has been prepared by considering the relevant GON regulatory and policies and the WB safeguard policy. The relevant framework/policies of GoN are: Environmental Protection Act and Regulation 1997, Forest Act 1993 and Regulation 1995, the National Parks and Wildlife Conservation Act 1973 and Rule 1996, Solid Waste Management and Resource Mobilization act 1987 and amendment 1992, National Agriculture Policy 2004, Local Self Governance Act 1999, Land acquisition Act (1977) and Regulation amended in 1992, Gender and Child Rights mainstreaming Guidelines 2005. Likewise the WB relevant safeguard policies are: Environmental Assessment, Forestry, Natural Habitats, Involuntary Resettlement, Physical Cultural Resources, and Indigenous People.

The land acquisition process is generally lengthy (almost a year) if the project needs private lands. Public lands (Government Lands) need to be given a high priority to implement subcomponent of the project. Similarly, non availability of effective regulatory measures to manage for e-wastes is a major challenge.

This framework includes: Environmental and social screening of the sub components; Resettlement Policy Framework (RPF), Framework for Vulnerable Community Development; Consultation Dissemination Framework; Institutional Arrangement Framework; and Framework for Monitoring and Mitigation and Adverse Impact.

Each subcomponent of the project will go through environmental and social screening in order to identify relevant environmental and social concerns and suggest further investigation/ assessment if necessary. Once the subcomponents are screened against all these criteria they will be categorized as per the nature and magnitude of impacts: the ineligibility criteria include core protected area, world heritage sites, and conflicted/disputed territory. Subproject/activity located in the protected area, but out of core area, may be permitted on written permission from the competent authority. Preliminary or full environmental assessment may be necessary for Category A and Category B subproject/activity, and management/safeguard plans needs to be prepared. The sub components will consider alternative designs (especially during site selection) in order to avoid land acquisition and minimize adverse social impacts. A resettlement action plan with the cost of land acquisition will be prepared during the implementation after screening subcomponents as per the guideline of WB. The compensation and allowances cost will be estimated during the implementation of the subcomponents of the project.

Following key requirements need to be taken into account to implement subcomponents of the project.

- Consultation especially for installation of WRS needs to be carried out in screening and developing the project. PMU is responsible for the consultation.
- Some activities such as installation and enhancement of stations in environmental sensitive areas such as National Park, Conservation Areas, Ramsar area, protected forests and other protected area is permissible only if written permission from the authorized officials is obtained through due process and meeting all requirements. PMU will coordinate with the Department of National Parks and Wildlife Conservations and/ or other relevant or competent party/ agency.
- The activities should not be implemented in areas with high risk of landslides, floods and erosion. PMU need to consult *with the concerned agencies such as Department of Soil*

Conservation and Watershed Management (DOSWWM) and Department of Water Induced Disaster Prevention (DWIDP), Department of Mines and Geology (DoMG)

- Internal monitoring need to be carried out by PMU/DHM periodically and reported to the Director of the Project. Project will carry out environmental compliance review once in six-month.
- PMU need to consult the key stakeholders of the project such as disaster management agencies including government, non-government, NRCS; managers, media, academicians, farmers, and service oriented agencies especially tourism, aviation etc
- Collection of Battery, e-wastes and other hazardous wastes from the stations/sources to the nearest collection center (Basin Offices/Regional Meteorological Offices/the DHM office at Kathmandu) by utilizing outsources and by Department's staff during regular monitoring period. The project will give preference to non-hazardous or the least hazardous alternatives available in purchasing devices and use of systems (for example mercury free alternatives in battery, thermometer, barometer etc, where possible or hybrid batteries that are less risky). Early in the first year of project implementation, hazardous waste collection, recycling and management system with due consideration to the risks of the hazardous wastes including from batteries will be developed and put in place. One option is to use the auction process for recycling, which will be carried out by PMU according to the government's rule and hazardous wastes management and handling protocol/ procedure specifically developed for this project during the first year of implementation. Out of 170 batteries, about 35 batteries may need to be collected two times and the rest one time during the project period.
- The compensation cost including allowances for affected land/property owners (crops/house loss) will be estimated during the implementation of sub-component. PMU is responsible for the estimation of the costs by consulting local market and Cost Determination Committee at district level.
- Mid-term Evaluation and Final Evaluation of social and environmental safeguard management need to be carried out in second year and the last year during the project period. PMU is responsible to facilitate administrative process for the selection of national evaluators.

Project's environmental steps are summarized below

Project's step	Environmental step	Remarks
Subproject concept and needs. Define project activity of each subcomponent with location, possible impacts, and further consideration (pre-feasibility and/or feasibility study of the project's subcomponent)	Collection of information regarding environments with field investigation. Environmental Screening is done and Category of the subproject/ activity assigned prior to pre-feasibility study.	PMU is responsible for the work. Environmental situation of the project site/risk to the project and from the project with possible mitigation measures need to be described in the feasibility report.

	Environmental screening to determine Category, and level of Environmental Assessment beyond screening (if needed).	Obtain service of an Environmental Specialist /Officer for environmental screening
Selection of pre-feasibility study report for detailed study (if required)	<p>Terms of Reference is prepared for IEE or EIA if required (for Category A and Category B).</p> <p>Commission initial environmental Examination (IEE) or Environmental Impact Assessment (EIA) if required prior to finalization of feasibility study, and prepare Environmental Management Plan (EMP).</p> <p>Incorporate recommendations into detailed design, costing, specifications, as well as into bidding documents.</p>	<p>Identify mitigations and/or prepare EMP for Category C activity.</p> <p>Mitigation measures and monitoring system need to be defined. PMU is responsible for the work and submission the report to the Project Steering Committee (PSC)</p> <p>IEE and EIA Terms of Reference and Report will be approved by the ministry.</p> <p>Mitigation measures and monitoring system need to be defined. PMU is responsible for commissioning the work and submission the report</p>
Approval of the Detailed Technical report by PSC	Review incorporation of recommendations from Screening, IEE or EMP into the Detailed Subproject/ Activity Report.	Obtain service of an Environmental Specialist /Officer for environmental screening
Bidding and awarding contract	<p>Incorporate environmental clauses and provisions in the bidding documents</p> <p>Brief discussion on environmental requirements, aware the prospective bidders on environmental requirements</p>	<p>Reviewed by the environmental specialist/ officer</p> <p>Consultation and dissemination prior to bidding or finalizing MOU</p>
Implementation	Compliance review (six-	

	monthly), and Impact evaluation (two times – mid-term and end of project)	
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At present DHM, the project implementing agency has little capacity to address social and environmental safeguard management related to this project. In current practice social and environmental safeguard management issues are not systematically addressed as there are no human resources to address social and environmental safeguard issues at the department. DHM is not equipped with capacity due to insufficient organizational set up and lack of trained manpower in the field of environmental and social science. MOAD, another implementing agency of the project has Gender Equity and Environment Division which helps Project Management Unit (PMU) in MOAD to address social issues in the project.

Project Management Units (PMU) has been proposed at both implementing agencies (DHM and MOAD). PMU will include technical, financial, procurement, environment and social specialists as may be required..

The total estimated cost of ESMF implementation is about NPR 23.4 million (approx USD 0.26 million). The breakdown of budget is as under:

Broad Activities	Costs in 000(NRs)
Waste Management (Dry Cell Management and E-waste Management)	1025
Budget for Capacity Building and Dissemination	500
Implementation of Social Safeguard and development measures	20000
Impact Evaluation	1200
Total Budget	23400

Table of Content

Acknowledgement	ii
Executive Summary	i
List of Tables	xv
List of Figures	xvi
List of Annex	xvii
List of Abbreviations	xviii
1. Introduction	1
1.1 Background	1
1.2 Objective of the Work	2
1.3 Scope of the Work	2
1.4 Methodology Adopted	3
1.4.1 Consultation with the Project Implementing Agencies and Sampling the District	5
1.4.2 Public Consultation	6
1.4.3 Review of Documents	7
1.4.4 Analysis and Presentation of Results	8
1.5 Limitation of the Work	8
2. Project Description	9
2.1 Project Components, sub-projects and Activities	9
3. Relevant Policies and Regulatory Mechanisms	13
3.1 Background	13
3.2. Relevant Policies	13
3.2.1 Policies of Government of Nepal	13
3.2.2 Policies of the World Bank	15
3.3 International Conventions	17
3.4 Adequacy, Efficiency of Legal Provisions	19
4. Environmental and Social Issues	20
4.1 Environmental and Social Status of Nepal	20
4.2 Environmental and Social Impacts of the Project	25
4.3 Institutional Capacity Assessment	29
4.4 Public and stakeholders Feedback	31

4. 5 Gender and social inclusion considerations related to project	33
5. Environmental and Social Management Frameworks (ESMF).....	35
5.1 Salient Features.....	35
5.2 Environmental management system	35
5.2.1 Environmental and social concerns	35
5.2.2 Environmental and Social Screening.....	35
5.3 Resettlement Policy Framework (RPF).....	40
5.3.1 Land acquisition Concern.....	40
5.3.2 Policy Guiding Principles:	41
5.3.3 Resettlement Policy	41
5.3.4 Eligibility Criteria	42
5.3.5 Entitlement Matrix.....	43
5.4 Framework for Vulnerable Community Development Plan	44
5.4.1 Steps for VCDP	44
5.4.2 Capacity Building.....	44
5.4.3 Specific Measures	45
5.5 Framework for Gender Development Plan.....	46
5.6. Consultation and Dissemination Strategy Framework	48
5.7 Framework for Capacity Strengthening Plan	50
5.7.1 Objective of the Plan.....	51
5.7.2 Institutional arrangement for implementing ESMF	51
5.8 Impact Monitoring and Evaluation	54
5.9 ESMF Implementation Cost	55
Annex	I
Annex 1.1 Lists of Participants in Stakeholder Consultation	II
Annex 1.2 Checklists for the Consultation	XII
Annex 1.3 Steps Adopted in the Consultation	XIX
Annex 2.1 Subcomponents and Activities of the BCRH Project in details	XX
A brief discussions about the instrumental features.....	XXV
Annex 3.1: Policies and Framework of Government of Nepal and the World Bank's Safeguard Policies in details.....	XXX
Annex 3.2: Land Acquisition Process	XLVIII

Annex 4.1.Environmental and Social Implications Subcomponent wise LII

Annex 5.1: A brief process for EIA/IEE and some Templates..... LVI

Annex 5.3: Eligibility Criteria for Affected People..... LXII

Annex 5.4 Institutional Arrangements for Implementation of ESMF LXIII

Annex 5.5: Environmental Checklist for project's screening LXIV

List of Tables

Compensation Entitlement Matrix	vi
Table 1.1 Activities adopted in the methodology in the study.....	3
Table 1.2: Selected District for consultation.....	5
Table 2.1: Project components and their subcomponents.....	10
Table 3.1: Applicable World Bank Environment and Social Policies.....	17
Table5.1: Environmental and Social Screening Criteria	36
Table 5.2 Compensation Entitlement Matrix.....	43
Table5.3: Specific Measures for Vulnerable People	45
Table 5.4: Gender Development Plan	47
Table 5.5: Potential Stakeholders for Consultation	49
Table 5.7: Roles and Responsibilities of key players of the Project.....	53
Table 5.8: Impact Evaluation Plan.....	55
Table 5.8: Tentative Cost for implementation for ESMF of the BCRH project	55

List of Figures

<i>Figure 1.1: Map showing selected Sample Districts-----</i>	<i>6</i>
<i>Figure 5.1: Project Assessment Framework including Environmental and Social Screening-----</i>	<i>32</i>
<i>Figure 5.4: Consultation Framework for information disclosure-----</i>	<i>42</i>
<i>Figure 5.3: institutional arrangement for implementing ESMF -----</i>	<i>46</i>

List of Annex

Annex 1.2: Checklists for the Consultation

Annex 1.3 Steps Adopted in the Consultation

Annex 2.1 Details Subcomponents and Activities of the BCRH Project

Annex 2.2: A brief discussions about the instrumental features

Annex 3.1: Policies and Framework of Government of Nepal and the World Bank's Safeguard Policies in details

Annex 4.1: Subcomponent-wise Likelihood of Environmental and Social Implication of the Project

Annex 5.1: A brief process for EIA/IEE and some Templates

Annex 5.2: Land Acquisition Processes

Annex 5.3: Eligibility Criteria for Land Acquisition

Annex 5.4 Institutional Arrangements for Implementation of ESMF

Annex 5.5: Environmental Checklist for project's screening

List of Abbreviations

AWS: Automated Weather Stations
BRCRH: Building Resilience to Climate Related Hazards
CDO: Chief District Officer
CIF: Climate Investment Fund
DDC: District Development Committee
DHM: Department of Hydrology and Meteorology
DPNet Nepal: Disaster Preparedness Network Nepal
EA: Environmental Assessment
EIA: Environmental Impact Assessment
EMF: Environmental Management Framework
EMP: Environmental Management Plan
EPA: Environmental Protection Act
EPR: Environmental Protection Rules
ESMF: Environmental and Social Management Framework
EWS: Early Warning System
FGD: Focus Group Discussion
GON: Government of Nepal
HMS: Hydro meteorological services
IEE: Initial Environmental Examination
INGO: international non-government organizations
IPP: Indigenous Peoples Plan
KII: Key Informants Interview
MOAD : Ministry of Agriculture Development
MOEST: Ministry of Environment, Science and Technology
NDMF Nepal: Natural Disaster Management Forum Nepal
NEPAP: Nepal Environmental Policy and Action Plan
NGO: Non-Government Organization
NMS: National Meteorological service
NRCS : Nepal Red Cross Society
OP: Operation Policy
PMU: Program Management Unit
PPCR: Pilot Programme Climate Resilience
RADAR: Radio Detection And Ranging
RAP: Resettlement Action Plan
RF: Resettlement Framework
R &R: Resettlement and Rehabilitation
RP: Resettlement Plan
RPF : Resettlement Policy Framework
RVR: Runway visual range sensor
SMF: Social Management Framework
SOCOD Nepal: Society for Community Development
SOP: Standard Operating Procedures
SPCR: Special Program for Climate Resilience
TOR: Terms of Reference
VCDP: Vulnerable Community Development Plan

VDC: Village Development Committee
WB: World Bank
WDO: Women Development Office
WMO: World Meteorological Organization
WRS: Weather Radar System
WRS: Weather Radar System

1. Introduction

1.1 Background

The Government of Nepal (GoN) has prepared Strategic Program for Climate Resilience (SPCR), which was approved by Climate Investment Fund (CIF). Nepal's SPCR identified five areas/components for investment. The investments outlined in the SPCR are expected to help Nepal to manage many climate risks discussed in the preceding paragraphs. The areas of investment identified by SPCR are:

1. Building Climate Resilience of Watersheds in Mountain Eco-Regions,
2. Building Resilience to Climate-Related Hazards,
3. Mainstreaming Climate Change Risk Management in Development,
4. Building Climate Resilient Communities through Private Sector Participation, and
5. Enhancing Climate Resilience of Endangered Species.

The World Bank is identified for administering SPCR Component 2 i.e. Building Resilience to Climate Related Hazards. Accordingly, preparation of the project on Building Resilience to Climate Related Hazards (BRCRH) has begun with some preliminary and prerequisite activities, one of them being the study presented here.

The project aims to develop a strong capacity to monitor and forecast hydro-meteorological events and climate variability, and to deliver this information in timely and user-friendly manner to the key clients (including farmers and disaster management professionals). Activities funded through the project would help improve decision-making and planning in key climate vulnerable and water resources dependent sectors, particularly agriculture, and contribute to building resilience for communities and sectors at risk.

The need for a well-functioning early warning system has been identified as a key priority in the Government of Nepal's National Strategy for Disaster Risk Management. At present, much of Nepal's hydrological and meteorological system relies on manual data collection with infrequent and unreliable reporting. Agro-meteorological information is another urgent priority to manage and mitigate climate risk in Nepal's large and highly vulnerable agriculture sector, and to underpin the country's food security efforts. Seasonal climate predictions are currently not available in Nepal, which DHM aims to develop within the framework of this project.

The study has been carried out in accordance with the scope of work for the study on "Preparation of Environmental and Social Management Framework for Implementation of Building Resilience to Climate Related Hazards-Pilot Programme Climate Resilience (PPCR) under Environmental Impact Assessment Programme" by Nature's Conservation Pvt. Ltd., a leading National Consulting Firm working on hydro-meteorological & environmental issues and development sectors in Nepal. The agreement between the department and the Consulting Firm was held on 13th March 2012 (30 Falgun 2068 of the fiscal year 2068/069

1.2 Objective of the Work

The main objective of the consulting service is to prepare Environmental and Social Management Framework (ESMF) for the Implementation of Building Resilience to Climate Related Hazards Project (BRCRHP). Since the subprojects are known, this framework will provide guidance to prepare safeguards documents during the implementation stage.

1.3 Scope of the Work

The scope of work includes the following:

- Environmental assessment of the overall project

- Review Legislative and Regulative, policies, Considerations

- Review of Existing Environmental Management Practices

- Institutional and Capacity Assessment

- Development of Environmental Management Framework (EMF) including Institutional arrangement for implementing EMF; Capacity strengthening plan; Consultation framework;

- Carry out a rapid review of social issues involved and make broad-based social assessment of the program/project (focusing on components and likely activities listed in the pre-feasibility study), highlighting potential positive and negative impacts of the program/project.

- Review policy and acts/ regulations of Nepal and the World Bank (OP 4.10, 4.12) in order to identify applicable provisions in the proposed program/project and suggest ways to fill any gap between Nepal and World Bank requirements.

- Assess the capacity of the institutions involved in the project, including the roles and responsibilities of implementing agencies, and offer guidelines for capacity development to address any gaps.

- Analyze and assess possible conflict, political economy factors and governance risks that could potentially affect project implementation, and offer recommendations to mitigate these risks and challenges. Key issues that will be dealt with will include: assessment of the political environment; stakeholder mapping and analysis; conflict analysis; and other governance factors that could influence the operating environment for the project;

- Assess gender and social inclusion considerations related to project activities. This will include: identification of key gender and inclusion related participation issues; identification of possible roles for women and disadvantage (or vulnerable groups) in project objectives and activities; examine the differences in knowledge, attitudes, practices, roles, status, wellbeing, constraints, needs and priorities related to gender and other differences; assess the potential for

differentiated impact of project based on gender and exclusion and identify options to maximize benefits and minimize adverse effects;

Develop a communication and consultation strategy for in line with the overall communication and consultation strategy developed for the project to ensure that the project affected people as well as the vulnerable groups, including women, benefit from the effective and timely delivery of hydro-meteorological events and climate variability envisaged in the project;

Develop a Social Management Framework (SMF) for the Program/Project implementation (fulfilling requirements for Resettlement Policy Framework (RPF), Vulnerable Community Development Framework (VCDF); and Gender Development Framework)

1.4 Methodology Adopted

The Environmental and Social Management Framework has been prepared by adopting several processes: Consultation with Project Implementing Agencies; Scoping of the Project through Public consultation including the stakeholders and project affected people; and review of relevant policies, and regulations (Table 4.1).

Table 1.1 Activities adopted in the methodology in the study

SN	Activities/tools	Purposes	Outcomes
1	Interaction with the project implementing agencies	<p>To know the project details: Clarification about the project (subcomponent/activities, sites)</p> <p>To select the district for public consultation</p>	<p>Obtained key subcomponents and activities of the project;</p> <p>Discussed on the possible sites of the activities</p> <p>Assessed on possible risks factors due to the proposed activities</p> <p>Selected three districts (Bardiya-Karnali basin, Ramechhap-Koshi basin, and Lamjung-Gandaki basin)</p>
2	<p>Public Consultation at District Level</p> <p>Tools adopted in the consultation are:</p> <ul style="list-style-type: none"> Focus Group Discussions (FGDs), Key Informants Interview (KII) 	<p>Sharing BCRH project among the beneficiaries</p> <p>Identification of possible environmental and social Issues relevant to the project</p> <p>Local level stakeholder's perception about the</p>	<p>Beneficiaries/stakeholders known about the BCRH project's benefit and possible adverse impacts</p> <p>People expected their involvements in the project to get direct benefit (especially income generation) and indirect benefits (like reducing risk and sustainable development)</p>

	<ul style="list-style-type: none"> • Transect walks • Stakeholders Workshop 	<p>project.</p> <p>Identify the issues regarding existing stations network of DHM and asses about how those issues would be addressed by this project</p>	<p>DHM staffs at basin/regional and field level expected their capacity building from the project to reduce the existing problems</p> <p>Beneficiaries wanted to ensure that no adverse impacts on health due to new technology to be adopted in the project especially Radar system and also wished to know actual benefit in quantity/quality before implementation of the project</p>
3	Consultation workshop at Central level	<p>Share the project objectives;</p> <p>Discuss on the findings regarding environmental and social issues relevant with the subcomponents of the project,</p> <p>Share the environmental and social management framework of the project, and</p> <p>Gather suggestion and feedback on the framework</p>	Received valuable feedbacks on ESMF draft
4	Review relevant environmental and social regulation and guidelines of GON and World Bank (WB) safeguard policies	Know the provisions of the legitimacy to implement the project	Legal frameworks regarding Environmental and social issues are identified
5	Analysis the information and presentation of results	To know the potential risks of sub components	People perception about the project are assessed

1.4.1 Consultation with the Project Implementing Agencies and Sampling the District

1.4.1.1 Clarification about the project components, sub components and activities

The Study team had series of consultative meetings with the DHM and Ministry of Agriculture Development (MOAD), World Bank (WB) officials for the better understanding of the project. The study team also consulted the International Team of Vaisala, a Finnish Company that develops, manufactures products and services for environmental measurements including hydro-meteorological equipment. The Vaisala Company has supplied some automatic weather measuring instruments to DHM. In this regards the study team had met with the member of the company to know about the potential impacts of the key activity of the project like Automatic Weather measuring instruments.

1.4.1.2 Districts selection for public consultation

The following districts were selected in a consultative meeting held on 4th April, 2012 at Department of Hydrology and Meteorology (DHM) by considering resource and time limitations. The representatives from the department, Ministry of Agriculture Development (MoAD) and the consulting team participated in the meeting. The selected districts (Figure 1.1 and Table 1.2) are representative of both the basins as well as the entire country and cover most of the social and environmental issues of the proposed project under PPCR.

Table 1.2: Selected District for consultation

SN	Selected District	Coverage Basin	Key features
1	Lamjung	Gandaki Basin (Marsyandi Watershed)	Water Resource development, Agriculture promotion, Climatic and Hydrologic Stations
2	Ramechhap	Koshi Basin (Sunkoshi Watershed)	Potential representation for a high technology like Radar, Intersection Coverage (Dolalghat-Barhbishe-Ramechhap..) Hydrological and Meteorological Stations Networks that may represent the issues of the project Commercial representation Drought prone Upstream-downstream linkages
3	Bardiya	Karnali-Bheri River Basin	Potential for Science and Community based Early Warning system (EWS) Potential User Groups of EWS and Agriculture promotion Climate and Hydrological stations network

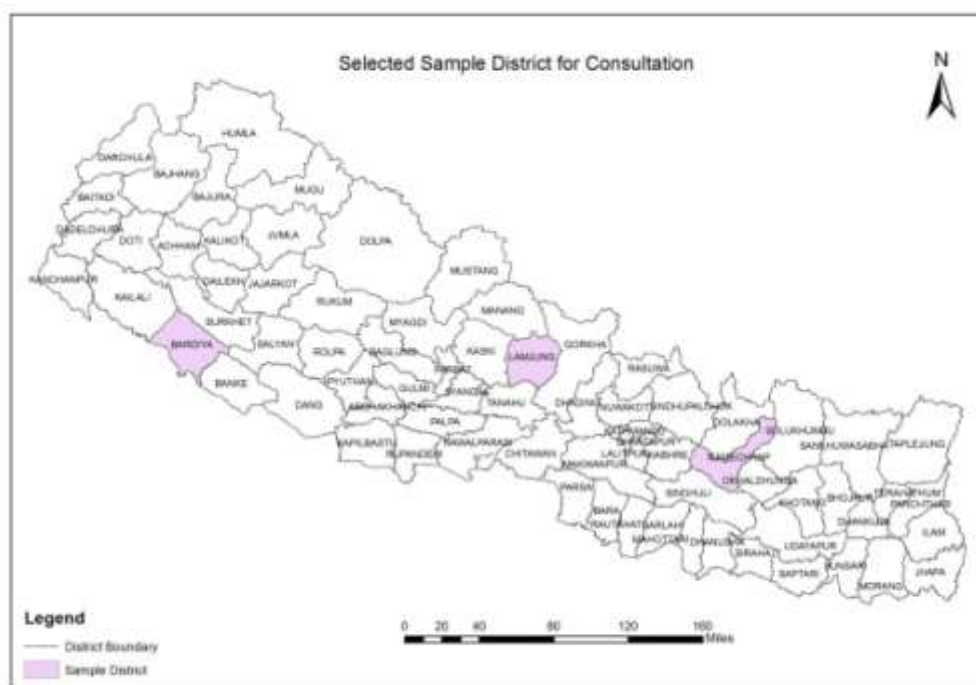


Figure 1.1: Map showing selected Sample Districts

1.4.2 Public Consultation

A) Consultation at District Level

Since DHM does not have its own at district level network, public consultations in the selected districts were coordinated with three local organizations working in the respective districts. The local organizations were identified by Natural Disaster Management Forum Nepal (NDMF Nepal), a member of national level network (Disaster Preparedness Network Nepal-DPNet Nepal). The identified local organizations were Society for Community Development (SOCOD Nepal) in Lamjung, Nepal Red Cross Society (NRCS) Bardiya District Chapter in Bardiya District and Malagiri Development Center in Ramechhap District.

The issues discussed in the public consultations and suggestions & feedback received from the participants are described in Chapter 4 in brief and in Appendix of this report in details.

1.4.2.1 Focus Group Discussion (FGD) at Community Level

The objectives of these consultations were to:

- understand the concerns of beneficiaries and primary stakeholders, including community members, indigenous groups, women, *Dalits*, the disabled, elderly, landless about environmental and social issue of upcoming project;
- dissemination of the project objectives to identify the issues and possible impacts of the activities of the project

- community's perception about the existing hydromet station Network and its services

A total of four FGDs were conducted in three sampled districts. The participants included farming community, district and community level government agencies, and station part-time DHM staff. The list of participants are listed in the report (Annex 1.1). The perception of the participants about the issues was gathered using structured and non-structured checklist for FGD (Annex 1.2).

1.4.2.2 Key Informants Interview (KII) at Individual Level

Interactions with indigenous community and vulnerable groups were carried out at the field level. This step resulted in the identification of key issues, assessment of the needs of the indigenous people and women. Separate individual interviews were carried out with vulnerable members, HMS data recorders/observers, meteorologists, hydrologists, instruments handling field based practitioners/persons, key leaders at community, farmers etc. The interactions were used to share information about the project, understand their views about the project and its potential impacts. Ideas were explored on how the project could provide assistance to targeted groups and to the local development through the planned services. Discussions were also carried out with DHM part-time observers/gauge readers to know their experiences including problems and issues regarding existing hydro meteorological monitoring networks at field level.

1.4.2.3 Stakeholder Meetings/Workshop at District Level

The district consultations workshops were carried out in Lamjung and Ramechhap. Primary and secondary stakeholders including representatives of local government bodies, non-governmental organization, media, political parties, security agencies, etc. participated in the workshop. Likewise, district level meeting chaired by Chief District Officers was conducted in Bardiya district. District level government officers including NRCS district chapter participated in the meeting. The name of participants is listed at Annex 1.1.

The steps adopted in the workshop are described in the annex (Annex 1.3).

1.4.2.4 Site observation and informal Interaction

The consultant teams visited the existing hydromet station site to assess the ground situation and community's perception about the existing stations. The consultant team with the local community also visited the possible sites of Automatic Weather and Hydrological Service Networks, and Radar system.

B) Consultation at Central Level

A stakeholder consultation discussion was carried out by conducting a workshop at central level. The purpose of this consultation was to share the project objectives; discuss on the findings regarding environmental and social issues relevant with the subcomponents of the project, share the environmental and social management framework of the project, and gather suggestion/feedback on the framework. A detailed procedures and the outcome of the workshop is described in Appendix.

1.4.3 Review of Documents

The documents reviewed and referred to include:

- Government of Nepal environmental and land acquisition legislation and operational guidelines
- Project documents related to Climate change, hydro meteorological services (HMS) social and environment sectors
- Early Warning System Guidelines, World Meteorological Organization (WMO) documents,
- World Bank Operational Policies

1.4.4 Analysis and Presentation of Results

The qualitative information gathered from the workshop through structured questionnaire was analyzed. A spreadsheet program was used for frequency count of the responses. The perceptions of the community about the project were quantified. The environmental, social, economic and agronomic issues identified are presented in Chapter 4.

1.5 Limitation of the Work

The following are the limitations of this study.

- The issues related to the project were collected in specific areas from the selected districts, which could not be generalized for the nationwide issues.
- Because of inadequate connectivity of DHM with locals, district level agencies and community's unfamiliarity with the HMS related instruments (simple and advanced equipments), community had difficulties in expressing their views about the project impacts.
- Stakeholders in the districts were also not familiar with the simple and advanced technologies like HMS networks and the equipment including the RADAR.
- Political disturbance like unexpected shutdown disturbed the field visits affecting the collection of data and information.

2. Project Description

This chapter deals with project description in terms of project subcomponents and their key activities. The detailed activities (about 60 activities) of subcomponents (about 22 subcomponents) are given in Annex 2.1. The potential environmental and social implications of subcomponents of the project are also described in details in Annex 4.1. The potential subcomponents that are concerned with environmental and social aspects are presented in this chapter.

2.1 Project Components, sub-projects and Activities

The project has been described in terms of components and potential subcomponents (Table 2.1). The project includes four components: Component A, Component B, Component C, and Component D (Table 2.1). DHM will implement the project components A, B, and C. MOAD will implement Component D. The consulting team consulted with the department to identify specific subcomponents and activities. According to DHM, specific subcomponents and detailed activities with possible locations will be identified during the project implementation phase. The potential subcomponents and possible activities under each subcomponent are identified by reviewing the project documents provided by the department. There are about 17 subcomponents including three subcomponents in Component A, five in Component B, four in Component C, and five in Component D (Table 2.1). Table 2.1 lists-out key activities concerning environmental and social sensitivity.

Table 2.1: Project components and their subcomponents

Potential Subcomponents	Key Activities Highlighting the environmental and social sensitive aspects
Components A: Institutional Strengthening, Capacity Building and Implementation Support of DHM	
Objective: to strengthen DHM's legal and regulatory frameworks, improve institutional performance as the main provider of weather, climate and hydrological information for the nation, built capacity of personnel and management, ensure operability of the future networks, and support project implementation.	
<ul style="list-style-type: none"> ➤ Institutional Strengthening ➤ DHM capacity building and training ➤ Systems design and integration, project management and monitoring 	
Component B: Modernization of the observation networks and forecasting	
Objective: The objective of the component B to modernize DHM observation networks, communication and ICT systems, improve hydrometeorological numerical prediction systems and refurbish DHM offices and facilities.	
<ul style="list-style-type: none"> ➤ Technical modernization of observation networks ➤ Modernization of DHM's communication and ICT systems ➤ Improvement of the numerical hydrometeorological prediction system ➤ Design and pilot operation of an environmental monitoring network ➤ Refurbishment / reconstruction of DHM offices and facilities 	<p>Re-equip of the hydrological stations-74 hydrological system will be automated</p> <p>Improvement of the Environment of Hydrological sites</p> <p>Installation of Weather Radar Unit/System</p> <p>Installation of Automated Weather Stations (AWS)- up to 100 Weather System (Sensor based equipments).</p> <p>Supports Computers and software (the details about the instrumental features and wastes generated are given in Annex 2.1 and in Annex 4.1).</p> <p>Small scale loss of trees, agriculture land and erosion may be possible depending on the</p>

Potential Subcomponents	Key Activities Highlighting the environmental and social sensitive aspects
	<p>location of a station and gauge-house. Battery, thermometer, barometer and similar devices may generate hazardous wastes as well as e-wastes.</p> <p>The proposed reconstruction of DHM offices may need to be subjected to IEE as per Nepal's legislation.</p>
Component C.: Enhancement of the Service Delivery System of DHM	
<p>Objective: The objective of this component is to enhance the service delivery system by creating a public weather service that provides weather and impact forecasts, and information services for vulnerable communities and the key weather dependent sectors of economy.</p>	
<ul style="list-style-type: none"> ➤ Introduction of a Public Weather Service (DRM, agriculture, media, civil aviation, health, energy, water resources, irrigation) ➤ ➤ Strengthening of DRM operations including piloting of —end-to-endll early warning systems in two river basins in the western and eastern parts of Nepal ➤ ➤ Improvement of service delivery ➤ ➤ Establishment of the National Climate Service ➤ 	<p>Communicates weather information and warnings to the general public. It requires sensitization and but does not requires any instruments.</p>
Component D: DHM climate and weather information for users in agriculture – Agriculture Management Information System	
<p>Objective: The objective of this component is to provide critical and timely agro-climate and weather information to farmers in order to increase productivity and reduce losses from meteorological and hydrological hazards.</p>	

Potential Subcomponents	Key Activities Highlighting the environmental and social sensitive aspects
<ul style="list-style-type: none"> ➤ Agricultural Management Information System – Portal, hardware and software ➤ ➤ Information Products ➤ ➤ Information Dissemination ➤ ➤ Capacity building ➤ Project management, social and communication, monitoring and evaluation of Component D ➤ ➤ 	<p>Community Empowerment activities on climate change and information dissemination</p>

The detailed activities of each subcomponent will be defined and identified during the implementation period. There are about 60 activities in the project (Annex 4.1). The social and environmental issues related to key subcomponents of the project are listed in Chapter4. The location, budget scale, and the possible products of the activities will be defined during implementation as per the requirements and priorities of DHM and MoAD.

3. Relevant Policies and Regulatory Mechanisms

This chapter deals with regulatory, legislation and policy and practices of Government of Nepal (GON) and World Bank. (WB) This chapter also focuses on the policy gaps between GON and WB.

3.1 Background

In the context of the project 'Building Resilience to Climate Related Hazards (BRCRH) -under PPCR' implementation, Government of Nepal's policies, acts and regulations were reviewed. Similarly the review process included the World Bank's Environmental and Social Safeguard Policies. Attempts have been made to assess the relevance, adequacy and effectiveness of the current policies and regulatory provisions. Attempts have also been made to identify measures to improve the effectiveness of these provisions with regard to environmental and social aspects.

There are a several laws related to environment and social issues. The issues are directly and indirectly concerned with disaster management, application of hydro-meteorological services, and agriculture information management. In addition, some of the sectoral laws address some environmental and social issues. The details of the reviewed policies and regulatory mechanisms are attached in Annex 3.1.

3.2. Relevant Policies

Of these policies highlighted in Annex 3.1, the policies relevant with the project are briefly explained below.

3.2.1 Policies of Government of Nepal

Environment Protection Act and Regulations 1997 have made IEE and EIA mandatory for the development projects. The list of development projects requiring IEE or EIA are given in the regulations. The provided list indicates that the regulations are applicable for BRCRH project.

Forest Act 1993 and Regulation 1995 are applicable for the project if subcomponents require forest lands. The regulation stipulates that the project is responsible to pay the compensation if it causes loss or harm to any local individual or community. Similarly, the entire expenses required for the cutting and transporting the vegetation products in a forest area used by the project shall be borne by the operators of the project⁶.

The National Parks and Wildlife Conservation Act 1973 highlights the prohibited activities in a project area. Activities are not allowed in protected areas (National Park, Conservation Area, Wildlife Reserve, Hunting Reserve, Strict Nature Reserve and Buffer zones) without a written permission from the authorized officials. In this regards, it is advisable to avoid such areas while developing a plan to implement the subcomponents of the project. The **rule (Conservation Area Management Rule 1996)** helps in screening the subcomponents of the project by assessing negative listings.

Solid Waste Management and Resource Mobilization act 1987 with amendment in 1992 describes the procedures for disposing solid waste. The act categorizes harmful hazardous wastes and provides

⁶ http://www.forestrynepal.org/images/Forest_Act_of_Nepal_1993.pdf

information on several controlling measure. There is provision to appoint inspection officer for checking and monitoring solid waste control and management. The inspector has authority to take action against the polluter or polluting agency. Disposal of battery and electronic goods can be carried out on the basis this act but it does not provide specific guideline for the disposal of such wastes. Auctions are the procedure usually followed to dispose these wastes. The amendment of this act in 2011 is under the process of endorsement.

National Agriculture policy 2004 gives special priority to the development of the pockets of high-value agricultural products. The local bodies have the rights and responsibilities for the formulation, implementation, monitoring and evaluation of agricultural plans in their respective areas. On the basis of this policy, farmers' groups receive on-site extension services. Resource centers are developed and strengthened for producing local seeds, seedlings, plants and improved breeds. The proposed project can play an important role in strengthening the centers by capacity building in the application of climate information into agriculture practices.

Information and Communication Policy, 2059 (BS) has developed long-term policies on information and communication sectors. The project can benefit from these policies as media can be mobilized in sharing the subcomponents and its outcomes to the concerned stakeholders. Private and government related mobile companies can be supportive as well as beneficiaries from this project through this policy.

Climate Change Policy GoN, 2001 addresses the issues of climate adaption and disaster risk reduction. Fforecasting water-induced disasters and reducing created from climate change and providing early warning information for disaster management are some of the key points of the policy. The policy provides some guidelines to address the issues of vulnerable communities in the context of reducing their risk to climate related disasters.

Land Acquisition Act, 1977, Land Acquisition Regulations, 1969 amended in 1992 empowers the government to acquire land for development purposes by paying compensation to the landowner. The land acquisition for subcomponents of this project can be acquired by means of these regulations.

Local Self Governance Act, 1999 provides more autonomy to District Development Committees (DDC), Municipalities and Village Development Committees. According to the act, DDC has authority to coordinate for screening and assessment of the subcomponents.

The Interim Constitution of Nepal 2007: The Interim Constitution of Nepal (2007) includes provisions that support gender equality and social inclusion. It has a separate article for women's fundamental rights (Article 20) and is inclusive toward Janajatis, Dalits, and Madhesis.

3.2.2 Policies of the World Bank

World Bank's policy on Environmental Assessment (EA) states that all projects proposed for World Bank's financing require an EA and Social Assessment (SA) to ensure that they are environmentally and socially sound and contribute to sustainable poverty reduction. Various instruments are used to perform EA depending on complexities of a project. They include Environmental Impact Assessment (EIA), environmental audit, hazard or risk assessment and Environmental Action Plan (EAP). The World Bank's environmental and social safeguard policies are the cornerstones of its support to sustainable poverty reduction. The objective of these policies is to prevent and mitigate undue harm to people and their environment in the development process. These policies provide guidelines for the bank and borrowers staffs in identification, preparation and implementation of programs and projects.

The World Bank's environmental assessment policy along with recommended processing is described in Operational Policies (OPs). There are (10 + 1) WB safeguard policies comprising a) Environmental Policies including OP 4.01 Environmental Assessment, OP 4.04 Natural Habitats, OP 4.09 Pest Management, OP 4.36 Forestry and OP 4.37 Safety of Dams b) Social Policies including: OP 4.11 Physical Cultural Resources, OP 4.12 Involuntary Resettlement, and OP 4.10 Indigenous Peoples c) Legal Policies including OP 7.60 Disputed Areas, and OP 7.50 International Waterways and d) Bank Disclosure Policy (Bank Procedure 17.50).

Of these policies, the policies relevant to BRCRH project are briefly described below.

Environmental Assessment (OP/BP 4.01) is conducted to ensure that Bank-financed projects are environmentally sound and sustainable, and that decision-making is improved through appropriate analysis of actions and of their likely environmental impacts. This policy is applicable for this project because some key activities especially installation of Hydrological and Meteorological stations and WRS may cause environmental adverse impacts.

This policy is applicable for screening the subcomponents of the project and for evaluating project's potential environmental risks and impacts in its areas of influence. It also helps to examine project alternatives; identify ways of improving project selection, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts enhancing positive impacts; and includes the process of mitigating and managing adverse environmental impacts throughout the period of project implementation.

Forestry (OP/BP 4.36) aims to reduce deforestation, enhance the environmental contribution of forested areas, promote afforestation, reduce poverty and encourage economic development. It is relevant to subcomponents which may be implemented in government or community forest areas. According to this policy, the Bank does not finance projects that, in its opinion, would involve significant conversion or degradation of critical forest areas or related critical natural habitats. Some of the existing hydrological and meteorological stations lie in forest areas. This safeguard policy will help to reduce forest losses and deforestation when the stations to be upgraded in the forest region.

Natural Habitats (OP/BP 4.04) directs to support natural habitats while the subcomponents of the project are implemented in national parks and protected lands. This policy affirms WB's commitment to promote and support natural habitat conservation with improved land use and the protection/rehabilitation of natural habitats. In the context of BRCRH project natural habitats may comprise of many types of terrestrial and freshwater ecosystems. They may include areas lightly modified by human activities, but retaining their ecological functions and native species. WB does not support projects that involve significant conversion or degradation of critical natural habitats. Some of the existing hydrological in the protected regions forest areas. This safeguard policy will help to promote natural habitat conservation when the stations to be upgraded in the forest region.

Involuntary Resettlement (OP/BP 4.12) policy is to avoid or minimize involuntary resettlement where feasible, exploring all viable alternative project designs; assist displaced persons in improving their living standards, income earning capacity, and production level, or at least, in restoring them; encourage community participation in planning and implementing resettlement; and provide assistance to affected people regardless of the legality of land tenure. The policy provides guidelines for mitigating the adverse effects of development projects including social and environmental impacts such as land acquisition, relocation, loss of occupations and income sources, productive assets as well as community resources. As highlighted in the project description, some key activities of this project may require private lands. Thus this policy is applicable when private lands are used to implement the subcomponents of the project.

Physical Cultural Resources (OP/BP 4.11) policy is to assist in preserving Physical Cultural Resources (PCR) and in avoiding their destruction or damage. PCR includes resources of archeological, paleontological, historical, architectural, religious (including graveyards and burial sites), aesthetic value. Cultural resources are important as sources of valuable historical and scientific information, as assets for economic and social development, and as integral parts of a people's cultural identity and practices. The loss of such resources is irreversible, but fortunately, it is often avoidable. This policy may govern while implementing the VRCRH project at some locations which requires special attention while selecting sites. Since the site for installing WRS has not been identified, this safeguard policy helps in guiding to select the sites in cultural resources areas.

Indigenous People (OP/BP 4.10) Policy is to: (i) ensure that indigenous people affected by World Bank funded projects have a voice in project design and implementation; (ii) ensure that adverse impacts on Indigenous Peoples are avoided, minimized or mitigated; and (iii) ensure that benefits intended for indigenous peoples are culturally appropriate. This policy underscores the need for Borrowers and Bank staff to identify indigenous peoples, consult with them, ensure that they participate in, and benefit from Bank-funded operations in a culturally appropriate way - and that adverse impacts on them are avoided, or where not feasible, minimized or mitigated. This policy is applicable for several subcomponents which need to be implemented in areas where there are significant presences of indigenous people/vulnerable present. The discussions are summarized in the following table (Table 3.1).

Table 3.1: Applicable World Bank Environment and Social Policies

World Bank Policy	Applicable due to	Addressed in ESMF
Environmental Assessment (OP/BP 4.01)	Project is likely to have impact on both social and natural environments	Preparation of detailed environmental management framework address the environmental and social issues
Natural Habitats (OP/BP 4.04)	Some activities will include national parks and/or protected forests and surrounding locations	Preparation of an environmental management plan to address impacts on biodiversity (flora and fauna)
Forestry (OP/BP 4.36)	Project will involve limited clearance of some government, community of private forest areas	Preparation of an environmental management plan to address impacts if any on forest areas
Involuntary Resettlement (OP/BP 4.12)	Project may require agencies/privates land	Preparation of a Framework for appropriate compensation or Resettlement Action Policy/Plan
Physical Cultural Resources (OP/BP 4.11)	Project may locate in culturally significant areas, since; the site for WRS is not fixed.	Avoid such areas or minimize the impacts as much as possible
Indigenous People (OP/BP 4.10) & Gender and Development (OP/BP 4.20)	Project may be implemented in areas where there are indigenous/ethnic people present	Preparation of Vulnerable Communities Development Framework

3.3 International Conventions

Government of Nepal has signed a few international conventions that are relevant to the project. Brief discussions about the conventions are given below.

United Nations Convention on Biological Diversity⁷

Nepal is a signatory to this convention that came into force in Nepal as of 21 February, 1994. To implement this commitment, Nepal is making efforts to develop national plan for biodiversity conservation and management, to identify and monitor biodiversity and establish a network of protected areas. Nepal is also attempting to include biodiversity as an essential component in environmental impact assessments.

The convention calls for the adoption of national strategies, plans, and programmes for the conservation and sustainable use of biological diversity into their relevant sectoral plans.

Agenda 21

Nepal is implementing “Agenda 21”, a non-binding international statement of goals and principles. It asks countries to promote activities that are well supported in Nepal, such as alleviation of poverty, improved land use, conservation of biodiversity, public participation, empowerment of women, respect of indigenous cultures, working with NGOs, development of human resources, etc

Ramsar Convention on Wetlands

On the basis of this convention, The Nepal Environmental Policy and Action Plan (NEPAP) 1993 have given high priority to identification and protection of marshes, wetlands and water bodies which are significantly rich in biodiversity. This plan has also recommended a study to assess the biological diversity of endemic plants and animals, both terrestrial and aquatic that occurs outside protected areas on farmlands, pastures, rangelands, forests, rivers, lakes and ponds. NEPAP is an effective initiative for the protection of wetlands and has provided a good policy foundation for development of the National Biodiversity Action Plan (NBAP)

United Nation Framework Convention on Climate Change (UNFCCC)

UNFCCC provides the basis for global action" to protect the climate system for present and future generations". This convention deals with reduction of greenhouse gases and other emissions.

Likewise the government as a member organization of WMO and ICAO has adopted the international guidelines relevant to the Project.

ICAO Annex 3-Meteorological Services for International Air Navigation

ICAO guides the provisions for meteorological observation, meteorological forecasts, meteorological warnings to pilots, aviation meteorological reports, and dissemination of meteorological Information. In order to make effective services regarding meteorological information, Civil Aviation Authority of Nepal (CAAN) coordinates with National Meteorological service (NMS)-DHM.

⁷ <http://www.fao.org/docrep/007/ae154e/AE154E08.htm#TopOfPage>

World Meteorological Organization Guidance, 2008

WMO provides guidelines for establishing a hydrometric or meteorological station. According to the guidance, the recommended land area required for AWS is 25 m x 25 m. A series of automated sensors are sited at the recommended positions and interconnected to one or more data collection units using interfaces. About 12 V Battery is required to power an AWS. Approximately 170 batteries need to be required. The life-time of each battery is about 1.5-2 years. Selecting an appropriate site for the weather station is critical for obtaining accurate and representative meteorological data. Typically a site should represent the general area of interest, and be away from obstructions such as buildings and trees.

Basel Convention, 1989

Basel Convention on the control of trans-boundary movements of Hazardous Waste and their disposal was adopted in 1989. The convention came into force in 1992 and 170 parties have been in this convention in 2008. The objectives of this convention are:

- to minimize quantity and hazard of wastes generated
- to endure environmentally sound management and adequate disposal facilities
- to dispose of wastes as close as possible to their point of generation
- to reduce trans-boundary movements
- to prohibit exports from developed to developing countries
- to provide support to Member States

3.4 Adequacy, Efficiency of Legal Provisions

The relevant policies of GON, WB and International Conventions discussed above are fairly adequate to deal with the possible issues of environmental and social concerns related to BRGRH project and its subcomponents.

4. Environmental and Social Issues

This chapter deals with an overview of environmental and social issues assessment related to project components/subcomponents. The assessment includes environmental and social implication due to the project components, current situation related to the project implementation including political risk, conflicts, institutional capacity, public concerns, and gender and social inclusions.

4.1 Environmental and Social Status of Nepal

Climate and Hydrology

Climate of Nepal is dominantly influenced by the South Asian monsoons. Average annual precipitation in Nepal is 1760 mm, 80 % rainfall occurs in monsoon (June to September). The winter precipitation is due to moisture coming from the Mediterranean Sea, and its intensity reduces to the east. Most parts of the country have an average annual rainfall of 1,500mm to 2,500mm, the maximum being about 4,500mm in Pokhara. A combination of sharp relief and fast-moving monsoon clouds bring frequent hailstorms and cloudbursts; the latter trigger numerous landslides, landslide dams and debris flow. Landslide dam outburst floods may sometimes cause extensive damage in downstream areas. Rainfall intensity exceeding 100mm/24 hours are frequent in many parts of Nepal.

Annual mean temperature of Nepal is around 15⁰ C. The winter season is the coldest, whereas the highest temperature occurs during the pre-monsoon period. Summer and late spring temperature maxima range from about 28° Celsius in the Hills to more than 40°C in the Terai. In winter, average maximum and minimum temperatures in the Terai range from a brisk 7°C to a mild 23°C. Much colder temperatures prevail at higher elevations. The Kathmandu Valley, at an average altitude of 1,310m, has a mild climate with temperature ranging generally from 19° to 27°C in summer and from 2° to 20°C in winter with occasional temperatures below freezing point in winter.

Around 6,000 rivers and rivulets including permanent and seasonal rivers, streams, and creeks, from Nepal ultimately become major tributaries of the Ganges River in northern India. After plunging through deep gorges, these rivers deposit heavy sediments and debris on the plains, nurturing and renewing their alluvial soil fertility. Once they reach the Tarai Region, they often overflow their banks onto wide floodplains during the monsoon, shifting course periodically. The rivers are deeply-incised across the east-west structural grain of Nepal and the Himalaya, having eroded with the up-liftment of the mountains.

Most of the major rivers in Nepal originate in the Himalayas with some having their origin in the Tibetan plateau. Glaciers are the sources of the big rivers of Nepal. In general, the river systems have a north-south direction of flows. The Koshi River, the Gandaki River and the Karnali River are the most prominent among the rivers in Nepal.

The priority risks due to climate risks and vulnerabilities in Nepal are: Quantity and quality of water, Food Security, Ecosystem health and Human health⁸. Government of Nepal emphasizes some adaptation programmes and policies in order to adapt climate change impacts: formulation of Renewable Energy Perspective Plan, National Adaptation of Action (NAPA), Local Adaptation Programme of Action (LAPA), Nepal Biodiversity Strategy, Climate change policy, Water and sanitation policy and strategy.

Forest, Biodiversity and National protected area

Nepal is divided into three ecological regions: High Mountains (35 % of total area), the Middle Mountains (42% of total area), and the Churiya and Terai (23 % of total area). The climatic condition of the country varies from alpine to subtropical conditions within a lateral span of less than 200 km. Within the same span, altitudinal variation is observed from about 60 meter in the South and 8848 m in the North.

A study shows the change (given below) in forest area per 100 ha in region between 1994 and 2000⁹.

Region	Forest Area in 1994 (ha)	Forest Area in 2000 (ha)
Mountain	2.3	22.8
Hill	39.68	50.3
Terai	35.17	36.4

On an average, forest land has decreased at an annual rate of 1.7 %. The forest area in Nepal was last reported at 25.36% in 2010 (World Bank, 2011).¹⁰ Soil erosion and flooding are the major causes of land degradation in the country. Nepal ranks at 25th position in terms of biodiversity with 11 bio-climatic zones, 118 ecosystems and 35 natural forests¹¹. Sixteen protected areas including national parks (9), conservation area (3), wildlife reserves (3), and a hunting reserve (1) and six buffer zones have been established for the protection of flora and fauna (Figure 4.1). The protected areas make up about 17% of the country's total area. Of these, the Sagarmatha National Park and the Royal Chitawan National Park have been included in the World Heritage List; and the Koshi Tappu Wildlife Reserve, Bishajari Tal (Chitawan), Jagdishpur Jalasha Reservoir (Kapilbastu), and Ghodaghodi Tal (Kailali) have been designated as Ramsar sites in the country.

⁸ Nepal: Strategic Program for Climate Resilience, 2011.

⁹ Environment Assessment of Nepal: Emerging issues and Challenges

¹⁰ <http://www.tradingeconomics.com/nepal/forest-area-percent-of-land-area-wb-data.html>

¹¹ Stainton, JD (1972). Forest of Nepal, John Murry, London

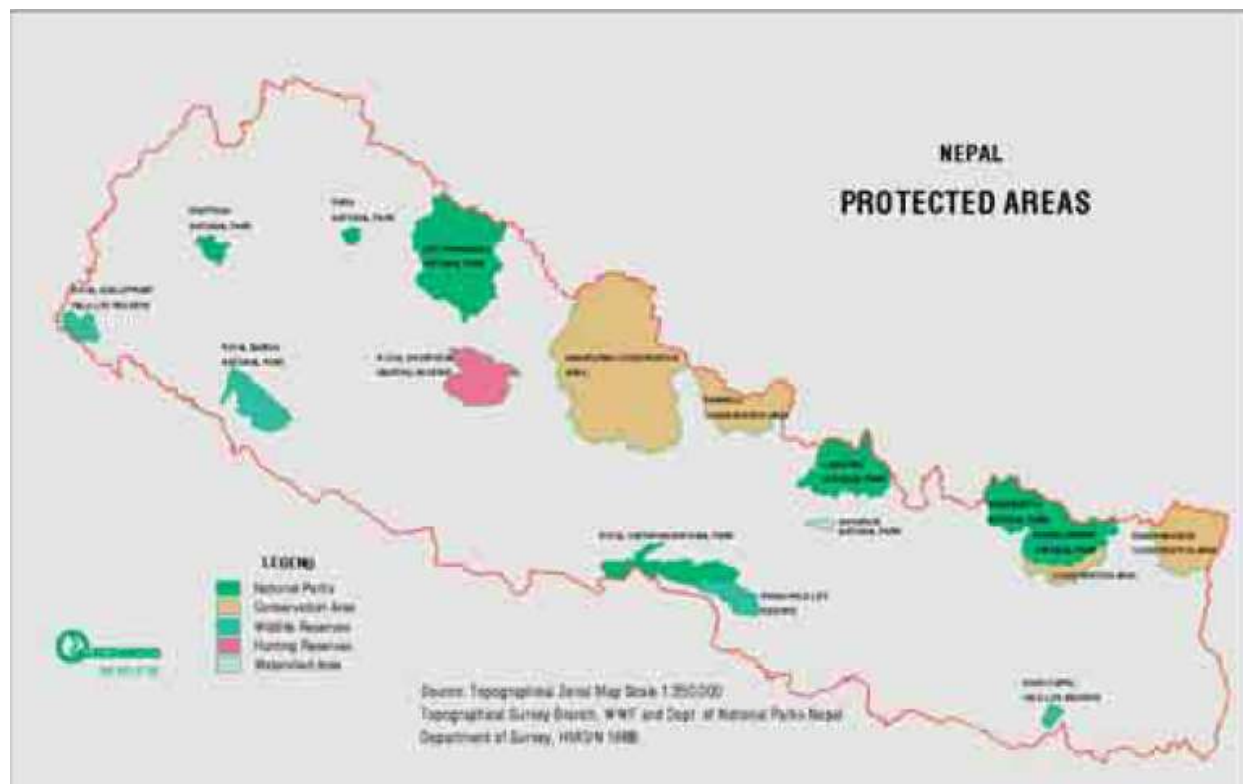


Figure 4.1: Protected Areas in Nepal

(Adopted from Environment Assessment of Nepal: Emerging issues and Challenges)¹²

Agriculture area damage

About 76 % the population depends on agriculture. Agriculture land increased from 24 % in 1986 to 28 % in 2000 at national level in the country. By region, agriculture land decreased from 33 % in 1986 to 28 % in 2000 in the Hill region which could be due to natural calamities. Agriculture land increased from 5% in 1986 to 10 % in 2000 in Mountain region and also increased from 42 % in 1986 to 56 % in 2000 in Terai region which could be due to population growth and very limited opportunity in non-farm activities. The cultivated lands have been distributed into: 52% in Terai, 40 % in Hill and 8% in Mountain. With 65% of cultivated land in the slopes of hills and mountains where loss of fertile topsoils due to erosion is common. Loss of topsoil due to erosion, pollutants, improper use of pesticides and insecticides, and deforestation are leading factors of declining soil fertility in the country.

Solid Waste and health impacts

Management of hazardous wastes is one of immense concerns in Nepal. Batteries, waste matter, electronic wastes are some of sources of hazardous wastes. Users and the concerned agencies usually collect the wastes. A proper disposal of collected wastes is generally very poor in the country. Lack of proper resources including means of recycling, infrastructures, equipment is a common problem faced by the concerned agencies in managing solid waste. Haphazard solid waste collection and not handled properly in recycling process and disposal system causes significant adverse impacts on public health

¹² http://books.icimod.org/uploads/tmp/icimod-environment_assessment_of_nepal.pdf

and the environment, contamination of surface water, ground water and soils as well. In the absence of proper landfill sites, the collected waste is directly dumped in rivers or forest and agriculture areas. There are no separate arrangements for managing hazardous waste.

Some efforts have been made to address hazardous waste management. For example, Solid Waste Management and Resource Mobilization Act, 1987 (being amended) describes that solid waste cannot be emitted, thrown, stored or disposed in any place other than place designated by the Solid Waste Management and Resource Mobilization Center. Likewise, a study had estimated the scrap battery to be 20-30 metric tons for the year 1998 and projected such battery scrap to 110-190 metric tons for 2008¹³. In addition, Nepal has been a party of Basel Convention on the Control of Trans-boundary Movement of Hazardous wastes and their disposal.

Socio-economic Profile

The Preliminary Results of National Population Census 2011 of the country estimates a total population of 26.7 million. Female population is estimated at 13.69 million while the male population stands at 12.92 million that is 48.56 percent males against 51.44 percent females. 1.8 million Population lives in mountain, 11.5 million in hills and 13.4 million in Tarai. The population increased by 14.99 percent in the past decade with an average annual growth rate of 1.40 percent. Multiethnic and multilingual country with as many as 102 ethnic groups and 92 languages is in the country.

The country's current poverty level is 25.4 per cent, suggesting that it has been reduced by 5.5 percentage points since 2005. The 2008-2009 assessment of variation in poverty incidence geographically and socially remains much the same as 2005 reporting period. The 2009 assessment indicates that 95.5 per cent of poor people live in rural areas and the incidence of poverty in rural areas (28.5 per cent) is almost four times higher than that in urban areas (7.6 per cent). Furthermore poverty reduction rate in rural areas (18 per cent) is slower than that in urban areas (20 per cent). Remittances are one of the main contributors to poverty reduction.

According to the Global Human Development Report 2009, Nepal has the lowest GDP per capita among all South Asian countries (UNDP 2009). It also ranks below most of her neighbors in the Human Development Index (HDI) ladder. The GDP per capita for Nepal in 2010 was about \$ 1300¹⁴. The slow pace of economic growth in Nepal is also reflected in its GDP growth rates over recent years. Human settlement is sparse in the Himalayan region due to harsh environmental conditions, the mountain regions is the traditionally populated zones of the country. The Terai region, due to its comparative advantage in transportation and agriculture resources, has led to the higher population growth than in other regions. The economy remains heavily dependent on agriculture as approximately 66 percent of the national population is engaged in agriculture. In terms of output, however, only 36 per cent of the nation's GDP is accounted for by this sector.

¹³ DANIDA/COWI, 2003 Study on Environmentally benign Handling, disposal and recycling of used lead-acid batteries in Nepal

¹⁴ http://www.theodora.com/wfbcurrent/nepal/nepal_economy.html

The land holding is a significant imbalance in land distribution according to the national survey in 2001/02. Only 5 % of the population hold 27 % of lands of size 3 ha or more. About 51 % of the population confined 59% of land of size 0.5-3 ha. Likewise, about 44 % of the people hold 14 % of land of size less or equal to 0.5 ha.

Gender Issues

Net Primary Enrollment in schools has increased from 81 percent in 2002 to 94.5 percent in 2010. Gender and social parity have been achieved in primary education. The Gender Parity Index for secondary school net enrollment has also increased from 0.87 (2007) to 0.98 (2010). Quota-system brought in over 33 percent of women in the Constituent Assembly. However, women's low status in the control of resources and political decision making remains, as does high incidence of violence against women (including early marriage and sex selective abortions).

The maternal mortality rate declined from 538 in 1996 to 380 per 100,000 live births, earning Nepal the MDG Millennium Award in 2010. The Infant Mortality Rate dropped from 79 in 1996 to 39 in 2010. At least one-third of deliveries are now in the presence of trained health workers. Full immunization coverage rose from 43 percent in 1996 to 87 percent in 2011.

The mortality rate among children under five years has been halved during the past 10 years which could be due to well-coordinated scale up of highly effective child survival interventions, such as vitamin A distribution, immunization and pneumonia treatment. The largest challenge today is addressing mortality among newborns, now accounting for 54 percent of all deaths among under-five children.

Gender disparities in political participation are decreasing both in elected and administrative government. Women now make up over 30 percent of the representatives in parliament. Implementation of an inclusion policy of women in the civil service shows positive trends.

Although the legal age of marriage is 20 for both male and female, it is hardly implemented in Nepal. According to Muluki Ain marriage chapter, the legal age for marriage is 20 for both male and female 2010 or 18 where the marriage is solemnized with the consent of guardians.

About 55 per cent women aged 25-49 were married by the age of 18 in 2011, according to Nepal Demographic Health Survey (NDHS). Likewise, 18 per cent of women aged 25-49 years in Nepal are married by the age of 15. Women in Nepal get married at a fairly young age — the median age of marriage for women aged 25-49 in 2011 was 17.5 years. Only 19 per cent of men in the same age group are married by 18 years of age and the median age at first marriage for men aged 25-49 is 21.6, four years later than women, NDHS reported. As per the survey, only two per cent of Nepali women aged 25-49 years had given birth by the age of 15, while 23 per cent gave their first birth by the age of 18.

Poverty Alleviation Programms

The 10th Plan followed by the second three year Interim Plan (2010-12), the government has given priority to poverty alleviation. In this regards, some key programs such as Social mobilization and

empowerment, Income generation through micro-enterprise promotion, Community infrastructure, and Capacity building and human resources development have been emphasized to reduce poverty through Poverty Alleviation Fund (PAF) in Nepal¹⁵. PAF seeks to contribute directly to achieve the national objectives: to attain the level of poverty to 10 percent in 20 years in pursuant with the long term goal of Nepal Government; and to reduce poverty by half by the year 2015 as per the millennium development goals.

4.2 Environmental and Social Impacts of the Project

The project would support a wide range of activities. Most of the activities which are based on the production of HMS services are unlikely to have environmental and social implications. However, there are possibilities of a few likelihood adverse environmental and social impacts due to particular activities like: installation of instruments for automatic weather system, Weather Radar System (WRS), by products of equipments system, and Capacity building trainings, etc. Potential subcomponents which could have some adverse environmental and social impacts are summarized below. Subcomponent-wise likelihood implications are listed in Annex 4.1.

Adverse Impacts

There are few subcomponents of the project causing likelihood adverse impacts on society and environment.

Subcomponent 1: Technical Modernization of the Observing networks and Modernization of DHM communication and ICT system

Environmental Impacts:

- Vegetation removal: impacts due to forest clearance/ trees/plants removal if a station is located in a forest area . Land needs to be cleared up to 5m x 5m for Gauge House, 8m x 8 m for Cable House and 25m X 25m lands for Automated Weather Station in ideal condition. According to this, approximately the total lands to be required as: 0.45 ha lands (for hydrological stations), and 6 ha lands (for meteorological stations) in ideal condition. The existing stations are not defined clearly in terms of locations, lands. The precise scale of impact in each case will be assessed during the implementation of the subcomponents, and an appropriate mitigations, where necessary, will be implemented.
- Hazardous and e-wastes: Dry-cell battery is the most commonly used power supply system to operate hydrological and meteorological sensor in automated operation mode. Such batteries are likely to affect human health and environment if they are not disposed properly¹⁶. The devices such as batteries, thermometer, barometer, electronics etc are sources of hazardous and e-wastes. They may be containing mercury, lead, cadmium, nickel, acid, zinc, lithium, etc. Leaching of these chemicals into soil or water or into air affect the environment, wildlife and human health, or the staff/workers may come in direct contact with them.

¹⁵ <http://www.pafnepal.org.np/uploads/document/file/Annual-Report-2009-2010.pdf>

¹⁶ Hostetler MA. Gastrointestinal disorders. In: Marx JA, ed. *Rosen's Emergency Medicine: Concepts and Clinical Practice*. 7th ed. Philadelphia, Pa: Mosby Elsevier; 2009:chap 170

- Damage to agriculture: Limited damage to agriculture fields with regular mobility of office staff observers and gauge readers in and around the stations. The impacts may also extend to limited pollution of water sources (this impact may possible if office staff regularly moved to sites)
- Denudation at the hill top: Since radar will be installed with construction work on the hill top which are usually covered by forest, the loss of trees and plants may extend to about 60-100 square meters.

Social adverse Impacts:

- Disturbances in agriculture lands: Although limited in extent impacts are expected on private and public lands, structures, standing crops and community infrastructures when AHS and AMS installed.
- Employment loss: Likely to lose the job opportunities by a gauge reader observer if the location of a hydrological or a meteorological station is changed to a better location during the upgrading of a station. The changed location may not be suitable for continuation by the employed person.
- Limited job opportunities to the weaker class: Less chances of job opportunities for unskilled worker, women and the member of marginalized communities as they have usually weaker awareness and poorer access to the development activities.
- Gender imbalance: Women are likely to be discouraged by their families particularly in hydrometric work as the sites may be located in difficult conditions and that the work may become more challenging during high flood conditions.
- Electrical and electronic pollution: Adverse impacts due to waste electrical, electronic (e-waste), and metallic equipment. Improper disposal of such wastes is the usual practice in Nepal, which may cause health hazards and pollution problems.
- Radiation hazards: Although no significant adverse impacts on health have been reported during operation of WR¹⁷, WHO highlights that the Radio Frequencies between 300 MHz and 15 GHz may interact differently with human body¹⁸.
- Education and awareness: During our field visits, people have expressed concerns about the possible long-term adverse effects of WRS on health including cancer, reproductive malfunction, and changes in behavior or development of children.

Subcomponent 2: Enhancement of Hydro meteorological Forecasting System

Environmental Impacts:

Most of the environmental impacts described in the subcomponent 1 are valid for this component as well.

¹⁷ http://www.wrh.noaa.gov/wrh/washington_coast_doppler_radar/_Final_EA_Exec_Summary.pdf

¹⁸ <http://www.who.int/peh-emf/publications/facts/fs226/en/index.html>

Additional factor is the extra consideration of environmental pollution that results from the added electrical, electronic goods, solar panels (life time 20-25 years) and battery recharging systems (life time 1.5 years).

Social Impacts:

Likelihood of adverse impacts due to waste electrical, electronic and metallic equipments, unavailability of facilities for processing such wastes may cause health hazards and pollution problems.

Subcomponent 3: Introduction of Public Weather Service (DRM, agriculture, media, civil aviation, health, energy, water resources etc)

Environmental Impacts:

Dissemination of information will have no noticeable environmental consequences. It means, no any environmental adverse impacts of dissemination.

Social Impacts:

- False alarms: Dissemination of wrong information and false alarms by mistake or by poor estimations may cause unnecessary havoc among public and concerned agencies.
- Misinterpretation: inadequate training and limited level of awareness may lead to the misinterpretation of the available information and warnings that may lead to wrong actions with more damages.

Subcomponent 4: Developing an Agriculture Insurance Scheme Program and Raising climate resilient agriculture science, practices and applications of agriculture management information system

Social Impacts:

- Crop failure: failure of crop if the agrj-advisory is not implemented with right plans and procedures or the advisory is not properly disseminated or misunderstood because of poor trainings. Marginalized people could be more affected in such situation as the level of awareness is less compared to more advantaged groups.
- System failure: In case of high dependence of the farmers on the advisory system, they may face setbacks in case of the failure of the system in delivering proper advisories in time or in case of the failure of telecommunication systems and networks.
- Disagreement in mobile distribution: Distribution of mobile sets is limited that may cause disagreement among farmers.

Beneficial Impacts

Subcomponent 1: Technical Modernization of the Observing networks and Modernization of DHM communication and ICT system

Social Impacts

- Employment opportunities: Increased opportunities will be available for the locals to obtain additional employment as about five to ten labors will be engaged during construction phase of AWS and AHS for three days to a fortnight. According to the subcomponent of the project, about 175 stations (100 AMS and 75 AHS) will be installed during the project. It indicates that almost about 87,500 labor (man days) will be engaged for short term work.
- Training opportunities: Locals may obtain training opportunities in the field of the operation of stations, equipment, automation, station maintenance, telecommunication systems, hydrology and meteorology,
- Capacity building: Build the coping capacity of concerned individuals, communities and agencies by receiving reliable hydro-meteorological information and early warnings about the likely floods and other water-induced disasters. Such information provide them opportunities to get prepared for mitigation measures.
- Improved adaptive measures: With the flows of appropriate information and trainings, people will be prepared for better measures for climate change and disasters. Improved productivity: Farmers would be benefited with better and more reliable information, which may lead to better productivity.
- Improved assessments: reliable and timely availability of data and information can improved the understanding of science and impacts for the individuals and agencies concerned about the processes.
- Additional support for marginalized people. Since the migration of women and marginalized groups are limited in relatively remote locations which are the preferred sites for hydro-meteorological installations, these groups are likely to be more beneficiaries of the project activities.

Beneficial Environmental Impacts:

- Improved mitigation measures: Enhanced opportunities as a result of improved data quality and better dissemination system are likely to assist in developing effective strategies for mitigating environmental degradations and for developing appropriate adaptation measures.
- Promote scientific understandings: Availability of reliable data and information and improved access to such data will provide platform for scientific communities for research and developments leading to better scientific understanding of the environmental processes. Such developments are the keys to the success of environmental management.

Subcomponent 2: Enhancement of Hydro meteorological Forecasting System and Installation of Modern computer processing and display system

- Improved skills: Technical staff will have better skills for monitoring environment in more reliable manner. Increased awareness: increased level of awareness among different stakeholders will help to interact with the environment in a environment friendly approach.
- Utilization of local resources: Application of available human and natural resources will be beneficial for upgrading the capacity of environmental management at local level.

- Favorable working environment: Technical staff will have more favorable working environment with better equipment and enhanced communication with the headquarters and regional or basin office.
- Informed decision: Beneficial for the general public to know the information about the weather conditions and possible threats of the weather while managing their daily life with compatible and environmentally friendly approaches.

Subcomponents: Developing an Agriculture Insurance Scheme Program and Raising climate resilient agriculture science, practices and applications of agriculture management information system

- Improved lifestyle: Improved weather and climatic information may enhance the agriculture productivity and food security bringing changes in the lifestyle of the farmers leading to better awareness and education, which will ultimately help for environment friendly sustainable development
 - External support: Introduction of insurance schemes will bring insurance related agencies into the picture working with farmers jointly for better management skills for reducing risks, which will contribute to the management of environment as well.
- Technical knowhow: About 1300 farmers will get and mobile sets that assist them to develop their capacity to use agriculture information system by using mobile system

Potential Impact on River Water

The project will support technical modernization of existing hydrological stations for river flow measurement in Nepal's river across the country. The type of activities includes improving the flow conditions around the flow measurement stations, river bank stabilization for protecting the hydrological station, and installing flow measuring equipments. Construction of new hydrological stations is not envisaged. The activities envisaged also include stable access to natural river flow at the point of water flow measurement, stabilization or reinforcement of few meters a river bank at some hydrological sites, construction of steeling wells on the river banks and other small scale improvements. These activities will be very limited in scale. During construction of the mentioned civil works river water turbidity around the sites may slightly increase. However, this effect is minor and localized which is unlikely to be noticeable beyond immediate constriction sites. There will be no water withdrawal. Hence, the project activities will not lead to any noticeable river flow disturbance or water quality deterioration beyond immediate site of hydrological station.

4.3 Institutional Capacity Assessment

The Department of Hydrology and Meteorology (DHM) under the Ministry of Environment, Science and Technology (MoEST) is the principle institution responsible for providing hydrological and meteorological services in the country. At present, the department has four divisions such as

Hydrological Division, Meteorological Division, Weather Forecasting Division, and Meteorological Network Division. Each of these divisions is supervised by a Joint Secretary-level staff. The department has a total strength of 233 staff. At regional level, the department has three basins offices in three major river basins (Koshi, Narayani, and Karnali) responsible for monitoring hydrological system. Likewise, for monitoring meteorological system, the department has three Meteorological Regional Offices: Eastern Climate Regional Office, Western Climate Regional Office, and Mid & Far Western Climate Regional Office.

Human Resource capacity to seek out environmental and social concerns

Snow, Glacier, Water Quality & Environment Section under Hydrological Division is responsible for monitoring snow, glacier, water quality, and environmental issues. A total of nine staff including six officer classes are working for the section. Although the section has some capacity to monitor snow and water quality aspects, it has insufficient strength to address environmental issues related to this project. Although the department provides regular trainings on hydrological and meteorological monitoring system but it hardly provides trainings on environmental management. Likewise, the department has no human resources to address social issues. Key limitations in the department to address overall environmental and social issues are: limited resources (technical and finance), and lack of experts to address social issues. Technical experts from social and environmental specialist will be appointed in PMU as needed, for full time in the initial phase of implementation which may be made intermittent at later stage. PMU is responsible to address ESMF issues.

Environmental and social issues can be addressed in the department by employing environmental and social scientists. Staff training on environmental issues must be included at different levels on regular basis.

Currently, DHM has inadequate official networks at district level. As a result, coordination with the concerned stakeholders at community levels is insufficient to address social and environmental issues locally. Coordination and communication framework (see chapter five) will help to link with the stakeholders at local level. Once the department has adequate resources with a concrete plan, it can work with local governments to reduce environmental risks.

Institutional relationship of MoAD is well established at central, district, and community and farmers levels. However, there is significant gap in resources including technical skill, communication means, etc particularly at local levels. Efforts are necessary to build capacity of Agriculture and Livestock Service Centers in managing environmental issues.

Governance and Grievance

As stated in the project description, potential adverse impacts of the project are not significant in general. There is less chance of dissatisfactions among the impacted population regarding the implementation of the project. During the field visits, people, in particular raised the issues related to possible opportunities and the added benefits at local level. Such concerns are likely to appear as

grievances during the project implementation phase. Satisfactory strategy should be developed beforehand to address such concerns while developing project implementation plan. The project should, hence, develop a mechanism that ensures to address such issues. Grievance redress mechanisms are institutions, instruments, methods and processes by which a resolution to a grievance is sought and provided¹⁹. The project will have a complaint system that allows stakeholders/affected people to raise issues or complaints through District Administration Office (DAO)/Chief District Officer (CDO) at district level. PMU will coordinate with CDO by to address the complaints. Where isolated vulnerable people are concerned, PMU/DHM will ensure to address their issues in culturally appropriate ways in close coordination with the relaxant group.

External Relations and Partnership

DHM has been developing public relations especially with the key stakeholders including government and non-government agencies. The media and public relations with the department depend on its services available to the partners. In addition to the partnership of the department, it has a very good understanding of the needs of partners. In this regards, the department needs to work on the partner's needs base. The department should have a coordination section and partnership policies to address social and environmental issues during the project implementation and post-project period.

Sustainability

Sustainability of the project depends on institutional and financial issues. Financial constraints are the limitations on improving institutional and project implementation/monitoring capacities. Likewise, political instability and uncertainties of the institutional policies are likely to have adverse impacts on the project. The project implementing agencies should have ability to develop a diversified funding base capable of sustaining its programmes over the long-term period. In addition to financial issues, the department should have a service delivery strategy to address sectoral areas: hydropower, DRR, tourism, agriculture, irrigation, drinking water, energy etc. The department can develop fundraising or cost recovery strategies providing its services to different sectors except in humanitarian response.

Political Risk

Since the government is in power transformation stage through federal system, many stakeholders except significant benefits (political and economic benefits) from the project. In this situation, both ministries (MOAD and MOEST) need to have institutional guideline to address stakeholders concerns and social issues in changing political environment.

4.4 Public and stakeholders Feedback

As discussed in the methodology section, the stakeholders' consultations were carried out at central and district levels. The district level consultations were carried out in Lamjung, Bardiya and Ramechhap whereas central level consultation was held in Kathmandu. The objectives of the consultation were to: disclose the project objectives and discuss its possible social and environmental implication. In addition, the interactions were useful to discuss the project components with the beneficiary communities and seek their views and perceptions. Discussion about the project with the vulnerable groups present in the

¹⁹ <http://www.adb.org/Document/SPF/Consolidated-Final-Report-05182009>

communities. The discussion was also fruitful to review current procedures and mechanisms for voluntary land donation for station establishment.

Primary stakeholders in the interaction programme included beneficiaries, farmers, disaster managers, DHM's hydromet data observers/recorders, women, DHM's Basin and Regional offices, staffs, key informants of District Disaster Relief Committee (DDRC) and Agriculture and Livestock Service Centers, etc. Likewise, secondary stakeholders included NGOs, CBOs, Media, Political Parties, community representatives, and other GoN's district and regional offices. The details about the outputs of public consultation are given in the proceeding report (Appendix of this report).

The issues raised in the consultations are summarized below.

Land Acquisition

Currently, the observatory stations are sitting both in public (Government) and private lands. Land encroachment towards observatory station is a key issue when the land is not properly secured. The fencing around observatory station is not sufficient to ensure its security. Private lands for the observation stations are obtained from land owners on voluntary basis. Since insignificantly small area (mentioned in section 4.2) for the enhancement and upgrading of existing station, availability of voluntarily available private lands is likely to be a sensitive issue.

Suggestion made available by the stakeholders included:

a) The observatory station should be in government's owned lands by ensuring security of the station from human and natural risks; and b) Government should purchase private land to install/enhance hydrological and meteorological stations.

Vegetation, Biodiversity and Natural Habitats

Observatory lands are required is small in sizes (less than 0.1 ha in idle condition). Notwithstanding likelihood of vegetation clearance to install AHS and AMS can be significant as the project activities involve several stations. Stakeholders advocating conservation issues highlighted that the installation of stations should avoid forest as much as possible. Special efforts are necessary for assessing the sites, locations, types of vegetations, sensitivity of natural habitats, flora and fauna.

Human Health and Waste Management

The stakeholders discussed on the possible health impacts due to the subcomponents of the project during implementation and operation. Although there were not many issues regarding the adverse impacts of automatic weather and hydrological systems, people were particularly concerned on the possible adverse impact of Radar System and its radiation field on health including cancer, reproductive malfunction, and changes in behavior or development of children.

It is important to distinguish between perceived and real danger that radar pose, as well as to understand the rationale behind existing international standards and protective measures. Safety analysis needs to be carried out during feasibility study of radar.

Electronic wastes, battery used for power supply and other devices in operating automatic stations may cause problems in a long run if they are not scientifically managed. In this regards, management plan at project level with a proper mitigation measures need to be developed during the project implementation. Special attentions needs to be given in managing and dealing with the hazardous and e-wastes that might be generated from the batteries, thermometer, barometers, and other devices and may contain mercury, lead, cadmium, nickel, acid etc. Project will give preference to devices that are non-hazardous or the least hazardous (such as mercury or lead free etc) if available. The project, early in the first year of implementation, will prepare and issue a hazardous waste and e-waste management protocol/guidelines/ procedure for use in the project. A general checklist and the formats for EMP are given in Annex 2.1 and Annex 5.1 as a reference.

Income Generation

Local people were particularly interested to know about the possibility of income generation from the project. Local human resources needed to be involved in the project during implementation of subcomponents and also during operation period to the possible extent.

Likewise, the existing resource persons, such as observers and gauge readers, raised an issues about the security of their employment in the scenario of automation. The stakeholders suggested that both the manual and automatic systems should be operated for the consistency of data and information.

Gender Inclusion and Participation of Vulnerable Groups

Stakeholders raised the issues of the inclusion of women and vulnerable groups in the project. Participation of vulnerable community need was one of the major highlighted issues during district consultations. Stakeholders highlighted the needs of changing the prevailing situation of minimum employment opportunities provided to women and vulnerable groups with higher domination of elite classes.

4. 5 Gender and social inclusion considerations related to project

Based on the public discussion, field visit and social implication of the project, the issues about the social inclusions are listed as:

- likely low level of involvement of women and socially vulnerable groups in project activities
- Low level of participation in decision-making
- Less access to benefits of project activities
- Less involvement of women in hydrological project activities due to challenging nature of work for women
- Discrimination in project related employment opportunities as stereotypical roles confine women to the household activities

Possible roles for women and disadvantage (or vulnerable) groups in project activities;

- Management of hydrological and meteorological stations
- Active role in protection of stations
- Role in information dissemination
- Organizing different meetings related to project activities
- Local governance

Knowledge gaps to gender and other differences

- Low level of technical knowledge and awareness level among women and vulnerable groups
- Women's limited access to education and skill and other trainings
- Women are less likely to involve in project activities due to their confine role in different household activities

Possible options to maximize benefits and minimize adverse effects

- Encourage representation of women and other vulnerable groups in meetings
- Encourage participation in project activities
- Provide Priority to women and other vulnerable groups in different opportunities

5. Environmental and Social Management Frameworks (ESMF)

5.1 Salient Features

It is essential that the potential environment and social concerns of the proposed project activities are thoroughly assessed in planning phase and design phases during which appropriate measures can be considered for the project implementation.

ESMF has been developed as a decision making tool to ensure that the project activities selected and implemented under project are socially responsive and environmentally sound. This framework will serve as a tool to guide the project implementers to select the optimal project intervention required to address social and environmental concerns, prepare mitigation plan, and to ensure complete integration of social and environmental concerns and mitigation measure in the design of the project activities.

ESMF recognizes the need for an early environmental and social assessment, during preplanning stage of activities at the field level to identify any adverse impact which helps to plan mitigation measures and help in mainstreaming this aspect throughout the implementation phase. ESMF has been prepared fully by considering the WB safeguard policy and GON regulatory/policy requirements. This framework includes environmental and social screening of the subcomponents; Resettlement Policy Framework (RPF); framework for vulnerable community development; consultation dissemination framework;; institutional arrangement and capacity building framework; and framework for monitoring and mitigation of adverse impacts.

5.2 Environmental management system

The Environmental Management System (EMS) establishes the criteria to identify the level of processes involved in environmental assessment, their sequence to conduct the studies for various components/phases of BCRH project including their legal requirements and implications. Once the need/justification of a subproject/activity is finalized, the process of EMS starts with environmental and social screening processes.

5.2.1 Environmental and social concerns

The environmental and social impacts identified (given in Chapter four) at this stage are preliminary and generic in nature. It must be further elaborated with higher level of specificity ascertaining the scale of impacts during the implementation stages of subcomponents and activities. The potential impacts are identified during various stages of the activities depending on location, design, construction and operation as their potential nature, extent, duration and severity differs because of the difference in locations, nature of subcomponents and stages. Having categorized the stage-wise potential impacts specific to a subcomponent/subproject/activity, they are further elaborated in the appropriate stage of the project.

5.2.2 Environmental and Social Screening

It will be ensured that the project design and implementation of the proposed subcomponents or activities are socially responsive and environmentally sound. While currently, project components and their sub components and individual activities are identified, precise identification of their

locations/areas will be finalized during project implementation. Most of the adverse social and environmental impacts of the BRCRH project are site specific. Environmental and social impacts of each subcomponent/subproject of the project will vary in their extent, magnitude and duration as per the nature and scale of the subcomponents and location chosen.

5.2.2.1 Screening criteria

In general, the environmental and social screening process identifies what levels of environmental and social assessment are required for the subcomponents. The purpose of the screening is to get relevant concerns addressed at an early stage. It ensures proper designs with adequate considerations mitigate environmental and social impacts. Furthermore, it enhances opportunities for proper budgeting.

The participation and consultation with beneficiaries/local communities and stakeholders are important in identifying the potential impacts of the interventions. The criteria (Table 5.1) are developed on the basis of the threshold values highlighted in safeguard policies of WB and environmental policies of GoN's; which are: (i) degree of impacts on the livelihood systems (ii) loss of common property resources affecting their livelihood systems (iii) subcomponents affecting landlessness, shelter, unemployment, marginalization and food security (iv) activities that require relocation of households, acquisition of lands and other properties (v) subcomponents that promote or involve child labor and (vi) subcomponent that is likely to make adverse impact on indigenous people, women and vulnerable groups including Dalits (occupational groups), (iv) potential risks to natural habitats and forests, (v) pollution risks including land, water and air, (vi) human health and occupational safety, (vi) land slope stability, and (vii) built artifact or heritage .

Each subcomponent of the project will go through environmental and social screening in order to identify relevant environmental and social concerns. The screenings are also helpful to suggest if any further investigation and assessment is necessary. Once the subcomponents are screened against all these criteria they will be categorized as indicated in the Table 5.1 and as per the nature and magnitude of impacts. An environmental checklist for screening is given in Annex 5.5. Category A is high risk activity, which are either not-allowed or discouraged as explained in Table 5.1. Subproject or activities in the following locations are ineligible for support under the project.

Located in core protected area (national park, conservation area, wildlife reserve, Ramsar site, etc), World heritage sites, and conflicted/ disputed territory.

Table 5.1: Environmental and Social Screening Criteria

Category	Screening Criteria
Category A (if High)	On environmental consideration, site involving physical activities in bio-diversity rich area, protected area buffer zone, migratory species route of movement or seasonal habitat, zone of high risks of landslide/erosion, high flood risk spots and

Category	Screening Criteria
	heritage sites are high risk. Similarly from social consideration, project sites included project activities resulting in loss of common property resources affecting livelihood system of local people; and major land acquisition and relocation of local people. An EIA is carried out for this type of activities as per GON EPA/ EPR 1997.
Category B (If medium)	Subcomponent's activities don't result in land acquisition or involuntary resettlement or both. If any intervention is required for the proposed reclamation /restoration, an assessment of impacts and preparation of mitigation plan. Limited environmental impact is possible. This will require carrying out an Initial Environmental Examination (IEE) as per GON EPA/ EPR 1997.
Category C (If Low)	Subcomponents intervention which is likely to have no or minimal adverse environmental and social impacts. This will not require Environmental Assessment beyond environmental screening. Vulnerable section of the projects area, such as schedule castes, women, landless and other poor individuals and families should receive special consideration during project implementation. Environmental and social monitoring mechanisms have to be developed for this purpose.

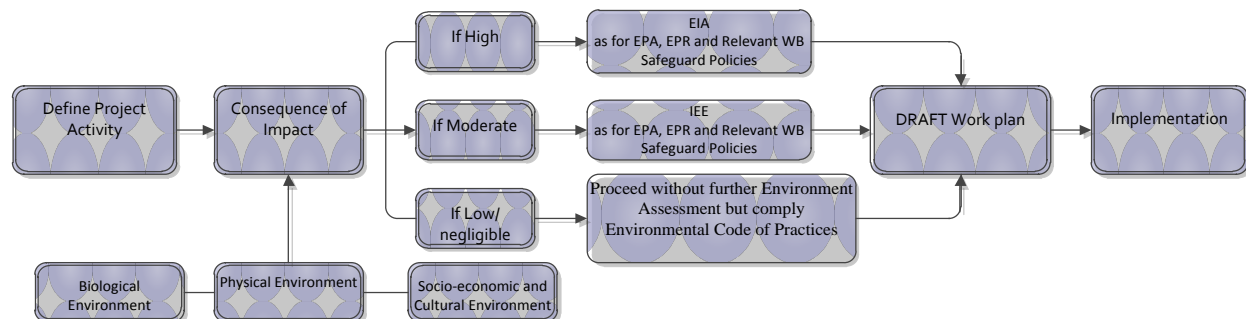


Figure 5.1: Project Assessment Framework including Environmental and Social Screening

For Categories A and Category B subproject/ activity, detailed designs will be modified taking the IEE or EIA recommendations in order to lower adverse impacts

Some subcomponents or activities of the BCRH project may include installation and enhancement of Hydro meteorological stations in National Conservation Areas by taking a written permission from the authorized officials as per the National Parks and Wildlife Conservation Act 1973 and Conservation Area Management Rule 1996.

5.2.2.2 Screening Process

At the time of implementation, the subcomponents need to be screened before carrying an impact assessment. PMU of the project will take responsibility for screening the subcomponents and preparing

the screening report. Project Screening Committee (PSC) will approve the screening report but MOEST is responsible to approve the report if EIA and IEE required for any activities.

The screening process intends to:

- Determine potential impacts of selected subcomponents as to whether they are likely to cause negative environmental and social impacts, identify the types and classify in terms of Categories;
- Determine appropriate mitigation measures for activities causing adverse impacts;
- Incorporate mitigation measures into project designs before implementation;

Screening Steps: Screening of Project subcomponents/Activities and Sites and assigning subcomponent Category

- Identification of subcomponents/activities implementation site/location
- Check if the activity / location eligible – reject subproject/ activity if ineligible
- If eligible, identify physical environment of the sites: steep slopes (as per WMO requirements for installing AHS and AMS), degradation, susceptible or non-susceptible to frequent flooding/landslides, heritage sites; assess size of the project's activities: area, lengths of path to reach to site from the nearest motarable road,
- Identification of Major interventions with environmental and social concerns of implementing activities and their assessments
- Identification of relevant features of sties: settlement area, farmers status, cultural/religious observations in the sites, social characteristics (indigenous community, women, vulnerable groups, marginalized group,
- Identify potential risks and judge their significances
- Assign category (Category A or Category B or Category C)

5.2.3 Environmental Assessment and Monitoring

There is no need for further assessment when activities/subcomponents fall in Category C, but it requires a simple environmental management plan including mitigation measures and monitoring system.

Category A and category B subproject/ activity will have to be assessed for their potential adverse impacts and mitigation measures developed and an EIA or an IEE will have to be carried out. This will require field work. PMU will commission an EIA or IEE (a brief process for the assessment is given in Annex 5.1).

Consultation and Dissemination._When the sites of subcomponent's activities with their possible environmental and social issues are exactly defined, stakeholder consultation will be carried out at policy and implementing level following transparency principles

Follow-up-Environmental Monitoring

Follow-up will be done to confirm the effectiveness and relevance of the implementation of the proposed mitigation measures. Monitoring will be carried out in accordance with the Environmental Management Plan (EMP) in specific activities such as installation of WRS. The EMP will be prepared for each subcomponent by PMU including the monitoring indicators for the subcomponents.

Project will also carry out six-monthly environmental compliance review through project's environmental specialist or independent consultant.

A linkage between project and environmental steps is shown in table below

Project and Environmental steps

Project's step	Environmental step	Remarks
Define project activity of each subcomponent with location, possible impacts, and further consideration (pre-feasibility and/or feasibility study of the project's subcomponent)	Collection of information regarding environments with field investigation Environmental Screening is done and Category of the subproject/ activity assigned prior to pre-feasibility study. Environmental screening to determine Category, and level of Environmental Assessment beyond screening (if needed).	PMU is responsible for the work. Environmental situation of the project site/risk to the project and from the project with possible mitigation measures need to be described in the feasibility report. Obtain service of an Environmental Specialist /Officer for environmental screening
Selection of pre-feasibility study report for detailed study (if required)	Terms of Reference is prepared for IEE or EIA if required (for Category A and Category B). Commission IEE or EIA if required prior to finalization of feasibility study, and prepare Environmental Management Plan (EMP). Incorporate recommendations	Identify mitigations and/or prepare EM for Category C activity. IEE or EIA Terms of Reference and Report will be approved by the ministry (MoEST). Mitigation measures and monitoring system need to be defined. PMU is responsible for the work and submission the report.

	into detailed design, costing, specifications, as well as into bidding documents	
Approval of the report by PSC	Review incorporation of recommendations from Screening, IEE or EMP into the Detailed Subproject/ Activity Report.	Environmental Specialist /Officer for environmental screening
Bidding and awarding contract	Incorporate environmental clauses and provisions in the bidding documents. Brief discussion on environmental requirements, aware the prospective bidders on the environmental requirements.	Reviewed by the environmental specialist/ officer Consultation and dissemination prior to bidding or finalizing MOU
Implementation	Compliance check (six-monthly), and Impact evaluation (two times – mid-term and end of project)	

5.3 Resettlement Policy Framework (RPF)

5.3.1 Land acquisition Concern

The project's activities are primarily based on upgrading existing stations. According to DHM, about 60 meteorological stations are in public (government) land and 40 stations in private lands. Likewise, hydrological gauging stations are in government land. The required lands are in the range of 25 m X 25 m in idle case and 10m X 8m in other case for upgrading the stations. Weather Radar System (WRS) may need about 100 m² for installation. The lands for WRS will be purchased if it is feasible in private land.

The statements below is removed from wb but need to discuss

The cost for the installation will be estimated during feasibility study.

For the land acquisition, land acquisition policy and guideline need to be adopted if the department requires private land to install such types of instruments. The department will assess the details about identification of the location, types of lands (public/government and private) priority and determination of the size of lands to be acquired. In most cases land will be taken on lease as is in the existing cases.

As per the World Bank policy, a resettlement policy framework has been developed in an attempt to minimize and / or mitigate potential adverse social impacts. The framework has defined groups of potentially affected people with varied eligibility groups such as Project Affected People (PAP), Project Affected Families (PAFs), Significantly Project Affected Families (SPAfFs), Marginal Farmers (FMs), Displaced Families (DFs), squatters, encroachers, and other vulnerable groups. Based on the eligibility criteria and type of losses, the affected families or people will be provided compensation as well as resettlement and rehabilitation assistances. An entitlement policy matrix to this effect has been developed as safeguard measures to mitigate the losses by types of categories of affected people viz owners, tenants, encroachers, squatters' communities etc.

5.3.2 Policy Guiding Principles:

According to the Bank policy on involuntary land acquisition, the guiding principles recognizes lost assets or income as fundamental right of all project affected persons and that physically displaced people must be relocated with basic amenities like school, health posts etc. Likewise all affected persons or entrepreneur or institution should be assisted to restore at least their pre -project income and livelihood status. Absence of legal title to land should not be a bar for compensation, resettlement, and rehabilitation assistance. Vulnerable groups such as indigenous people, Dalits, women-headed households, and senior citizens should be entitled to special benefit packages in addition to compensation and resettlement. It is recommended to avoid or minimize involuntary resettlement wherever feasible, exploring all potential alternative arrangements.

5.3.3 Resettlement Policy

The guiding resettlement policies and strategies for the project (for specific project activities as per requirements) are as follows:

- Wherever possible, the sub components will consider the sites that avoid land acquisition and minimize adverse social impacts.
- The resettlement plan should ensure that all PAPs should be able to maintain and if possible even improve their living.
- Develop a mechanism to protect indigenous peoples, socially depressed and economically vulnerable people like ethnic minorities, women-headed households, and marginal farmers.
- The affected people should be entitled for compensation for their lost assets. They should be paid a replacement cost as agreed between PAF and subproject authorities. In general, the compensation rate would be based on valuation of the district land acquisition committee and/or negotiations reached between the parties and witnessed by a third party. VDC officials or

District Agriculture Office/DDC can be requested to assume the role of witness as a third party. Compensation for loss of perennial crops and trees should be calculated as annual net product value multiplied by number of years for new crop to start producing, Land acquisition process (see Annex 5.2) could be followed to ensure the replacement value for the land

- Ensure resettlement activities as a participatory process by informed participation and frequent consultation with the SPAP. Provide assistance to SPAP regardless of their ownership as title holders or non holders. Likewise, assist the displaced people to restore their livelihood and income generating activities.
- If possible, provide “land for land” particularly to the vulnerable groups. Similarly the relocation should be as close to the previous land/house as possible.
- The agreement should ensure that ownership of the compensated land and property is transferred to the community or the subprojects beneficiary.
- The Resettlement Plan Framework shall be implemented in consultation with and in participation of the affected people. Subproject structures will only start when full compensation to SPAP for their assets is paid.
- If affected land is under tenancy, both the landowners and tenants will be treated as affected people and will be eligible for entitlements and compensation. Rehabilitation measures for restoration of the livelihood of SPAPs will be devised under the subproject implementation plan.
- The affected people will get priority in employment during project construction works and other project activities.
- Project Resettlement Plan will be translated into Nepali and made available at the local level for reference. It can be accessed by anybody of the community as and when needed.
- A Subproject Implementation Plan (SIP) must include all the cost of resettlement and other social development activities. Likewise annual allocation, if required, is to be included in the yearly budget of the subproject.
- Functional mechanism will have to be established for seeking and resolving the objections of the affected people.

5.3.4 Eligibility Criteria

The detailed eligibility criteria of affected people is given in Annex 5.3. The following groups of people, who have their own lands, are entitled to compensation and assistance under some of the subcomponent's activities (installation of AMS/AHS/WRS).

Marginal Farmer: Farm families having less than 0.1 ha of land in hills and 0.25 ha in the Terai.

Displaced family: Any tenure holder and his family members, tenant, Government lessee or owner of property, encroacher or squatter on government land who on account of involuntary acquisition or taking of the land or other property for the project purpose, has been displaced from such land or property.

Squatters: People who have occupied land violating the laws and are not entitled to compensation for lost land under this policy. But, if displaced they are entitled to resettlement assistance as well as compensation for loss of other assets, such as buildings excluding land.

Encroachers: People who have trespassed into public/private/community land to which they are not authorized.

Vulnerable Groups: Distinct groups of socially distressed people who might suffer disproportionately from the effects of resettlement. These groups can be ethnic minority/ indigenous groups, women headed households, the poor (based on the poverty line), the disabled, elderly and landless/ families.

5.3.5 Entitlement Matrix

The entitlement matrix describes entitlement of affected households for their loss of land and assets on land and the responsible organisation for the management of compensation scheme (Table 5.2). PMU/DHM will carry out land compensation works during implementation of the project by adopting the entitlement matrix. The costs for the compensation will be estimated by PMU in a close coordination with CDC during the implementation period. PMU will be responsible to proceed entitlement activities.

Table 5.2 Compensation Entitlement Matrix

Loss Category	Entitlement Unit	Description of Entitlement
Loss of Trees and Crop	Landowner	<ul style="list-style-type: none"> At least three months advance notice for crop harvest In absence of advance notice, cash compensation based on annual value of the produce and calculated according to the Department of Agriculture norms (crop compensation) Cash compensation based on annual value of the produce and calculated according to the Department of Forestry (for trees compensation)
Land given on voluntary basis	Registered Owner	<ul style="list-style-type: none"> Onetime payment as grant equivalent to one year of minimum agriculture wages Employment as part time operator to one member of the household preferably to the woman of the house
Loss of agriculture land, if any	Registered owner	<ul style="list-style-type: none"> Cash compensation at replacement cost Any transfer costs, registration fees or charges Compensation for crops and trees if any Subsistence allowance equivalent to one year of minimum agriculture wages
Loss of agriculture land, if any	Non titleholder	<ul style="list-style-type: none"> Compensation for crops and trees if any Subsistence allowance equivalent to six months of minimum agriculture wages for loss of livelihood
Loss of House or other property	Property owner (title holder)	<ul style="list-style-type: none"> Compensation at replacement cost or as settled by users' organization and PAP or committee under District Administration Office. Shifting allowance of NPR 5000 as one time grant.

Loss Category	Entitlement Unit	Description of Entitlement
		<ul style="list-style-type: none"> Resettlement assistance of NPR 50000
Loss of house or other property	Encroachers / squatters	<ul style="list-style-type: none"> Compensation for the structure build on government land at replacement value One time grant of NPR 5000 as shifting allowance. Resettlement assistance of NPR 50000
Loss of Income or source of income	Eligible household	<ul style="list-style-type: none"> Subsistence allowance equivalent to one year of minimum agriculture wages

5.4 Framework for Vulnerable Community Development Plan

Indigenous ethnic group (listed by GoN), women, disabled people, Dalits are groups in vulnerable community. In accordance with the World Bank's Operational on Indigenous Peoples and relevant GoN policies a framework for Vulnerable Communities Development Plan (VCDP) has been prepared to define the policy and implementation framework. It addresses the impacts on vulnerable peoples ensuring meaningful consultations with these people during the implementation of the project activities. A common approach providing a minimal welfare safety net for vulnerable people in the project has been planned. Stakeholders' consultations and *social screening during the feasibility stage* of each subcomponent will identify the presence of vulnerable groups in project's activity areas.

5.4.1 Steps for VCDP

The steps to be followed for VCDP are as follows:

- Screening to identify whether Indigenous / vulnerable Peoples are present or have collective attachment to, the project area
- Social assessment and analysis by social development professional in collaboration with PMU at DHM need to be carried out to address the social concerns of the subcomponent area
- Identifying views of the affected communities by following a process of free, prior, and informed consultation at each stage of the project, and particularly during project preparation
- Institutional arrangements (including capacity building wherever necessary) for screening project-supported activities, evaluating their effects on Indigenous Peoples, preparing IPPs (if required), and addressing grievances
- The preparation of Plan
- Monitoring and reporting including the establishment of mechanisms and benchmarks appropriate to the project and
- Disclosure of the draft Plan

5.4.2 Capacity Building

- Provide an action plan to address the capacity enhancement needs of vulnerable groups including indigenous and Dalit community and ensure that they will be able to know real time information of climate related hazards and adopt mitigation measures.
- DHM and District Agriculture Office (line agencies of MOAD) will be involved in mobilizing the indigenous people for group formation and strengthening through training. Likewise capable

members of local ethnic groups, including women will be engaged by the concerned agencies of PMU/DHM to undertake information dissemination works, preparing the beneficiary groups for project activities and contributory works.

- Development of beneficiary groups during the subcomponent implementation will include social mobilization and information campaign, and skills upgrading.
- Representation of the vulnerable groups and their active involvement in project activities during and post implementation phases will increase their access to the services to be provided by the project. These groups will also have sufficient opportunities for gaining skills and getting other benefits of the project, such as income generation, developing capacity for disaster mitigation etc.
- Involvement of local media will uplift the advocacy organization at local level to promote project benefit on more sustainable manner. It will act as useful tool particularly in the field of DRR and the application of climate information in sectoral developments.
- Mitigation measures will prioritize while addressing the susceptibility of diverse vulnerable groups including ethnic groups.
- PMU will be actively involved in disseminating information on to the target groups beneficiaries about the key project components, subcomponents, activities, eligibility and selection criteria, stakeholder involvement, contribution of the project and project implementation process. Professional support will be provided to PMU through DHM, MoAD and NARC.

5.4.3 Specific Measures

Specific measures for vulnerable groups including indigenous peoples, Dalits, minor ethnic communities, women, and powerless communities are outlined in Table 5.3. Source of funding and the agencies responsible to implement the proposed strategies are included in the table.

Table 5.3: Specific Measures for Vulnerable People

Proposed Strategies	Sources of Funding ²⁰	Agencies Responsible
A. Inclusion		
<ul style="list-style-type: none"> • Ensure awareness raising, active participation and capacity building of the vulnerable communities <ul style="list-style-type: none"> • Ensure of participation in awareness campaign, project implementation and monitoring • Ensure equal wages for similar work during implementation • Launch project information campaign to inform the target groups about the key The Project	PMU

²⁰ The sources of funding and responsible agencies need to be discussed before finalizing the ESMF.

Proposed Strategies	Sources of Funding²⁰	Agencies Responsible
features of the project and sub project		
B. Programme Planning		
<ul style="list-style-type: none"> • Asses and analyze the presence of indigenous and Dalits in subcomponent sites • Treat and support indigenous people, dalits and other vulnerable communities preferentially • Involve indigenous people and dalits in beneficiary groups to increase their participation. • Define training/income generation activities based on the identified needs and priorities of vulnerable people in the subproject area. The Project	PMU
C. Capacity BuildingThe Project	PMU
<ul style="list-style-type: none"> • Conduct project related meetings in indigenous and vulnerable community absed areas to encourage their participation. Ensure a quorum which includes representation from IP groups. • Provide targeted assistance/training aimed at vulnerable groups to enhance livelihoods and participation in the subcomponents • Built in awareness campaign about the project in the subproject • Build capacity of indigenous peoples, Dalits and other vulnerable communities promoting necessary knowledge and skills to participate in subcomponent activities • Develop capacity through trainings on application of Agriculture Information system to small farmers 	-----The Project	PMU/DHM/MoAD

5.5 Framework for Gender Development Plan

The GDP framework outlines the specific issues linking with corresponding strategies and activities which will be given due consideration in the BCRH-PPCR project. This will ensure women's participation in the value-chain in order to benefit from project activities. Suggested Gender Development Plan for the project is presented in Table5.4.

Table 5.4: Gender Development Plan

Gender issues	Strategy	Proposed activities	Responsible agency
Lack of awareness	Awareness campaign about the project for the community focusing on the vulnerable group including women.	Formation of women groups around specific project areas. Share information about the project benefits in Nepali language.	PMU DHM/MOAD
Low Level of literacy	Support functional literacy campaign and develop extension programmes to take the benefits from the project as per the needs of illiterates.	Undertake literacy programs as built- in activities coordinated with literacy programmes. Develop the implementing strategies to communicate real time information specifically for EWS. Develop audio-visual aids and documentary for training programs about the project for illiterate women groups	PMU DHM/DDRC/NEOC
Excluded from Opportunities and because of social boundaries as a result low level of participation in decision making process	Rapport building with Women Development Office at District or local level involving them in Programmes Gender sensitization to all stakeholders including project entities. Ensure Women's participation during meetings, project implementation And monitoring .	Carry out meetings and interaction programme with and orientation to women in the community. Conduct leadership training for women members of commodity groups. Provide opportunities of exposure or study visit to women's group to develop their leadership capacity	PMU DHM/DWDO
Lack of knowledge on	Promote need based technical awareness and support services.	Organize training on newly lunched technologies (metrological/hydrological)	PMU DHM/MOAC

Gender issues	Strategy	Proposed activities	Responsible agency
and access to technical knowhow			
Disparity in Wages	<p>Accord Priority Employment to women in project generated construction activities.</p> <p>Promote equal wages for equal work</p>	<p>Inform women groups regarding proposed construction works. Identify women interested to work; assess their skills and involve them as per their capabilities.</p> <p>Monitor women wage rate and do the needful to ensure wage equality for similar type of construction works.</p> <p>Inclusion of the above elements in the contractors' document.</p>	PMU DHM/MOAC

5.6. Consultation and Dissemination Strategy Framework

According to Environmental Protection Regulation 1997, consultations with the project's beneficiaries including local population and NGOs must be conducted ensuring their participation at all stages of project implementation. These consultations are important particularly when project activities start directly affecting these communities. Changes in natural and social environment must be made conditional to the prior consent of the affected communities. Representatives of local communities affected by the project and NGOs should be involved in consultations.

Public consultations will be conducted during project implementation in compliance with Nepali laws on NGOs and Media and World Bank Policy on Disclosure of Information²¹. Consultation framework for information disclosure has been schematically presented in Figure 5.4.. The project's information such as sites, scale of impacts- adverse and beneficial social and environmental benefits, sustainability, monitoring system and the outcome of the project etc need to be compiled.

²¹ <http://wwwl.worldbank.org/operations/disclosure>

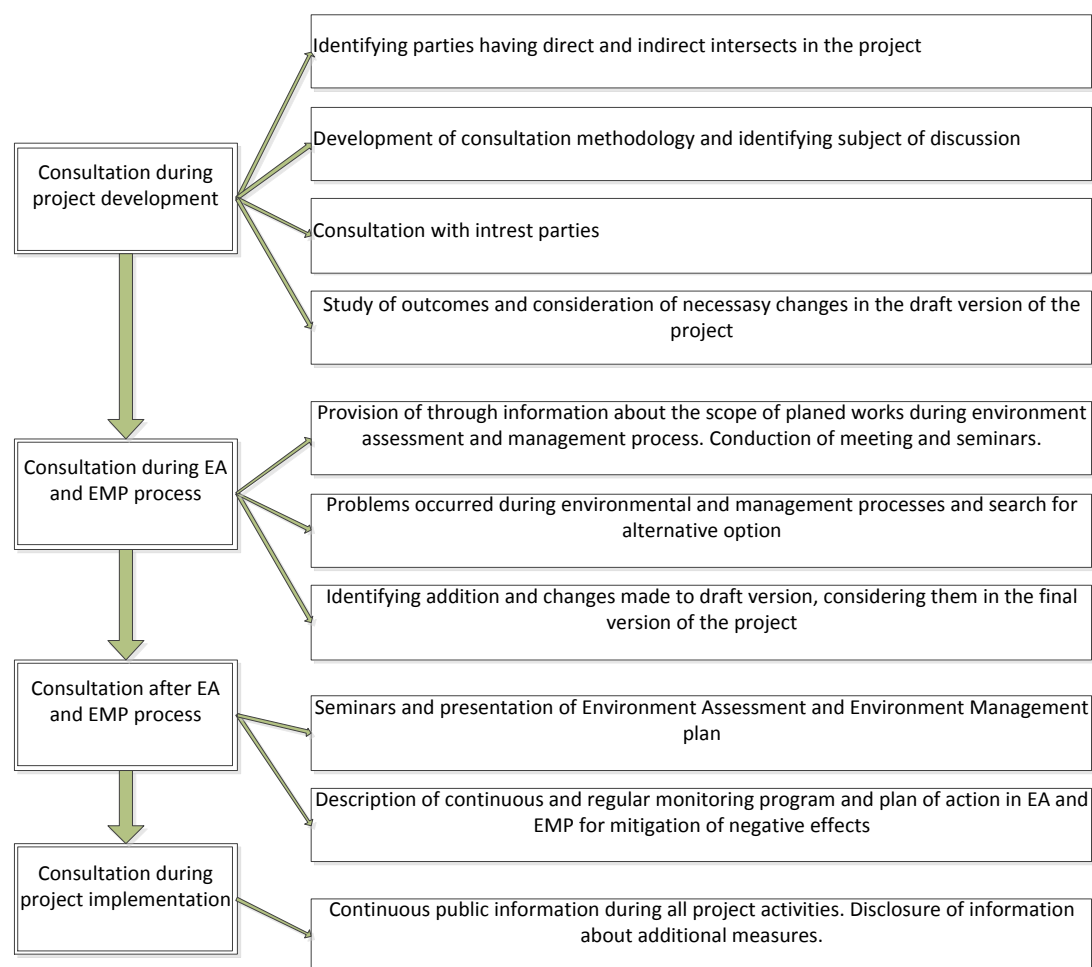


Figure 5.4: Consultation Framework for information disclosure

Table 5.5 presents potential stakeholders for consultation, mode of consultation and ways of dissemination at various stages of consultation. Project Management Unit, both at DHM and MoAD will take all the responsibilities for the consultation.

Table 5.5: Potential Stakeholders for Consultation

Stages for the Consultation	Strategic Works	Mode of Consultations	Ways of Dissemination	Key Stakeholders
Screening	Site visits (if necessary)and desk work	Public Meetings, Interaction, FGDs and transect walk together with the local residents	Provide information about project's activities using local language/Nepali language	Government agencies, farmers, CBOs, existing station observer/gauge readers

Project Formulation	Identification of interest parties, development of consultation methodology & Schedule, consultation with interest parties, and Consideration of necessary changes	Workshop, Meetings	Orientation in local language/Nepali language	DHM line agencies from the department to field level offices, District level Government Offices especially DDRC, NRCS, DADO, media Agriculture and Livestock Service Centers
Impact Assessment	Scoping, assessment and management process, alternative option, mitigation measures	Workshop, meetings, FGDs, site surveys	Orientation using local language/Nepali language	Government and non-government agencies (DDRC), media, academia, disaster and climate network organizations, NRCS, Farmers etc
Implementation and monitoring	Consultation and collaboration on the basis of project activities	Workshop, meetings, group formation	Orientation using local language/Nepali language,	DHM's Basin and Regional Offices, District Administration Office, DADO's line offices at community level, DDC, DOI, Line offices of DWIDP at regional and sub-regional bases, NRCS District Chapters, NGOs, media, NARC, DADO, RADO, Agriculture and Livestock Service Centers etc.

5.7 Framework for Capacity Strengthening Plan

DHM and its regional and basin level organizations will have additional responsibilities to implement BRCRH project (the Components A, B, and C). Likewise, MOAD and its national level, regional level and district level organizations will also have some additional responsibilities to implement the Component D of the project. Furthermore, DHM will have additional responsibilities to implement the subcomponents of the project in environmental and social aspects at different stages of the project: Screening, Planning, Implementation and Monitoring.

5.7.1 Objective of the Plan

The objective of the plan is to facilitate and support the strengthening of capacities of the project implementing agencies (DHM in particular) for the effective implementation of the project.

5.7.1.1 Organizational Level

- Orientation on importance and needs of environmental and social screening and management of environment and social issues to the basin and regional staff of DHM and district/field-level staff of MOAD needs to be provided. This process will help PMU to coordinate with the stakeholders and to carry out screening of project subcomponents.
- Environmental and social professional play a key role during the execution of the project. For long-term sustainability, DHM should recruit such professionals for permanent position.

5.7.1.2 Implementation Level

- Organize regular trainings, seminars and conferences at different levels at DHM as well as at MOAD.
- Provide orientation and training to the users at community levels on the management of social and environmental impacts.

5.7.2 Institutional arrangement for implementing ESMF

The Project Management Unit (PMU) proposed at both the implementing agencies (DHM and MoAD) will coordinate the overall ESMF implementation plans in cooperation with technical teams of both organizations. PMU at DHM will work under the guidance of the Director General. Likewise PMU at MoAD will be supervised by Agribusiness promotion and Statistics Division. PMU should include at least one environment specialist and one social specialist capable of facilitating the whole project cycle related to ESMF (screening, planning, assessment, Implementation, and monitoring & compliance).

Detail institutional arrangement is shown in Figure 5.3 and Annex 5.4.

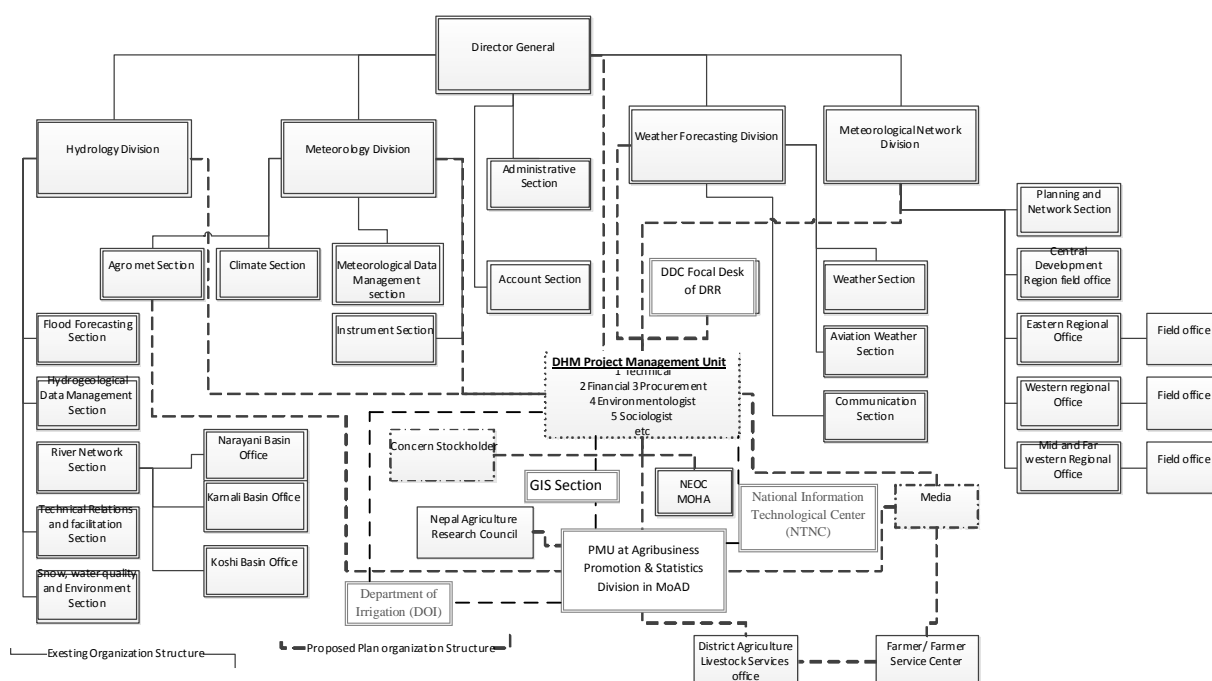


Figure 5.3: institutional arrangement for implementing ESMF

Roles and Responsibilities of key players of the Project

PMU will work in a close coordination with World Bank and the technical team formed at the department to execute the project. It will maintain a working relation with all the relevant divisions of the department collaborating with the key agencies, such as (MOHA, MOLD, MOIAC, MoAD and nongovernment agency like Disaster Preparedness Network (DPNet), Nepal Red Cross Society, Private Media, and Private Companies. Issues related with environment and sociology of the project will be addressed by PMU. It will coordinate with DDRC especially focal desk of disaster at District Development Committee (DDC) at district level. Likewise PMU will be established under Agribusiness Promotion and Statistics Division in MoAD. The details roles and responsibilities of the key players of the project are outline in the Table 5.7.

Table 5.7: Roles and Responsibilities of key players of the Project

Key Players	Roles and Responsibility for Social and Environmental Management
Project Management Unit	<p>Facilitate all the processes to complete the project cycle: screening, planning, assessment, Implementation, and monitoring & compliance</p> <p>Coordinate with the beneficiaries for sharing information and managing the issues</p> <p>Collaborate with line agencies of government and non-government working in social and environmental management</p> <p>Assess the possible environmental and social issues</p> <p>Develop Terms of references (ToR) for necessary out-sourcing of project regarding social and environmental issues</p> <p>Implement Land acquisition procedures</p> <p>Consult focal desk of the concerned ministries/department/Private sectors/Non-government especially MoHA, MoAD, MoI, MoE DWIDP, Social Welfare Council, DoSWC, MoLD, DDC, DPNet, UNDP/DRR, CAAN, Climate Change Network, MoEST, MoIC etc.</p> <p>Coordinate with Government Agencies and INGOs working in Natures Conservation like DoNWLC, IUCN, WWF etc.</p> <p>Coordinate with NARC (through PMU in MoAD) for necessary scientific assessment about the beneficial and adverse issues of environment.</p> <p>Carry out project screening procedures/steps</p> <p>Develop Environmental Management Plan, Commission IEE for Category B and EIA for Category A subproject/ activity,</p> <p>Carry out six-monthly environmental compliance review (project environmental specialist or independent consultant).</p> <p>Manage environmental and social awareness and orientation activities.</p> <p>Commission independent evaluation/audit of environmental and social management two times over the project period (prior to Mid-term and end of project)</p> <p>Carry out land acquisition/compensation/allowances costs during the</p>

	project implementation
National Emergency Operation Center (NEOC), MoHA	weather phenomena/floods/drought/landslides to DDRC and NDRC in coordination with PMU and relevant sections of DHM
District Development Committee	Coordinate with PMU and DDRC to share the beneficial issues of the project and also assist to manage adverse issues of the project
Media	Gather beneficial and adverse issues of the project disseminate to the concerned
District Agriculture Development Office (DADO) and District Livestock Development Office (DLDO)	Coordinate with PMU in MOAD and Agriculture and Livestock Service Centers to share beneficial and adverse issue of the project Assist to manage social conflicts that may rise due to subcomponents of the Component-D
Geographical Information System (GIS) Section, MOAD	Directly involve with PMU in MoAD to address the social and environmental issues
NARC	Carry out necessary research work on agriculture and climate issues by coordinating PMU in MOAD
NGOs at District and Local Level	Assist in Screening, monitoring of social and environmental issues by coordinating with PMU
Disaster and Climate Network Organizations	Help to share beneficial issues of the project

5.8 Impact Monitoring and Evaluation

Impacts of the proposed subcomponents on physical, biological, socioeconomic and cultural environment will be monitored on the basis of a scheduled plan. Frequency of monitoring will depend on size, location and magnitude of the project parameters. The PMU is responsible to adhere with monitoring parameters, locations, schedule and responsibilities. Impact monitoring will be carried out through internal monitoring system. Likewise, two time impact evaluation will be carried out: mid-term evaluation in two years; and final evaluation in four years (Table 5.8). The cost for impact evaluation is given in the table. PMU is responsible to proceed both evaluations through external sources (consultant).

Table 5.8: Impact Evaluation Plan

Evaluation	Responsibility	Schedule	Report to
Mid-term Evaluation	PMU	Second year	Project Steering Committee
Final Evaluation	PMU	Last year	Project Steering Committee

5.9 ESMF Implementation Cost

The cost of overall environmental and social management includes Waste management, Dissemination, and Impact compliance and evaluation and capacity buildings. The total cost for the implementation of the ESMF is estimated at NRs. 23.4 million equivalent to US\$ 0.26 million (1 US\$=NRs 89) over a period of five years. The breakdown of estimated costs for implementing the ESMF is given in Table 5.8.

Table 5.8: Tentative Cost for implementation for ESMF of the BRCRH project

Broad Activities	Activities	Costs in 000(NRs)	Remarks
Waste Management (Dry Cell Management and E-waste Management)	Collection from point Source (Stations) to nearest collection center (the Department/Basin Office/Regional Office) and then dispose through: Outsource collection and management OR Collection and Auction	1025	Collection of Batteries from 35 stations Two times during Project Implementation period. Here 35 stations will be upgraded till second year (Rate of collection is at NRs 5000 from each station based on local market) Electronic wastes will be collected by staffs and dispose through auction.
	Collection from point Source (Stations) to nearest collection center (the Department/Basin Office/Regional Office) and then dispose either through: Outsource collection and management OR Collection and Auction	675	Collection of Batteries from 135 stations One time at NRs 5000 during Project implementation in the last year of the project Electronic wastes will be collected by staffs and dispose through auction.

Budget for Capacity Building and Dissemination	Carry out Users (HMS users) sensitization/consultation for	500	Lump sum cost
Implementation of Social Safeguard measures	Cost towards R&R assistance; VCDP and GAP	20000	Estimated
Impact Evaluation	Carryout Impact Monitoring at two stages: Mid-term Evaluation; and Final Evaluation	1200	Monitoring for Key Subcomponents causing social and environmental adverse impacts (the amount is lumpsum)
Total Budget		23400	

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Forest Rule, 2051 (1996) and its Amendment 2062 (2006)

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Labor Rules, 2050 (1993)

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Annex

Annex 1.1 Lists of Participants in Stakeholder Consultation

जलवायु स्वच्छ नगर प्रकल्पको नैतिकरण गृहतथाशौच
 १. काठमाडौं जलवायु प्रणाली व्यवस्थापन प्रणाली व्यवस्थापन जलवायु -
 प्रत्यक्ष कार्यवाहक प्रमुख अधिकारी अभियुक्ति कार्यक्रम
 प्रमुख अधिकारी अधिकारी श्री मन्त्र राज जोहरा जलवायु
 विशेष उपस्थितिमा सम्म २०६६/६/१० गते काठमाडौं
 जिल्ला प्रशासन कार्यालयमा भएको उपस्थिति ।

नाम	पद/संस्था	सह
१. श्री मन्त्र राज जोहरा	प्रमुख अधिकारी	५५५
२. श्री मन्त्र राज जोहरा	प्रमुख अधिकारी	५५५
३. श्री मन्त्र राज जोहरा	प्रमुख अधिकारी	५५५
४. श्री मन्त्र राज जोहरा	प्रमुख अधिकारी	५५५
५. श्री मन्त्र राज जोहरा	प्रमुख अधिकारी	५५५
६. श्री मन्त्र राज जोहरा	प्रमुख अधिकारी	५५५
७. श्री मन्त्र राज जोहरा	प्रमुख अधिकारी	५५५
८. श्री मन्त्र राज जोहरा	प्रमुख अधिकारी	५५५
९. श्री मन्त्र राज जोहरा	प्रमुख अधिकारी	५५५
१०. श्री मन्त्र राज जोहरा	प्रमुख अधिकारी	५५५

वर्दीया जिल्ला -

प्राथमिक-सुरक्षा-कार्यक्रम-आयोजन-आय

आयोजन-समिति २०६६ ई.स. के अंतर्गत २५ गले
अनुसूचित जाति-दिन २५ अक्टूबर २०२० ई.स. रा. १०.००
०१.०० वि. स. व. से २०२० ई.स. के अंतर्गत २५ गले
प्रशासक-आयोजन, अंतर्गत २५ गले २५ गले
सूचना-समाचार-सूचना-समाचार-सूचना-समाचार-
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अंतर्गत (अंतर्गत)

क्र.सं.	नाम-व.र.	संख्या/अंतर्गत-संख्या
१	अंतर्गत-संख्या	अंतर्गत-संख्या
२	अंतर्गत-संख्या	अंतर्गत-संख्या
३	अंतर्गत-संख्या	अंतर्गत-संख्या
४	अंतर्गत-संख्या	अंतर्गत-संख्या
५	अंतर्गत-संख्या	अंतर्गत-संख्या
६	अंतर्गत-संख्या	अंतर्गत-संख्या
७	अंतर्गत-संख्या	अंतर्गत-संख्या
८	अंतर्गत-संख्या	अंतर्गत-संख्या
९	अंतर्गत-संख्या	अंतर्गत-संख्या
१०	अंतर्गत-संख्या	अंतर्गत-संख्या
११	अंतर्गत-संख्या	अंतर्गत-संख्या
१२	अंतर्गत-संख्या	अंतर्गत-संख्या
१३	अंतर्गत-संख्या	अंतर्गत-संख्या
१४	अंतर्गत-संख्या	अंतर्गत-संख्या
१५	अंतर्गत-संख्या	अंतर्गत-संख्या
१६	अंतर्गत-संख्या	अंतर्गत-संख्या

વેઠક - મીળજં ડાવા, રામેદાપુર

અમલોની ૨૦૬૯ વર્ષની વેચાણ રકમને લઈ
રામેદાપુર મેલની, રામેદાપુર અલગીત કીસન
ડી ડી ડી ડી ડી ડી ડી ડી ડી ડી ડી ડી ડી
પ્રમત્ત રામેદાપુર, ડી ડી ડી ડી ડી ડી ડી ડી
કુશન ડી ડી ડી ડી ડી ડી ડી ડી ડી ડી
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ડી ડી ડી ડી ડી ડી ડી ડી ડી ડી ડી ડી
(રૂપિયો)

ક્ર. સં.	નામ	પદ	સહી
૧	વિજયભાઈ ડી ડી ડી	ડી ડી ડી	ડી ડી ડી
૨	મણિભાઈ ડી ડી ડી	ડી ડી ડી	ડી ડી ડી
૩	રાજકુમાર ડી ડી ડી	ડી ડી ડી	ડી ડી ડી
૪	ડી ડી ડી	ડી ડી ડી	ડી ડી ડી
૫	ડી ડી ડી	ડી ડી ડી	ડી ડી ડી
૬	ડી ડી ડી	ડી ડી ડી	ડી ડી ડી
૭	ડી ડી ડી	ડી ડી ડી	ડી ડી ડી
૮	ડી ડી ડી	ડી ડી ડી	ડી ડી ડી

સમુદાયના સભ્યો - ચિલાપાની વર્ધિયામિલી

કર્ણાની ચિલાપાની જલ તથા હાવામાંની હેન્ડ માં લાગુ પડતા
 ઉચ્ચતરના પ્લેનફોન માં ઉપલબ્ધિ નિ
 સ્થાન : કર્ણાની ચિલાપાની : તારીખ : ૨૦૧૩/૦૧/૧૬

નામ	લેખા/પેરા	સહી
૧. શ્રેણ શાહી	ભોજાવા	જાણી
૨. શુભા દાસ	સેડીપેરે સેમલ	સુમ
૩. રામચંદ્ર જુનાવરી		
૪. પાર્વતી જુનાવરી	ગંજારીડ	જાણી
૫. પૂર્ણિમ શાહી	લાપારી	જાણી
૬. રવિશંકર શાહી	ભોજાવા	જાણી
૭. પદમ વિવર (શિક્ષક)		જાણી
૮. શ્રીવત્સ શાહી	મિત્રી	જાણી
૯. રામચંદ્ર જુનાવરી	ગોંડિવાડ	જાણી
૧૦. દિનકર લાપારી	કર્ણાની વર્ધિયામિલી	જાણી
૧૧. વીપક પોઝીલ	બોચાલ	કર્ણાની વર્ધિયામિલી

जिल्हातून उल्कावर्षाकडून सुरक्षितता निर्माण करणे		
समुदाय (उल्कावर्षाकडून सुरक्षितता) या सहाय्यासाठी		
लुकीवजार, लोहापुडू		
नाम	पद/संस्था	सदि
1. अनामिका शिंदे	हा.ब. सविसेवक, लुकी	30
2. सुरेश प्रसाद भास्करा	पां.प.प.	30
3. राजेश भाग	लुकीवजार, लोहापुडू	30
4. अनामिका शिंदे	हा.ब. सविसेवक, लुकी	30
5. लुकीवजार, लोहापुडू	हा.ब. सविसेवक, लुकी	30
6. लुकीवजार, लोहापुडू	हा.ब. सविसेवक, लुकी	30
7. लुकीवजार, लोहापुडू	हा.ब. सविसेवक, लुकी	30
8. लुकीवजार, लोहापुडू	हा.ब. सविसेवक, लुकी	30
9. लुकीवजार, लोहापुडू	हा.ब. सविसेवक, लुकी	30
10. लुकीवजार, लोहापुडू	हा.ब. सविसेवक, लुकी	30
11. लुकीवजार, लोहापुडू	हा.ब. सविसेवक, लुकी	30
12. लुकीवजार, लोहापुडू	हा.ब. सविसेवक, लुकी	30
13. लुकीवजार, लोहापुडू	हा.ब. सविसेवक, लुकी	30
समुदाय (उल्कावर्षाकडून सुरक्षितता) या सहाय्यासाठी		

**'जलवायुजन्य पकोप प्रभावको न्यूनीकरण, जल तथा मौसम र कृषी सूचना
व्यवस्थापन प्रणाली सम्बन्धी जलवायु-उत्थानशीलता परियोजना'**

कार्याशालागोष्ठी तथा छलफल कार्यक्रम

मिति: २०७९ बैशाख १४

स्थान: बेसीराहर, लमजुङ

उपस्थिती पुस्तिका

क्र.सं.	नाम, घर	कार्यालय, ठेगाना	पेशा, पद	हस्ताक्षर
१.	ककुण्डा भण्डारी	जि.प्र.क. लमजुङ	प्र.वि.अ.	
२.	चेजान कुमार पोखरेल	जि.वि.प्र. लमजुङ	प्र.वि.अ.	
३.	डम्बर बहादुर गुरुङ	बि.स.स. लमजुङ	कृषक	
४.	विमोद प्रसाद पन्थ	जि.क. वि. लमजुङ	क.क. वि.अ.	
५.	शान्त बहादुर ठोहरा	प्र.वि.प्र. लमजुङ	प्र.वि.अ.	
६.	विमोद पोखरेल	लमजुङ	क.क. वि.अ.	
७.	देवी शर्मा	लमजुङ	क.क. वि.अ.	
८.	गोविन्द कुमार श्रेष्ठ	जि.प.स.क. लमजुङ	प.वि.	
९.	रमेश बहादुर थापा	लमजुङ	क.क. वि.अ.	
१०.	धनराज पौडेल	लमजुङ	क.क. वि.अ.	
११.	लेखमान ब.वि.ला.	लमजुङ	क.क. वि.अ.	
१२.	प्रमोद बहादुर बस्नेत	लमजुङ	क.क. वि.अ.	
१३.	नविराम सिमरे	लमजुङ	क.क. वि.अ.	
१४.	शालिग्राम भण्डारी	लमजुङ	क.क. वि.अ.	
१५.	धनराज ठोहरा	लमजुङ	क.क. वि.अ.	
१६.	रमेश थापा	लमजुङ	क.क. वि.अ.	
१७.	शान्त बहादुर ठोहरा	लमजुङ	क.क. वि.अ.	
१८.	आनन्द सिमरे	लमजुङ	क.क. वि.अ.	
१९.	रमेश कुमार श्रेष्ठ	लमजुङ	क.क. वि.अ.	
२०.	रमेश बहादुर बस्नेत	लमजुङ	क.क. वि.अ.	
२१.	रमेश प्रसाद पौडेल	लमजुङ	क.क. वि.अ.	
२२.	सुखलाल पौडेल	लमजुङ	क.क. वि.अ.	
२३.	रमेश पौडेल	लमजुङ	क.क. वि.अ.	
२४.	रमेश बहादुर ठोहरा	लमजुङ	क.क. वि.अ.	
२५.	रमेश बहादुर ठोहरा	लमजुङ	क.क. वि.अ.	
२६.	रमेश बहादुर ठोहरा	लमजुङ	क.क. वि.अ.	
२७.	रमेश बहादुर ठोहरा	लमजुङ	क.क. वि.अ.	
२८.	रमेश बहादुर ठोहरा	लमजुङ	क.क. वि.अ.	
२९.	रमेश बहादुर ठोहरा	लमजुङ	क.क. वि.अ.	
३०.	रमेश बहादुर ठोहरा	लमजुङ	क.क. वि.अ.	
३१.	रमेश बहादुर ठोहरा	लमजुङ	क.क. वि.अ.	

અભિયાનના પ્રારંભ પાઠ્યક નિર્દેશિકા, અભિયાનના મોસમ ર કૃષિ સ્થળો તપાસવાનું
પ્રકાશની સુવિધા અભિયાન - રૂઢાણાથી લેવા પાડેલો

ગોઠરી તથા દુલ્લખા

મિતિ : ૨૦ ૬૬/૦૭/૨૬

મંત્રી, રાજીવરાય

ક્ર.સં.	ગામ નામ	પદ સંદર્ભ	સંપર્ક નંબર	રજીસ્ટ્રાર
૦	માધવ પ્રાંતિકારી	નિ.ક.ક. 10-10-0	8689625985	8/
૧	કૃષિ સમાજ (કુરેદી)	નિ.સા. નિ.ક. નિ.ક. 10-10-0	8689625985	8/
૨	કૃષિ સમાજ (કુરેદી)	કૃષિ	9741069333	8/
૩	કૃષિ સમાજ (કુરેદી)	કૃષિ	048510110	8/
૪	કૃષિ સમાજ (કુરેદી)	કૃષિ	2741181180	8/
૫	કૃષિ સમાજ (કુરેદી)	કૃષિ	8689625985	8/
૬	કૃષિ સમાજ (કુરેદી)	કૃષિ	8689625985	8/
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A Half-Day

National Consultation Workshop

Address: Sap-Phalcha, Kathmandu

Date: 2069/3/3

Registration copy

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3	Dina Raj Ghosh	World Bank	Env Spl	98413-932	[Signature]
4	Kamal P. Pradhan	DHM	DDG	9841684083	[Signature]
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14	Rajan B. Kanyasika	Kath. University	Asst. Prof	9851135951	[Signature]
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18	Khila Nath Dahal	DWEDP	SDMG	9841769454	[Signature]
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31	Deepak Paul	Consultant, ESMP		9841647318	[Signature]

Annex 1.2 Checklists for the Consultation

Checklist for FGD

- a) Importance of the climate station and hydrologic station network and its application in the sectoral developments particularly in agriculture, disaster risk reduction and water resources development
- b) Issues about the existing stations: lands, and women health, and involvements, others
- c) How to modernize the station and its services applicable in livelihoods?
- d) Ownership of the station if it changes into modern system through the project
- e) Possible locations for the WRS in the district and people perception about the Radar system its application in the early warning system and local development through HMS information (specific in Ramechhap district)

Checklist for Discussion during Workshop/Meeting

Pilot Program for Climate Resilience (PPCR): Building Resilience to Climate Related Hazards

Questionnaire for Stakeholder's discussion at Meeting/Workshop

1. What do you feel about the project that aims to reduce possible risk due to climate change impacts on different sectors especially on Agriculture, Water and weather & Environment?
 - a. Highly useful
 - b. Good but based on high technology
 - c. Can't Say
2. Do you think the project will increase your income (especially through agriculture commodities/production)?
 - a. Yes
 - b. No
 - c. Can't say
3. Do you think disaster risks in your region will be reduced through this project?
 - a. Yes
 - b. No
 - c. Can't say
4. Do you use chemical fertilizers and pesticides in agriculture practices? If yes,

a. Yes

b. No

If yes, point out the potential sectors that are risk to excess use of chemical fertilizer and pesticides: a. Agricultural based produces, b. Human health, c. Environmental Pollution, and d. others

5. How does project gets lands that will be required for the project especially for automated hydrological and meteorological stations?

a. Compensation

b. Voluntary

c. Land acquisition (purchases)

d. Others

6. Does the project's activities causes gender discrimination?

a. Yes. if yes, possible adverse changes.....

b. No

c. Can't say anything

7. Does the project increase livelihoods of women, and marginalized groups?

a. Yes. if yes, possible adverse changes.....

b. No

c. Can't say anything

8. Does this project cause discrimination among vulnerable groups including, Dalit, Janajati, and economically poor people?

a. Yes. if yes, possible adverse changes.....

b. No

c. Can't say anything

9. One of the specific objectives of this project is to communicate information regarding agro-climate, water depth and flow, weather related disasters through internet, mobile service, radio, television and other electrical means of communication. In this regards, do you able to get those information through the said communication means?

a. Yes

b. No

10. Do those means of communication cause impacts on farmers, and local stakeholders?

a. Yes.

b. No

11. If yes, what types of will be happened?

a. Beneficial impacts like income generation by using technology

b. Adverse impacts like excessive use of chemical pesticides and fertilizers

c. Both

12. Does this project bring total economic development at local level?

a. Yes,

b. No

c. Can't say

13. Does this project bring appositive awareness development?

a. Yes

b. No

c. Can't say

14. Does this project cause impacts on Agriculture, Environment, and social surroundings in total?

a. Yes

b. No

Name:.....

Address.....

Occupation.....

Question/Queries.....

Questionarre for Ramecchap District

1.What is the level of impacts due to cliamte related disasters in this district?

a. Low

b. Medium

c. High

2. How do you feel the effectiveness of the measures used in the past to reduce the impacts of climate related disasters?

a. Weak

b. General

c. Good

3. Did you feel weather information was useful in reducing disaster risks in past?

a. Yes

b. No

c. Can't say

4. How do weather related information make more effective and practicable to reduce disaster risks?

a. By using a effective technology for Data Collection

b. through optimum utilization of existing communication means

c. Both above

d. Others

5. Do you know about a high technological instrument like Radar to detect weather related information?

a. Yes

b. No

6. What do you feel about the project (with Weather Radar System) that aims to reduce possible risk due to climate change impacts on different sectors especially on Agriculture, Water and weather & Environment?

a. Highly useful

b. Good but based on high technology

c. Can't Say

7. Do you think the project will increase your income (especially through agriculture commodities/production)?

- a. Yes
- b. No
- c. Can't say

8. Do you think disaster risks in your region will be reduced through this project?

- a. Yes
- b. No
- c. Can't say

9. Do you use chemical fertilizers and pesticides in agriculture practices? If yes,

- a. Yes
- b. No

If yes, point out the potential sectors that are risk to excess use of chemical fertilizer and pesticides : a. Agricultural based produces, b. Human health, c. Environmental Pollution, d. Others

10. How does project gets lands that will be required for the project especially for automated hydrological and meteorological stations?

- a. Compensation
- b. Voluntary
- c. Land acquisition (purchases)
- d. Others

11. Does the project's activities causes gender discrimination?

- a. Yes. if yes, possible adverse changes.....
- b. No
- c. Can't say anything

12. One of the specific objectives of this project is to communicate information regarding agro-climate, water depth and flow, weather related disasters through internet, mobile service, radio, television and

other electrical means of communication. In this regards, do you able to get those information through the said communication means?

a. Yes

b. No

13. Do those means of communication cause impacts on farmers, and local stakeholders?

a. Yes.

b. No

14. If yes, what types of will be happened?

a. Beneficial impacts like income generation by using technology

b. Adverse impacts like excessive use of chemical pesticides and fertilizers

c. Both

15. Which mediums are more effective to get climate related information?

a. Radio

b. Television

c. Government Agencies/sources

d. Non-government sources

16. Which information among the following are a high priority of farmers in the district?

a. District weather condition

b. Market information including price of agricultural foods

c. Time for cropping system (sowing and harvesting)

d. Technological knowledge

e. Others

17. Does this project cause impacts on Agriculture, Environment, and social surroundings in total?

a. Yes

b. No

Name:.....

Address.....

Occupation.....

Question/Queries.....

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Pilot Program for Climate Resilience (PPCR): Building Resilience to Climate Related Hazards

Response to Question and Queries

Name/Organization	Question/Queries	Response	Remarks

Annex 1.3 Steps Adopted in the Consultation

Steps adopted in the District Workshop:

Preparation for Workshop

Identify and Coordinate with local level partner organization from respective districts to facilitate the district level workshop

- Identify the invitees/stakeholders working in disaster risk reduction, agriculture business, water resources, aviation, hydropower, media, lead farmers, district level planning (government and nongovernment), etc.
- Finalize the workshop date, programme scheduled, venues, invitees etc by coordinating with Chief District Officer and Local Development Officer in the respective district.
- Distribute the official letter to the invitees through the local partners

During Workshop

Starting and Opening session

- Register the name of the participants in a given table
- Distribute a note copy and a pen for necessary use in the workshop
- Distribute the workshop scheduled (Annex 1d) and also provide the project documents in brief in Nepali language
- Start Formal opening session and remarks

Presentation session

- Disclose the project documents in Nepali and English through i) power point presentations and ii) Hands out distribution in Nepali
- Distribute the executive summary of the project in Nepali

Question Answer Session

- Share challenges and opportunities of the project
- Distribute the structured questionnaire related to the project issues (Annex 1f)
- Record participant's voices/speech using the voice recorders in audio format and take photographs
- Collect the checklist from the participants
- Respond the questions, queries asked by the participants in written form in a standard format – Stakeholder Meeting Findings (Annex 1g).

Closing session

- Share general feedback and lesson learned from the workshop
- Remark on the possible impacts due to the project

Annex 2.1 Subcomponents and Activities of the BCRH Project in details

SN	Component and Sub-components	Key Activities
1	Component A. Institutional Strengthening, Capacity Building and Implementation Support of DHM	
	Objective: to strengthen DHM's legal and regulatory frameworks, improve institutional performance as the main provider of weather, climate and hydrological information for the nation, built capacity of personnel and management, ensure operability of the future networks, and support project implementation.	
1.1	Institutional Strengthening	<p>a. DHM institutional development and strategic planning</p> <p>b. development of a legal and regulatory framework for DHM operations, including development of standard operating procedures, assessment of new business models and enhancing public private partnerships</p> <p>c. —Twinning operational support from advanced NMSs and WMO</p>
1.2	DHM capacity building and training	<p>a. Development and implementation of a DHM capacity building and training program including</p> <p>b. Implementation of training activities (workshops, round tables, etc.) for major users (agriculture, water resources management, energy, transportation)</p>
1.3	Systems design and integration, project management and monitoring	<p>a. Detailed design of DHM systems, procurement and implementation support (General Consultant/Integrator)</p> <p>b. Project management, monitoring, reporting and evaluation of Components A, B and C (which are the components managed by DHM)</p> <p>c. Development of needs assessment and design of air, water</p>

SN	Component and Sub-components	Key Activities
		<p>quality and sediment monitoring networks</p> <p>d. Development of design documents for reconstruction/refurbishment of DHM's headquarter and regional offices</p> <p>e. Support for environmental and social due diligence and protection</p>
2	Component B: Modernization of the observation networks and forecasting	
	Objective: The objective of the component B is to modernize DHM observation networks, communication and ICT systems, improve hydrometeorological numerical prediction systems and refurbish DHM offices and facilities.	
2.1	Technical Modernization of the Observing networks	<p>a. Rehabilitate technical re-equipment of the hydrological stations-74 hydrological system will be automated</p> <p>b. Improvement of the environment of the hydrological stations (bank stabilization, improvement of flow conditions, engineering works, etc.)</p> <p>c. Special equipment for hydrological stations (current meters, sediment samplers, tracer laboratory equipment, training, staff gauges, boats)</p> <p>d. Delivery and installation of weather radar for detection of heavy precipitation and other meteorological phenomena</p> <p>e. Renewal of temperature-wind sounding of the atmosphere</p> <p>f. Upgrade and expansion of automated surface observing systems for aviation safety</p> <p>g. Surface meteorological and lightning detection networks</p>

SN	Component and Sub-components	Key Activities
		<p>h. Glacier and snow monitoring (equipment and surveys)</p> <p>i. Establishment of DHM calibration facilities</p> <p>j. Vehicles to support DHM field operations, maintenance and inspections</p>
2.2	Modernization of DHM's communication and ICT system	<p>a. Communication equipment (DHM networks)</p> <p>b. Archiving, data base development and digitizing</p> <p>c. Satellite receiving system, remote sensing and GIS laboratory</p>
2.3	Improvement of the numerical hydrometeorological prediction system System	a. Modern computer equipment for Numerical Weather Prediction
2.4	Design and pilot operation of an environmental monitoring network	a. Pilot operation of air and water quality monitoring networks.
2.5	Refurbishment / reconstruction of DHM offices and facilities	a. Refurbishment/ reconstruction of DHM offices and facilities including power supply
3	Component C: Enhancement of the Service Delivery System of DHM	
	<p>Objective: The objective of this component is to enhance the service delivery system by creating a public weather service that provides weather and impact forecasts, and information services for vulnerable communities and the key weather dependent sectors of economy.</p>	

SN	Component and Sub-components	Key Activities
3.1	Introduction of a Public Weather Service (DRM, agriculture, media, civil aviation, health, energy, water resources, irrigation)	<ul style="list-style-type: none"> a. Forecaster workstations b. Specialized communication instruments including TV studio, all-hazards radio, websites c. Development and operationalization of a forecast accuracy verification system and survey of forecast utility
3.2	Strengthening of DRM operations including piloting of —end-to-endll early warning systems in two river basins in the western and eastern parts of Nepal	<ul style="list-style-type: none"> a. Development of Standard Operating Procedures (SOPs), warning protocols and signals agreed with all basin and DRM stakeholders including Emergency Operations Centers and DDCs/VDCs b. Forecaster workstations, communication systems and software development c. Operational training and drills with government stakeholders, non-government stakeholders and communities.
3.3	Improvement of service delivery (i.e., warnings and advisories) to communities including introduction of mobile applications	<ul style="list-style-type: none"> <i>a. Enhance service delivery of DHM in partnership with private sector, academia, NGOs</i> <i>b. Scale up use of mobile phones for data capture by DHM observers</i> <i>c. Pilot the development of mobile applications for the provision of HMS information and products</i>
3.4	Establishment of the National Climate Service	<ul style="list-style-type: none"> a. Computer systems to access climate information from WMO and other global and regional centers b. Support for the development of a National Framework for Climate Services and sectoral Working Groups c. Development of a digital library of climate-relevant information from all sectors for Nepal; software development to downscale climate forecasts d. Operational support and information exchange between water resources, public health and climate data bases
4	Component 4: DHM climate and weather information for users in agriculture – Agriculture Management Information System	

SN	Component and Sub-components	Key Activities
	Objective: The objective of this component is to provide critical and timely agro-climate and weather information to farmers in order to increase productivity and reduce losses from meteorological and hydrological hazards.	
4.1	Agricultural Management Information System – Portal, hardware and software	a. Detailed design of the AMIS Portal and assessment of information requirements b. Central facilities (e.g., software, data and web server, computer, monitor, printer digital color scanner, plotter) c. Retrofitting the GIS office space for AMIS operations d. Vehicles and motor bikes to support field operations for farm community outreach and data collection e. District and extension service facilities f. AMIS infrastructure (software and hardware) at NARC's central office
4.2	Information Products	a. Agriculture data digitizing and archiving . b. Development of agriculture monitoring products and decision tools c. Exploratory research to develop financial risk transfer instruments for agriculture sector
4.3	Information Dissemination	a. Introducing mobile applications based on data from AMIS b. Advertisements – mass media (FM radio, TV channels) c. Publications d. Feasibility studies for AMIS Portal product dissemination via different means.
4.4	Capacity building	a. Professional training in data analysis (short courses and advanced degree) b. Stakeholder training in AMIS tools and awareness of climate resilience (regional, district and community level) c. Farmers' groups partnership (simple rain gauge and thermometer)

SN	Component and Sub-components	Key Activities
		d. Agro-climate workshops at different levels (regional, district)
4.5	Project management, social and communication, monitoring and evaluation of Component D	

A brief discussions about the instrumental features

The Component B, one of the components of the project is related with the modernization of hydrometeorology and environmental observation networks. Table 2.2 shows that some of the existing stations network (manned type) would be modernized to automatic system (automated type). In this regards, features of the modern systems including Automatic Weather System (AWS) and Automatic Hydrological System (AHS), Radar are briefly pointed out below. The equipments to be used in the modern system help to extract the possible implications of environment and social as well.

Automatic Weather System:

1. Sensors and sensor interfaces:
 - 7 Standard meteorological parameters that meets the requirement of WMO (Air temperature, Relative humidity, Precipitation, Wind speed and direction, Global solar radiation, Atmospheric pressure)
 - Present Weather Sensors (present weather and Meteorological optical range)
 - Web camera to image the surrounding environmental conditions
 - Ceilometers for cloud height
2. Data collection unit
3. Central control and processing unit
4. Display unit
5. Communication interfaces
6. Power supplies

Agrometeorology

- 7 Standard meteorological parameters that meet the requirement of WMO and ICAO (Air temperature, Relative humidity, Precipitation, Wind speed and Direction, and Atmospheric pressure)
- Soil temperature sensors at 5, 10, 20/30, 50cm
- Air Temperature sensor (Air Temp sensor mostly the metal Resistance and semiconductor based sensors)
- Sunshine duration sensors
- Net radiometer sensor (with four component separately)
- Soil moisture sensor
- Evaporation

AWOS for Aviation Meteorology

- 7 Standard meteorological parameters that meet the requirement of WMO and ICAO (Air temperature, Relative humidity, Precipitation, Wind speed and Direction, Global Solar radiation and Atmospheric pressure)
- Runway visual range (RVR) sensor
- Present weather sensor (present weather and Meteorological optical range)
- Ceilometers for cloud height and type.
- Web camera to image the surrounding environment conditions

Relative Humidity Measuring Sensor

Capacitive relative humidity sensors are commonly used and is based on the principle that dielectric constant change with change in humidity of the atmosphere. The other types are resistive humidity sensors. The choice of the sensors depends upon the environment at which the measurements are done.

Wind speed and direction measuring sensor

For the standard meteorological observation wind sensors should be placed in 10m height above the ground in open terrain. Open terrain is defined as an area where the distance between the anemometer and any obstruction is at least 10 times the height of the obstruction.

Precipitation Measurement

In automatic weather station especially for rainfall measurements tipping bucket rain gauge are used and it counts the no of tip for the rainfall measurements. For solid precipitation measurements weighing rain gauge are used with rim heating.

Temperature measuring Sensor

- should be housed in a Ventilated Radiation Shield

- Should be at least 30 m from large paved areas and can be located in an open level area that's at least 9 m in diameter. The open areas should be covered by short grass, or where grass does not grow, the natural earth.
- Need to avoid the followings:
 - Large industrial heat sources
 - Rooftops
 - Steep slopes
 - sheltered hollows
 - High vegetation
 - Shaded areas
 - Swamps
 - Areas where snow drifts occur
 - Low places holding standing water after rains
 - Standard Measuring Height: 1.25-2.0m

While selecting the representative sites for precipitation measurement care should be taken on following points:-

- The effects on the wind field of the immediate surroundings of the site can give rise to local excesses and deficiencies in precipitation. In general, objects should not be closer to the gauge than a distance of twice their height above the gauge orifice.
- Sites on a slope or the roof of a building should be avoided.
- The best sites are often found in clearings within forests or orchards, among trees, in scrub or shrub forests, or where other objects act as an effective wind-break for winds from all directions
- The surface surrounding the precipitation gauge can be covered with short grass, gravel or shingle, but hard, flat surfaces, such as concrete, should be avoided to prevent excessive in-splashing

The features of the sites of AWOS: Sitting and exposures:-

- Outdoor instruments should be installed on a level piece of ground, preferably no smaller than 25 m x 25 m where there are many installations, but in cases where there are relatively few installations the area may be considerably smaller, for example, 10 m x 7 m (the enclosure). The ground should be covered with short grass or a surface representative of the locality, and surrounded by open fencing or palings to exclude unauthorized persons. Within the enclosure, a bare patch of ground of about 2 m x 2 m is reserved for observations of the state of the ground and of soil temperature at depths of equal to or less than 20 cm
- There should be no steeply sloping ground in the vicinity, and the site should not be in a hollow. If these conditions are not met, the observations may show peculiarities of entirely local significance;

- The site should be well away from trees, buildings, walls or other obstructions. The distance of any such obstacle (including fencing) from the rain gauge should not be less than twice the height of the object above the rim of the gauge, and preferably four times the height;
- The sunshine recorder, rain gauge and anemometer must be exposed according to their requirements, preferably on the same site as the other instruments;
- It should be noted that the enclosure may not be the best place from which to estimate the wind speed and direction; another observing point, more exposed to the wind, may be desirable;
- Very open sites which are satisfactory for most instruments are unsuitable for rain gauges. For such sites, the rainfall catch is reduced in conditions other than light winds and some degree of shelter is needed;
- If in the instrument enclosure surroundings, maybe at some distance, objects like trees or buildings obstruct the horizon significantly, alternative viewpoints should be selected for observations of sunshine or radiation;

Aviation meteorological stations

- The aviation meteorological stations should be representative of the runway field for safety and comfort of the aviation operations. While keeping the instruments care should be given for placing the sensors to protect it from artificial effect due to aircraft.
- Wind mast which is at 10m height should be frangible type.
- There are number of sensors based on laser technology such as ceilometers, present weather sensors (visibility and present weather) snow depth sensors etc in meteorology but mostly they are classified as safe by WMO and other related organization.

Automatic Hydrological Station

- Data Logger: Memory card, Processor, Sensor channels
- Power System: Solar Panel, Back up Battery
- Modem: GSM/GPRS or CDMA
- Sensors: Water Level Sensor

Weather Radar System (WRS)

Weather RADAR (RAdio Detection And Ranging) used by WMO members may be classified in several ways due to the criteria of the classification, e.g. receiving and transmitting type, operating frequency band, polarization type, type of transmitter, Doppler, non-Doppler, etc. The most common classification and types are described briefly in this part. The mostly used weather radars are C-Band , S-Band and X-Band radars respectively.

S-band radars

Those radars operate on a wavelength of 8-15 cm and a frequency of 2-4 GHz. Because of the wavelength and frequency, S band radars are not easily attenuated. This makes them useful for near and

far range weather observation. It requires a large antenna dish and a large motor to power it. S-Band radars are generally used to detect and track severe weather phenomena in long ranges such as tornado, hurricane, etc.

C-band radars

Those radars operate on a wavelength of 4-8 cm and a frequency of 4-8 GHz. The signal is more easily attenuated, so this type of radar is best used for short range weather observation. Also, due to the small size of the radar, it can therefore be portable. The frequency allows C band radars to create a smaller beam width using a smaller dish. C band radars also do not require as much power as and S band radar. C-Band radars are very suitable for precipitation measurements. The new developments on polarimetry have made them very capable for hydrometeor classification.

X-band radars

Those radars operate on a wavelength of 2.5-4 cm and a frequency of 8-12 GHz. Because of the smaller wavelength, the X band radar is more sensitive and can detect smaller particles. These radars are used for studies on cloud development because they can detect the tiny water particles and also used to detect light precipitation. X band radars also attenuate very easily, so they are used for only very short range weather observation. Most of the terminal Doppler weather radars are chosen as X-Band radars by considering their structure and features. Furthermore, X-Band is very suitable for mobile radar applications.

About Radar

Features	S-Band Radars	C-Band Radars	X-Band Radars
FREQUENCY	2-4 GHz (2.9 GHz)	4-8 GHz (5.6 GHz)	8-12 GHz (9.3 GHz)
WAVE LENGTH	15-7.5 cm (10.3 cm)	7.5-3.8 cm (5.3 cm)	3.8-2.5 cm (3.2 cm)
TYPICAL RANGE	300-500 km	120-240 km	50-100 km
PEAK POWER	500 kW- 1MW (750 kW)	250-500 kW (250 kW)	50-200 kW (200 kW)
MEASURING SENSITIVITY	Rain, snow, hail (The bigger particles as compared to C-Band)	Rain, snow, hail, drizzle (The bigger particles as compared to X-Band)	Rain, snow, hail, light drizzle (The smaller particles as compared to S-Band and C-Band)
ATMOSPHERIC ATTENUATION	Less attenuation as compared to C-Band	Less attenuation as compared to X-Band	Much attenuation as compared to C-Band and S-

	and X-Band	while much attenuation as compared to S-Band	Band
ANTENNA SIZE (1 deg. beam width)	7.5 m	4.2 m	2.5 m

Annex 3.1: Policies and Framework of Government of Nepal and the World Bank's Safeguard Policies in details

a) Environment Planning & Management, Information Management and Agriculture Promotion

Environment Protection Act 1997 and Regulations 1997 and National EIA Guidelines 1993: The Environmental Protection Act and Rules deal with the conduction of Initial Environment Examination (IEE) for smaller or Environmental Impact Assessment (EIA) for larger projects. Any development project, before implementation, should pass through environmental assessment, which may be either IEE or EIA depending upon the location, type and size of the projects. It requires the concerned organization/agency forward IEE or EIA Report to the concerned Ministry and the Ministry of Environment, Science and Technology (MOEST) for approval. As per the provisions all EIA Reports are to be approved by MOEST and the information should be made available to public, and all IEE reports are to be approved by the concerned Ministry. The Act empowers the ministry for settling the standards and control of pollution. With the provision explained in the Act, the ministry shall issue provisional or permanent pollution control certificate to industries. It also empowers for setting complaints procedures for non-compliance of standards. It also facilitates to constitute Environment Protection Council to provide policy directives or suggestions to Government for protection of environment.

National Environmental Impact Assessment Guidelines, 1993: In order to integrate the environmental aspects in development Projects and programs, the government has developed the National EIA Guidelines (1993). The guidelines provide criteria for project screening and Environment Impact assessment (EIA). This includes scoping, preparation of terms of reference for EIA, methods of EIA report, impact identification and prediction, impact mitigation measures, review of the draft EIA report, impact monitoring, evaluation of impact studies, impact auditing, community participation and schedules and annexes to IEE and EIA. Many of the guideline provisions are now included in the Environment Protection act, 1997 and Environment protection regulation, 1997. EIA in Nepal has now become legally mandatory.

Environmental Guidelines for Small Rural Infrastructure Planning, 2057: The directive is focused on the practical implementation of small rural infrastructures through the minimization of environmental impacts. This directive includes the simple methods of environmental management in the different phases of the project cycle. More emphasis is given to prevent rather than cure. So, the recommendations for the mitigation measures are provided only when it is necessary.

Forest Act 1992 and Regulation 1995: The use of forestland for infrastructure Project is subject to forest law and regulation. The bridge Projects need to comply with the provisions of forest law when it requires the use of forestland for construction. The Act requires decision makers to take account of all forest values, including environmental services and biodiversity, not just the production of timber and other commodities. The Act, 1993 empowers the government in case of no alternatives, to provide parts of any types of forests for the implementation of a national priority plan with assurance that it does not adversely affect the environment significantly. The act and rules call for carrying out EIA /IEE of the development proposals if they are to be implemented in the forest areas and/or passes through it. Section (68) of the Act empowers government to give consent to use any part or the any category of forest areas, in case of absence of alternative, for the implementation of the national priority proposal with the assurance that it does not pose any significant adverse effect in the environment. Similarly, the Act authorizes the government to provide part of national, protected, community or leasehold forest, which is absolutely necessary for implementation of national priority projects. It facilitates organizing users' group to manage forests. Section 49 of the Act prohibits reclaiming lands, setting fires, grazing, removing or damaging forest products, felling trees or plants, wildlife hunting and extracting boulders, sand and soil from the national forest without prior approval. Forest Regulation, 1995 Rule 65 of the Forest Regulation stipulates that in case the execution of any project having national priority in any forest area causes any loss or harm to any local individual or community the proponents of the project itself shall bear the amount of compensation to be paid. Similarly, the entire expenses required for the cutting and transporting the forest products in a forest area to be used by the approved project shall be borne by the proponents of the project.

Aquatic Animal Protection Act, 1961 and First Amendment, 1998: This Act is one of the oldest acts in Nepal that recognizes the value of wetlands and aquatic animals. The act promulgated for protecting aquatic animals in natural water bodies like rivers, reservoirs and lakes has remained virtually defunct due to lack of related bylaws/regulations. Its first amendment in 1998 section 5a states for use of safe pesticides use for catching aquatic life. Section 4a, 4b and 5 empower the government to prohibit catching, killing and harming certain kind of aquatic animals in different scenario.

The National Parks and Wildlife Conservation Act, 1973 and Conservation Area Management Rule 1996: The act is the key legal instrument in protecting biodiversity within the protected areas. Section 5 of the Act prohibits, inter alia, hunting of animals or bird, building any house, hut or other structure, clearing or cultivating any part of the land, harvesting, and cutting, burning or damaging any tree, bush or other forest products, mining within National Parks and or Wildlife Reserves. Section 5(j) of the act also prohibits blocking, diverting any river or stream flowing though National Park or Reserve, or any other source of water, or using any harmful or explosive materials therein. Section 10 of the act provides protection status of 27 species of mammals, 9 species of birds and 3 species of reptiles. The Act recognizes six categories of protected areas, namely National Park, Conservation Area, Wildlife Reserve, Hunting Reserve, Strict Nature Reserve and Buffer Zones.

- *Buffer Zone Management Regulation, 1996:* The Regulation prohibits the following activities with the Buffer Zone
- Occupy any land without legal ownership or cut trees, clear forests or cultivate forestland
- Any activities damaging forest resources or to set fire in the forests
- Excavate stone, earth, and sand or mine or remove any minerals, earth or other such materials

- Use of any harmful poison or exclusive substances into the river, stream or source of water flowing in the buffer zone
- Hunting illegally and any acts damaging to wildlife
- Rule 18 of the regulations empowers the warden to give order to stop or rectify certain activities. This concerns operating activities or planned actions within or outside the buffer zone that have or will have a negative effect on land use, public health, natural environment or natural resource conservation. On recommendation of the user's committee, the warden may, give an order to the concerned person or institution to stop such activities immediately or to mitigate the impacts.

Conservation Area Management Rule, 1996: The rule framed under the Nation Park and Wildlife Conservation Act, 1993 contain provisions for the mobilization of Conservation Area Management Committee (Rule 8) and the Local User Groups in natural resource management. It calls for the formulation and implementation of the management plans by detailing activities for natural resource management, wildlife conservation and their sustainable utilization (Rule 13). The rules prohibit activities such as wildlife hunting and damage to flora and fauna within the conservation area (Rule16). As per rule 17, the conservation officer may prohibit any activity, which changes the land use and affect the public health, natural environment and natural resources of conservation area. In addition, any person willing to perform commercial activity within the conservation area should obtain permission (Rule 21). Any person utilizing the resource against the rule is liable to pay the charges as determined by the committee (Rule 25). According to this rule, any activity that should be carried out should comply with the working plan.

The Water Resources Act 1993: The act contains provisions to minimize environmental impacts, including soil erosion, floods and landslides. This provision calls for carrying out EIA study prior to project implementation (Section 20). The Act also empowers government to frame standards while utilizing water resources (Section 18) and to frame rules on environment related matters and controlling pollution (Section 24). Also, in a process for resolving any conflict, the Water Resources Utilization Investigation Committee should consider environmental impacts likely to occur from a proposal [Rule 28 (3)]. The Irrigation Rules, 1989, prohibits activities, which pollute the canal or irrigation water (Rule 4.1)

Solid Waste Management and Resource Mobilization Act, 1987: This act categorizes harmful hazardous wastes and provides controlling measure. It makes provision to appoint inspection officer for checking and monitoring solid waste control and management with power to take action against the polluter or polluting agency. The Inspection Officer is empowered to issue directive to any industrial or commercial centre or individual to clean and throw away the wastes liable to harm the public health. The Inspection Officer coordinates with the local government to control pollution in land, water and air by managing commercial wastes. No direct discharge of effluents from the industries, hospitals and nursing homes is allowed. There is penalty of Rs.50 to 1,000 for violations.

Natural Calamity Act, 1982: The act deals with relief operations and protection of lives and properties. Furthermore, rehabilitation of disaster victims, protection of life and property and preparation and adoption of preventive measures like Early Warning System (EWS) etc are addressed in this act. According to the act, the Ministry of Home Affairs (MoHA) is designated as the lead agency responsible

for implementation of the Natural Calamity Act, 1982 and is the responsible for rescue, relief works, data collection and dissemination of resources and information.

The Nepal Environmental Policy and Action Plan (NEPAP), 1993 was the first comprehensive policy document on environment and development. Prior to this policy document the government had endorsed in 1992 the National Environmental Impact Assessment Guidelines, which was published a year later in 1993. It was prepared in response to the growing global awareness about the importance of maintaining the balance between economic development and environmental conservation. Considering the NCS mandatory and constraint on policy and plan for the preparation of EIAs in Seventh Five Year Plan., first National EIA Guideline was endorsed in September 1992 and gazette in July 1993. NEPA provides with an outline of the main features of Nepal's environmental policy. They are:

- Manage natural and physical resources efficiently and sustainably;
- Balance development efforts and environmental conservation for sustainable fulfillment of the basic needs of the people; Safeguard national heritage;
- Mitigate the adverse environmental impacts of development projects and human actions;
- Integrate environment and development through appropriate institutions, adequate legislation and economic incentives, and sufficient public resources;
- Foster environmental education and awareness at all levels; and
- Facilitate participatory involvement of private sector, NGOs, international non-government organizations (INGOs), and civil society with government efforts in environmental protection

National Agriculture policy 2004: It gives special priority to development of pockets of high-value agricultural products. The local bodies will be delegated with the rights and responsibilities of formulation, implementation and monitoring and evaluation of agricultural plans. Farmers' group will be utilized to provide on-site extension services and resource centers will be developed and strengthened for producing local seeds, seedlings, plants and improved breeds. Such centers will be gradually integrated, and will be made capable of operating laboratory services in fields such as soil analysis, seed certification, crop protection and livestock diagnosis. Special facilities for target groups (oppressed, depressed classes, marginal farmers, and agricultural workers) will be developed by creating opportunities for gaining access to lands and contractual farm lands. The District Agricultural Development Committee and Agricultural Committee formed at district and village level will assist the local bodies in implementing and monitoring the policies. Safety Nets will be developed for those farmers who hold lands less than 0.5 hector and lack of year-round irrigation facilities and also for landless and marginalized communities when weather and disaster occurs.

Information and Communication Policy, 2059: The policy highlights long-term policies on information and communication sector. The policy gives a high priority to develop the information and communications sector up to the rural level in a coordinative and competitive manner, while using proper modern technology and means of communications invented in the world at the moment.

Climate Change Policy GoN, 2001: The policy addresses climate adaption and disaster risk reduction by Monitoring the status of glaciers and glacier lakes through studies and implement adaptation activities in priority vulnerable glaciers; Forecasting water-induced disasters and risks created from climate change and providing early warning information, developing necessary mechanism for the implementation of preventive measures and ensuring regular supervision, and enhancing capacity; Identifying the people, communities and areas impacted by climate change and implementing adaptation and impact mitigation measures based on local knowledge, skills and technologies; Formulating and implementing integrated programmes taking into consideration the objectives and the provisions of the conventions related to climate change, desertification and biodiversity; Developing a necessary mechanism for forecasting and preventing vector-borne, infectious and communicable diseases induced by climate change; and Developing and expanding bilateral and multilateral cooperation for risk reduction and adaptation to address the effects of climate change in the international trans-boundary areas.

Himalayan National Parks Regulations, 1979: The regulations have made special provisions for the people living in the park enclaves to collect natural resources to fulfil daily necessities such as firewood, leaf litter, small pieces of timber and fodder. These regulations allow people to continue to graze their domestic cattle on the park rangeland. They can also help reduce the number of "outsiders" or even stop their entry into the park/reserve to harvest resources, and thus help reduce the exploitation pressure on the park/reserve.

The Tourism Act, 1978: The act contains provisions to minimize waste and environmental pollution in the trekking areas. Scattered regulatory measures are also available in other sectorial laws but they do not clearly spell out the need for EIA studies.

The Mines and Minerals Rules, 2000: It obliges the proponent to adopt environmental protection measures and ensure environmental conservation (Rule 19). Furthermore, the rules 32 and 33 elaborate provisions to minimize significant environmental impacts. This Rule provides an opportunity to identify potential environmental impacts and implement mitigation measures, which is a part of the EIA process.

The Explosives Act, 2018: It is expected that explosives will be used during the construction of the Project. Hence, the provision of the Explosive Act, 2018 also needs to be taken into consideration. Section-3 of the Act states that GoN may declare any substance as explosives through a notification in the Nepal Gazette. Section 4 forbids producing, storing, using, carrying and importing explosives without a license. The Section also provides the person to apply for the license to the Chief District Officer with prescribed descriptions.

Plant Protection Act, 2029 (1972) and Rules, 2031(1974): It makes a provision for establishing labs, checkpoints and quarantine stations. The rules make treatment requirement of plants before import and export, and compliance of import and export formalities including phytosanitary certificate. It makes a provision for appointing a Plant Protection Officer. Appeal could be made to Director,

Department of Agriculture. The decision of the Director, in turn, may be appealed to an officer designated by the Government.

Pesticides Act, 2048 (1991) and Rules, 2050 (1993): This act aims to regulate quality of pesticides, production, sale and use of pesticides, Pesticides Registration Agency's permit obligatory for the import, permit required for persons wishing to be a professional sprayer with the validity for five years, Pesticides Committee to cancel or suspend registration of pesticides proved ineffective or harmful to people or animals or environment, and appointment of Pesticides Inspector.

Seeds Act, 2045 (1988) and Rules, 2054 (1997): The key provisions and regulatory features include: National Seeds Board to coordinate production and distribution of seeds both in public and private sectors; issue license for import and export of seeds; provide ownership rights to breeder of new seeds; sub-committees to set quality standards of seeds; sub-committee to approve, release and register new seeds; approve quality standards of seeds produced by domestic and foreign agencies; establishment of Seeds Certification Agency; establishment of Central Seeds Laboratory; Designating Public Analyst (Seeds); classify certain species or variety of seeds essential for agriculture as "designated seeds" for the purpose of regulating their use; restriction for selling designated seeds the species or variety of which is not identifiable or do not fulfill the minimum condition of germination or purity; permit necessary for import or export of designated seeds; standard formats for approval or release of new breed, registration, ownership of new seeds and export and import of seeds.

Chemical Fertilizer (Regulatory) Order, 2055(1998): The Order was issued under the power granted by the Essential Commodities Control Act, 1960. Regulatory provisions include procedures for import, manufacture or mixing, quality control and penalties. The Fertilizer Board has been given the authority to advise the government in the formulation of policy, priorities, specifications, and quality control; setting a system of quality control before the entry of fertilizers into the country and at the point of distribution; and permit for manufacturing or mixing of fertilizers in the country. Manufacturer needs to obtain a certificate from an independent surveyor about the specifications of the fertilizers manufactured and the dealers have to register and provide information about the sales to the District Agriculture Development Office.

Animal Feeds Act, 2033 (1976) : This Act prohibits production, sale, export and import or storage of contaminated and polluted feeds; prohibit selling of feeds by falsely claiming a different product or higher in quality. Government has to set a minimum standard of feed. Appeal may be made to the Appellate Court

Food Act, 2023 (1966) and Rules, 2027 (1970): Government is authorized to issue orders from time to time about the quality of foodstuffs; such orders will be published in the Nepal Gazette. This Act and Regulation make provision for constituting a Board for setting the standard of food, and for designating food analyst and Food Inspectors for monitoring compliance of quality standards of food set by the government. Appeal may be made to the Appellate Court

Consumer Protection Act, 2054 (1998) and Rules, 2056 (2000): The Consumer Protection Act and Rules deal with the protection of the rights of consumers from the sale of goods and services that affects adversely the life, property and health. It ensures the rights of consumers to be informed about the price, property, quantity, purity and quality standard of goods and services and protect themselves from unscrupulous trade, the rights of consumers to choose goods and services at competitive price, and the rights of the consumers to be heard against exploitation by unscrupulous business and the right to compensation.

Land Acquisition Act, 2034 (1977), Land Acquisition Regulations, 2026 (1969) amended in 1992: This act and regulation empowers the government to acquire land for development purposes, by paying compensation to the landowner. The act clearly empowers the government to acquire necessary land at any place in any quantity by giving the compensation for the land required for any public purpose or for operation of any development project initiated by government institution (Section 3 and 4).

Furthermore, government may decide to have the land acquired for any institution, in case such institution requests the Government for acquisition of land for any of the following purposes subject to payment of compensation and all other expenses under this Act:

- Construction of residential quarters for the staff, workers or labourers of the institution, or undertake any function in the interest of the general public,
- Project connected with an institution fully owned by the Government

The term “public purposes” means functions undertaken in the interest of or for the benefit or use of the general public projects approved by the Government, and projects undertaken by Village Development Committees (VDCs), Municipalities and District Development Committees (DDCs).

While determining the amount of compensation for land to be acquired for institutions other than VDCs, Municipalities, DDCs, and institutions fully owned by Government, the compensation fixation committee shall take the following matters into consideration:

- The price of land at the time of the publication of the notice for land acquisition
- The value of the crop, houses, walls, sheds etc if any acquired along with the land
- The losses which the concerned person would suffer as a result of acquisition having been required to shift his residence or the place of his business by reason of the acquisition of his land.

There is also provision to acquire land through negotiation; the government can acquire land for the purpose of public work by directly negotiating with the owner.

The Government shall provide compensation to the concerned person and organization as decided by the Compensation Fixation Committee. The committee consists of Chief District Officer, Chief District Land Administration and Revenue Officer, Project Chief and the Representative of the DDC. The compensation paid under this Act will be in cash. However, under the Section 14 of the Act it is stated that, the Government may allot land to those people whose land has been acquired, from the land it possess such as Ailani, or Government-owned any other land, and if they prefer land for land.

Land Acquisition Guidelines under the Land Acquisition Act 2034 (1977) empowers government to acquire any land, on the payment of compensation, for public purposes and works. This policy is supplemented by guidelines and procedures for land acquisition. Land acquisition processes including required time are given in the report (Annex 3.3.).

Two sets of guidelines related to land acquisition are significant for RAIP. They are the Land Acquisition Guidelines of 1989 and guidelines issued by HMGN pursuant to section 16 and 17 of the Land Acquisition Act 2034 in 1977. These guidelines specify two categories of affected families, Project Affected Families (PAF) and Seriously Project Affected Family (SPAF). A PAF consists of the members of a household including elderly dependents and minor children (under 18 years of age) residing under one roof and operating as a single economic unit, who are adversely affected by the project. SPAF is defined as a family who loses over 25% of its total land holdings or whose land is reduced to an uneconomic holding (less than 5.0 katha) or who is being displaced. Under these guidelines the concerned officials, with the assistance of the project team, are to carry out assessments of project affected families to identify their standard of living and types of assets. Valuation of land and asset lost were to be based on comparative market values of similar assets in the vicinity. The guidelines also included arrangements for rehabilitation of project affected families. For PAF's, the compensation package includes cash for assets acquired or damaged by the project and a rehabilitation grant to cover any suffering and hardship. For SPAF's, the compensation additionally include employment for one family member and provision of skill training. The Guidelines specify the establishment of an Acquisition and Rehabilitation Committee (also known as Compensation Fixation Committee, "CFC") consisting of the concerned Chief District Officer (Chair), Land Revenue Officer, representative of the District Panchayat (now DDC) and the Project Manager and others as deemed necessary. The Committee is responsible for acquiring land and paying compensation. In 1993, a second set of guidelines reduced the Acquisition and Rehabilitation Committee to a four-member Compensation Fixation and Rehabilitation Management Committee by dropping the Land Revenue Officer and other appointees by GoN. The functions and powers of the committee were clarified as were methods of payment and means of ensuring fair valuation of land quality.

National Policy on Land acquisition, Compensation and Resettlement, 2006: The policy describes about the indigenous people, vulnerable groups, project affected persons, and seriously project affected persons/families in the context of compensation and resettlement. This policy recognizes compensation at replacement cost for the loss of land, assets or income of affected persons and their relocation. This policy outlines the resettlement principles.

Guthi (Religious Trust Land) Corporation Act, 1976: According to the act, the land acquisition must comply with the provisions of the Guthi Corporation Act. Section 42 of this Act makes it clear that *Religious Trust Land* acquired for development purpose must be replaced with land instead of being compensated in cash.

The Act for National Academy for Uplift of Adivasi / Janajati Act 2058 (2002) : This Act has defined “nationalities” (Adivasi) and indigenous people (Janajati) as people having their own mother tongue, distinct traditional cultural identities and social structure. This definition apparently is very close to the World Bank definitions on the indigenous people. The Act has enlisted 59 such caste / ethnic groups prevailing in Nepal.

Local Self Governance Act, 2055 (1999): This act provides more autonomy to District Development Committees, Municipalities and Village Development Committee. The Act empowers the VDCs, DDCs and Municipalities to conserve manage and use their natural resources and collect tax, revenue from the sale and use of such resources and use it for local development. Section 220 of the Act has provisions for revenue sharing with DDC, natural resources, including water resources. There are provisions relating to agriculture development; it authorizes the local bodies to plan and carry out agricultural development programme and arrange agricultural *Haat* (village market). It facilitates the development and operation of Veterinary Hospitals, and development of pastures for livestock grazing.

The Interim Constitution of Nepal 2007: The Interim Constitution of Nepal (2007) includes provisions that support gender equality and social inclusion. It has a separate article for women’s fundamental rights (Article 20) and is more inclusive toward Janajatis, Dalits, and Madhesis. As per article 20 of the the Interim Constitution of Nepal 2007 “no woman shall be discriminated against in any way on the basis of gender” It sets forth the right to equality and to rights against untouchability, racial discrimination, and exploitation (e.g., forced labor). It also authorizes the State to implement measures for the “protection, empowerment and advancement of women, Dalits, indigenous nationalities, and Madhesis” (Article 13). Similarly, the 2007 amendment to the Civil Service Act reserves 45% of vacant posts for excluded groups, allocated as follows: women (33%), ethnic groups (27%), Madhesis (22%), Dalits (9%), differently abled (5%), and backward regions (4%) to increase the effectiveness and responsiveness of the civil service.

Gender and Child Rights Mainstreaming Guidelines 2005: This guidelines was approved by the Cabinet of GON in 2061 (2005), aiming at enhancing gender equality and promoting the mainstreaming of gender and child rights, and welfare works in local level. Women Development Office (WDO) was appointed as Focal Point Agency and Women Development Officer is referred to the Chief of Focal Point Agency. Working areas of the Focal Point Agency are; a) Networking, b) Mainstreaming, c) Facilitation, d) Coordination, e) Contact Services, and f) Follow-up and Evaluation.

Land Act, 2021(1964) and Rules, 2021(1964): The Land Act and Rules limit land holding of a person or family as landowner. As per the Act the maximum ceiling one can hold depends upon the location of land in ecological regions of the country-10 bigha (about 6ha), 25 ropanis (1.25ha) and 70 ropanis (3.5ha) in Terai, Kathmandu Valley and hills, respectively. It also puts a ceiling on tenants for holding land up to 4 bighas, 10 ropanis and 20 ropanis in Terai, Kathmandu Valley and hills, respectively. This Act exempts institutions such as government, local bodies, medical and educational, Guthi (Trust land) and foreign agencies enjoying diplomatic facility from ceiling of ownership of land. It allows land holding above the ceiling for industrial and agricultural purposes under certain condition and as prescribed by

the government, and also allows cooperative societies to hold land above the ceiling as prescribed by the government. Furthermore, it authorizes the government to implement a programme for control of land fragmentation and consolidation of land. It provides appropriate facilities as required to a group of ten or more landowners who want to implement cooperative farming for increasing agricultural production. It provides procedures for consolidation of land and authorizes the government not to allow fragmentation below a certain unit of land in the area where the programme for control of fragmentation and consolidation of land has been started. The Act has made provisions to make facilities available for farmers wishing to adopt cooperative farming.

Legal Aid Act 1998: The act seeks to improve access of the economically under-privileged and other disadvantaged groups like Dalit, women and other ethnic groups to *justice system*.

Labour Act 1992: The act makes provision for a healthy, safe and secure environment for workers. It directs industries or any enterprise to arrange proper residence facility for workers. Enterprises have to set aside obligatorily 5% of gross profit for workers residence. Industries require waste management and the control of noise pollution in the working area. As per this Act, only Nepalese citizens can be employed on a permanent basis in any enterprise and the industries employing non-Nepalese specialists on a contract basis would need permission from the Labour department. Matters relating to workplace conditions including workplace standards, protections for working women and vulnerable people, and minimum wages are governed by this act and Child Labour (Prohibition and Regulation) Act, 1999. According to Section 16 an employee or worker has to work 48 hours per week. He/She is allowed a break of 30 minutes in a day. Section 21 of the Labour Act authorizes the government to fix minimum wages of workers and employees upon recommendation of the Minimum Wages Fixation Committee consisting of equal number of representatives of workers or employees, owner of the enterprise and the Government. The Government, by publishing a notice in Nepal Gazette in August 2006, has fixed the minimum wages of different categories of workers.

Working Conditions: Matters relating to workplace conditions including workplace standards, protections for working women and vulnerable people, and minimum wages are governed by Labour Act, 1991 and Child Labour (Prohibition and Regulation) Act, 1999.

Working hours: An employee or worker has to work 48 hours per week. He/She is allowed a break of 30 minutes in a day (Section 16, Labour Act (LA), 1999).

Workplace conditions: The owner should provide a clean and tidy workplace to workers (Sec. 27, LA) and safety against fire (Sec. 30, LA). Minors (16 to 18 years of age) should not be engaged at work without adequate direction and training (Sec. 32A, LA).

Housing: The owner should allocate not less than 5% of the gross profit to make provision for housing (Sec. 41, LA). Workers of the Tea Estate should be provided with housing facilities for workers who do not have a house close to the factory site (Sec. 45, LA).

Protections for working women and vulnerable people

Working hours: Minors (Between 16 to 18 years of age) and females may be engaged in work normally between 6 AM to 6 PM (Sec. 5, LA). Females may be deployed at work in a hotel and travel agency beyond the regular hours by making special arrangements for safety according to the nature of work (Sec. 48, LA).

Minimum Wage: Section 21 of the Labour Act authorizes the government to fix minimum wages of workers and employees upon recommendation of the Minimum Wages Fixation Committee consisting of equal number of representatives of workers or employees, owner of the enterprise and the Government.

Child Labour

Section 2 of the Child Labour (Prohibition and Regulation) Act, 1999 (CLA) defines child as someone who is below the age of 16 years. Section 3 of the CLA prohibits employment of a child below 16 years of age as worker. It prohibits employing a child in hazardous work. The Act includes services such as workshops, labs, slaughterhouses, cold storages as hazardous work. It also includes work such as manufacturing or production of pesticides and collection of solid wastes in the list of hazardous work. Production of biogas is also included in the list of hazardous work or enterprises.

Prohibition and Regulation Act, 1999 : The act defines child as someone who is below the age of 16 years. Section 3 of the CLA prohibits employment of a child below 16 years of age as worker. It prohibits employing a child in hazardous work. The Act includes services such as workshops, labs, slaughterhouses, cold storages as hazardous work. It also includes work such as manufacturing or production of pesticides and collection of solid wastes in the list of hazardous work. Production of biogas is also included in the list of hazardous work or enterprises.

First Five Year Plan (1956-1961): The plan was the first planned process of development in Nepal while Sixth Five Year Plan (1980-1985) had first mentioned the need for EIA for major infrastructure projects. Government had established a project entitled “Environmental Impact Study Project” (EISP) under the Ministry of Forest and Soil Conservation in 1982. During 1982 to 1988, EISP prepared draft documents on environmental policy, environmental act and guidelines and conducted EIA on several ongoing infrastructure projects. However, the efforts at project level became ineffective, due to lack of interest of the decision-makers and the politicians (Bhattarai, 1999).

Seventh Five Year Plan (1985-1990), first time a national level policy on environment management was incorporated. The policy emphasized to carry out EIA for all major development projects such as tourism, water resources, infrastructure, forestry and industry. However, implementation of EIA policy was not realized to the extent previewed. EIA was carried out in hydro-power development, irrigation and drinking water and road construction without mandatory requirement of the Government, though, but rather as a requirement stipulated by loan and donor agencies. The Nepal Government/National Planning Commission (NPC) and International Union for Conservation of Natures (IUCN) developed and endorsed the National Conservation Strategy (NCS) in this period for sustainable management of natural resources and the protection of the environment. The NCS for Nepal was prepared jointly as an inter-

sectoral umbrella policy at the national level for addressing environmental issues during the development process.

Eighth Five Year Plan (1991-1995): The plan reemphasized the need for an EIA system to integrate environmental concerns into the development process. The Eight Five Year Plan anticipated the establishment of a national system for EIA and stipulated that EIA be conducted at the stage of feasibility study.

Ninth Five Year Plan (1998-2003)

A participatory EIA system

Poverty alleviation as the main objective

Integration of economy and ecology

Emphasized to make necessary procedures for the involvement of local bodies, communities, private sector, NGOs and government agencies

Focused on the need for conducting EIA study in order to ensure biodiversity conservation while implementing development projects in remote area

Institutional strengthening and legal provision

Use of economic instruments

Industry-specific discharge standards for water and air and appropriate compliance plan for industries

Establishment of national environmental data bank and easy access to public

Environmental programmes with the involvement of women and poverty-stricken people

Resettlement Policy Status in Nepal: Nepal's history of resettlement policy started with the establishment of Rapti Development Board in 1956. Supported by US assistance, it was meant to resettle flood victims of 1955 in Chitwan Valley by bringing forest land under cultivation. In 1963, Nepal Resettlement Company was established under the Ministry of Food and Agriculture. The company executed resettlement programs in the Tarai districts of Banke, Nawal Parasi and Jhapa. After five years of establishing Nepal Resettlement Company, a Resettlement Department was established within the same Ministry. The department mainly executed resettlement of displaced people on forest land designated for clearance with ten regional offices. For some time, both these agencies existed simultaneously and performed overlapping functions at times. The project specific policies for involuntary resettlement have resulted in disparities between Government funded projects and donor-financed projects. These discrepancies have given rise to clear discrimination in the provision of

compensation packages and resettlement schemes among people affected by these projects. Likewise, the following are some of the areas and issues that the LAA 1977 overlooks:

it has no provisions for granting compensation to project affected people lacking ownership of land;

It does not address hardship caused from delays in payment of compensation for several years after the completion of the project;

The LAA1977 lacks in mechanisms to ensure ethnic minorities and vulnerable groups—Adivasis/Janjati, Dalits and women—use compensation money in a manner that would enable them to restore their living standards at least to levels prior to the project; and

It does not analyze the limitation of land for land compensation.

Tenth Periodic Plan (2002-2007) : The plan seeks to reduce poverty from 38% to 30% by 2007 through emphasis on four key areas, high, sustainable, and broad based economic growth, social sector and rural infrastructure development; targeted program for the ultra-poor, vulnerable and deprived groups; and good governance. This plan includes genetic resources and biodiversity conservation programs in sustainable manner.

Tenth Five Year Plan, 2003 Conservation of biodiversity through management of buffer zone involving local user groups, promote & encourage Eco-tourism in the protected areas. Conservation of biological diversity will be achieved through the utilization of landscape approach, community participation, and soil conservation in sustainable way forming basis for development,

Three Year Interim Plan (2007/08 – 2009/10)

Long term Vision: To achieve sustainable economic development by reducing environmental impacts

Objectives: To carry out economic development by reducing pressure on the environment through implementation of international conventions and agreements

Policies and working policies adopted in the three-year interim plan are as follows:

Formulation and implementation of an integrated policy related to environment.

Adoption of environmental standards and widening implementation of cleaner production, energy efficiency, environmental monitoring and auditing works

Formulation, implementation and monitoring of the programs in accordance to the treaties, conventions and agreements on environment that are endorsed by and to which a Nepal is a party

Implementation of programs as infrastructures development and socio-economic development works in which the aspects of environment are integrated and making implementation status public on a regular basis

National Action Plan on Disaster Management, 1996 emphasizes all phase of the disaster risk management: preparedness, response, reconstruction & rehabilitation and mitigation to deal natural disasters.

Three Year Interim Plan (2007/08 – 2009/10): Nepal's Constitution does not permit discrimination on the basis of sex and advocates special legal provisions to protect and advance the interests of women. The Interim Constitution of 2007 includes women's rights, gender equality and the empowerment of women as important liabilities and responsibilities of the State in legal and moral terms. ("Three Year Interim Plan 2007/08-2009/10", NPC, p. 102). In the Three Year Interim Plan, Chapter eight highlights the issues of women and socially disadvantaged groups (vulnerable groups) and describes the problems, challenges, objectives, strategies, approaches and programs to target following six social groups.

i) Empowerment of Women and Gender Equality

The objectives are to build and equitable and gender inclusive society by ensuring equal rights of women of all castes, creed and regions. To achieve these objectives, policy and legal reforms as well as other necessary measures will be taken to ensure at least 33 % representation of women in the policy and decision making process at all levels. Tasks will be undertaken to create strong environment, including legal framework to end all kinds of violence and gender discrimination against women. A special program will be run to protect the rights of conflict victims and internally displaced women, and to rehabilitate them. Active and meaningful participation of women in conflict resolution and peace building will be ensured.

ii) Upliftment and Development of Dalits

The objective is to increase the access of Dalits to the social and economic resources and thereby promote their representation and influence in proportion to the population. The strategies are to reform state structure, policies and rules to eliminate the constraints of Dalits upliftment.

iii) Adibasi Janajati

The objective is to promote economic and cultural development of Adibasi Janajatis by increasing their access to the administrative, social and economic resources. The strategies are to reform existing state structure, laws and policies which present hindrances to the promotion of interests of Adibasi Janajatis.

iv) Madhesi Community Development

The objective is to improve living standard of the Madhesi community by increasing their access to the administrative, social and economic resources in proportion to their population. The strategies are to revise state machinery, policies and rules to remove the hindrances of policy and structural nature to integrate Madhesi community in all state organs. Other backward class is also included in this group.

v) Muslim Community

The objective is to increase access of Muslim community to social and economic resources and to increase their representation in proportion in the state organs. The strategy is to achieve proportionate representation of Muslim community in decision process and decision making mechanism.

Vi) Persons with Disability

The objective is to create persons with disability-friendly environment, free of obstacles and enabling them to access to all possible facilities for a just, dignified and independent livelihood. The strategies are to build legal, institutional, physical and economic infrastructure, to empower persons with disability economically, socially and politically.

Local Bodies Gender Budget Audit Guideline 2008: This guideline was approved by Ministry of Local Development in May, 2008, aiming at institutionalizing and promoting the system of equitable development gender mainstreaming in Local Bodies and its partner organization's policy and programs. The specific objectives are:

To institutionalize gender mainstreaming in annual and periodic plan of LBs

To incorporate the gender inclusion goal in the structure and plan of action of LBs

To monitor and evaluate the LBs resources mobilization, budget allocation and expenditure

To contribute to Millennium Development Goals

To institutionalize gender responsive good governance system

The scope of work are ; a) disaggregated data, b) gender mainstreaming, c)gender responsive capacity building, d) ensuring program and budget, e) facilitation, f) Coordination, g) guidance, h) monitoring and evaluation, i) gender budget audit, j) gender analysis and self evaluation, k) good governance, l) exchange of experiences and learning , and m) documentation.

Gender and disadvantaged groups related budget guidelines: National Planning Commissions (NPC) issues budget guidelines with close coordination with Ministry of Finance. Several guidelines and schemes have been put into effect regarding budgetary regulations. They include:

i)Expanded Block Grant Guideline, DDC, 2065: It earmarks 30% of total DDC budget for projects to benefit women and disadvantaged groups. At least the Grant earmarks 15% of capital budget for programs for women, Dalits, Adibasi Janajati, the disabled, Madhesi, Muslims, backward caste groups, the elderly, children and youth. The challenge will be in ensuring that the implementation does not dilute its effectiveness.

ii) Local Bodies Gender Budget Audit Guideline, 2064 issued by MLD and approved by GON and Ministry of Finance, guiding how to do gender audit. This guideline is comprehensive and covers many aspects of

mainstreaming gender into the planning and program cycle of local bodies. However, it is limited to gender aspects alone and does not provide specific guidance on how to do Gender Mainstreaming and Social Inclusion (GM/SI) responsive budgeting from the holistic point of view. The Ministries and districts have yet to practice gender-responsive budgeting on an institutional basis.

World Bank Safeguard Policies

The World Bank's environmental and social safeguard policies concern of its support to sustainable poverty reduction. The objective of these policies is to examine the potential environmental risks and benefits associated with Bank investment lending operations. It is an essential tool for integrating environmental and social concerns into development policies, programs and projects by providing minimum requirements that all Bank-supported operations must meet.

Environmental Assessment (OP/BP 4.01): It is conducted to ensure that Bank-financed projects are environmentally sound and sustainable, and that decision-making is improved through appropriate analysis of actions and of their likely environmental impacts. EA evaluates a project's potential environmental risks and impacts in its area of influence; examines project alternatives; identifies ways of improving project selection, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts; and includes the process of mitigating and managing adverse environmental impacts throughout project implementation. EA takes into account the natural environment (air, water, and land); human health and safety; social aspects (involuntary resettlement, indigenous peoples, and cultural property); and trans-boundary and global environmental aspects. It also takes into account the variations in project and country conditions; the findings of country environmental studies; national environmental action plans; the country's overall policy framework, national legislation, and institutional capabilities related to the environment and social aspects; and obligations of the country, pertaining to project activities, under relevant international environmental treaties and agreements. The Bank does not finance project activities that would breach such country obligations, as identified during the EA.

World Bank undertakes environmental screening of the project to determine the appropriate extent and type of Environmental Assessment (EA).

Forestry (OP/BP 4.36): This policy aims to reduce deforestation, enhance the environmental contribution of forested areas, promote afforestation, reduce poverty and encourage economic development. The Bank does not finance projects that, in its opinion, would involve significant conversion or degradation of critical forest areas or related critical natural habitats. This policy aims to reduce deforestation, enhance the environmental contribution of forested areas, promote afforestation, reduce poverty, and encourage economic development

Natural Habitats (OP/BP 4.04): This policy affirms WB's commitment to promote and support natural habitat conservation and improved land use, and the protection and rehabilitation of natural habitats and their functions in project financing. Natural habitats comprise many types of terrestrial, freshwater, coastal, and marine ecosystems. They include areas lightly modified by human activities, but retaining

their ecological functions and native species.. WB does not support projects that involve significant conversion or degradation of critical natural habitats.

Involuntary Resettlement (OP/BP 4.12):The key objectives of the World Bank's policy on involuntary land acquisition are to avoid or minimize involuntary resettlement where feasible, exploring all viable alternative project designs; assist displaced persons in improving their former living standards, income earning capacity, and production level, or at least, in restoring them; encourage community participation in planning and implementing resettlement; and provide assistance to affected people regardless of the legality of land tenure. The policy provides guidelines for mitigating the adverse effects of development projects including social and environmental impacts such as land acquisition, relocation, loss of occupations and income sources, productive assets as well as community resources. The policy covers not only physical relocation, but any loss of land or other assets resulting in relocation or loss of shelter; loss of assets or access to assets; loss of income sources or means of livelihood whether or not the affected people must move to another location. When the policy is triggered, Resettlement Action Plan (RAP) must be prepared. An abbreviated plan may be developed when less than 200 people are affected by the project. In situations where all the precise impacts cannot be assessed during project preparation, provision is made for preparing a Resettlement Policy Framework (RPF). The RAP/RPF must ensure that all the Bank's policy provisions detailed in OP 4.12 are addressed particularly the payment of compensation for affected assets at their replacement cost.

Physical Cultural Resources (OP/BP 4.11):The key objective of this policy is to assist in preserving Physical Cultural Resources (PCR) and in avoiding their destruction or damage. PCR includes resources of archeological, paleontological, historical, architectural, religious (including graveyards and burial sites), aesthetic, or other cultural .Cultural resources are important as sources of valuable historical and scientific information, as assets for economic and social development, and as integral parts of a people's cultural identity and practices. The loss of such resources is irreversible, but fortunately, it is often avoidable.

Indigenous People (OP/BP 4.10): The main objectives of the Indigenous People Policy are to: (i) ensure that indigenous people affected by World Bank funded projects have a voice in project design and implementation; (ii) ensure that adverse impacts on Indigenous Peoples are avoided, minimized or mitigated; and (iii) ensure that benefits intended for indigenous peoples are culturally appropriate. This policy underscores the need for Borrowers and Bank staff to identify indigenous peoples, consult with them, ensure that they participate in, and benefit from Bank-funded operations in a culturally appropriate way - and that adverse impacts on them are avoided, or where not feasible, minimized or mitigated.

Pest Management (OP 4.09): Rural development and health sector projects have to avoid using harmful pesticides. A preferred solution is to use Integrated Pest Management (IPM) techniques and encourage their use in the whole of the sectors concerned. In appraising a project that will involve pest management, the Bank assesses the capacity of the country's regulatory framework and institutions to promote and support safe, effective, and environmentally sound pest management and uses various

means to assess pest management in the country and support integrated pest management (IPM) and the safe use of agricultural pesticides.

Projects on International Waterway (OP 7.50): The objective of the policy is to ensure that the international aspects of a project on an international waterway are dealt with at the earliest possible opportunity and that riparian's are notified of the proposed project and its details. It may affect the relations between the World Bank and its borrowers, and between riparian states. Therefore, the Bank attaches great importance to the riparian making appropriate agreements or arrangements for the entire waterway, or parts thereof, and stands ready to assist in this regard.

Projects in Disputed Areas (OP 7.60): The objective of the policy is to ensure that other claimants to the disputed area have no objection to the project, or that the special circumstances of the case warrant the Bank's support of the project notwithstanding any objection or lack of approval by the other claimants. Project may affect the relations between the Bank and its borrowers, and between the claimants to the disputed area. Therefore, the Bank will only finance projects in disputed areas when either there is no objection from the other claimant to the disputed area, or when the special circumstances of the case support Bank financing, notwithstanding the objection.

Safety Dams (OP.4.37): The policy objective is to ensure quality and safety in the design and construction of new dams and the rehabilitation of existing dams, and in carrying out activities that may be affected by an existing dam. When the WB finance new dams, this policy requires that experienced and competent professionals design and supervise construction and that the borrower adopts and implements dam safety measures through the project cycle.

Annex 3.2: Land Acquisition Process

Step	Action	Responsibility	Time Required	Clause No. in LAA
1	Identifies the areas of land to be acquired and requests authorization from the concerned Ministry or Department to proceed with acquisition	Project Manager (PM)	Determined during feasibility/ engineering design work	3,4
2	Ministry/Department officially authorizes the PM to initiate preliminary action for land acquisition	Ministry of Department	½ month	5
3	Issues notice of preliminary action and affix it in proper places for information.	PM	1 month	6 (1)
4	After 3 days, begins survey of land and prepares map, measures dimensions of houses/walls, counts trees to be felled and assesses the amount of standing crops to be cut, etc. Estimates compensation for lost houses, trees, crops, etc. Completes preliminary action within 15 days and submits all documents to Chief District Officer (CDO) for further action.	PM	1-2 months	6 (2,3) 7 8 (1)
5	May complain to the CDO about the amount of compensation for houses, trees, crops, etc.	Land Owner	½ month	7 (3)
6	Review's PM's documents from preliminary action and decides on complaints of compensation for losses. CDO's decision is final.	CDO	2 months	9 (1)
7	Issues a land acquisition notice which should be displayed at the following places:	CDO	2-3 months	9 (2)

	<ul style="list-style-type: none"> • The local office of the concerned project • District Administration Office • The concerned VDC/Municipality offices • Land Administration or Revenue office • Thoroughfares located around the concerned lands • Such other places as the CDO may deem appropriate <p>The notice should also indicate that the land owners shall submit an application claiming compensation within a minimum time limit of 15 days, with evidence of the land ownership certificate. The time limit will</p> <p>be allowed for the owners to fell trees or cut standing</p> <p>crops, demolish houses or walls to the land owners.</p>			
8	<p>Inform land owners who may not see the notice.</p>	CDO	½ month	9 (3)
9	<p>After receiving the land acquisition notice, suspends</p> <p>any land transaction until the directs it to lift the suspension.</p> <p>Land Revenue</p> <p>Office</p>	CDO	½ month	9 (4)
10	<p>CDO forms a Compensation Fixing Committee (CFC)</p> <p>of the following officers to determine the amount of compensation payable:</p> <ul style="list-style-type: none"> • CDO • Land Administrator of Chief of the Revenue office • PM in the case of a project and officer designated by • the CDO for other purposes • A representative of the DDC • CFC will determine the amount of compensation considering: • Current price of land • Value of standing crop, houses, walls, sheds, etc. • Loss incurred as a result of shifting residence or • place of business 	CFC	2 months	13 (2)

11	CDO prepares list of persons entitled to compensation and issues notice of the same.	CDO	½ month	18 (1)
12	Any person who is not satisfied with the list may file a complaint to Ministry of Home (MoH) within 15 days.	CDO	1 month	18 (2)
13	May complain to MoH through the CDO within 7 days giving reason why his land should not be acquired.	Land Owner	½ month	11 (1)
14	Before taking a decision on the complaint filed, the MoH shall consult the officer responsible for preliminary action and, if necessary, the CDO. MoH shall exercise the powers vested in a district court, such as summoning witnesses recording statements, or procuring document. MoH will notify the CDO about the final decision of the complaint.	MoH	3 months	11 (2) 11 (3)
15	Takes possession of the concerned land and hands it over to concerned office for which it is acquired after: Finalization of the amount of compensation by the CFC Decision has been made on complaint, or At any time after expiry of the time limit for filing complaints	CDO	2 months	12 (10)
16	Notifies the amount of compensation payable by the concerned Ministry of Department.	CDO	½ month	19

17	Authorizes the PM to make compensation payment to the land owners.	Ministry or Department	½ month	13 (1)
18	PM makes payment to land owners in presence of Revenue Officer, CDO and DDC officers' representatives.	PM	2 months	13 (2)
19	Must receive compensation amount within a time limit of 3 months after which he will not be entitled to any compensation	Land Owner	3 months	37
20	Takes possession of the land and hands it over to the concerned Ministry or Department and notifies HMG/N.	CDO	2 months	22
21	Obtains land ownership certificate and deposits copies with concerned ministry, department and project office.	PM	1	month

Annex 4.1.Environmental and Social Implications Subcomponent wise

Subcomponents	Major Environmental and Social Implications
Detailed design of the DHM system Program	<p>i) Most of the field level staffs (working staffs) especially women and marginalized individuals (station observers) are not familiar with department's activities (sometimes isolate from the department). In this situation, likelihood of excluding in consultation with those persons while designing of future DHM system.</p> <p>ii) The local vulnerable communities (socially, economically disadvantaged groups) are hardly aware about the services of the department. In this condition, social implication due to lack of knowledge about the department's services. The voices of those communities about the DHM's services are hardly included in the new system of the department.</p>
Capacity Building	<p>i) Likelihood of less participation of field level staffs-Women, isolated persons in capacity building trainings.</p> <p>ii) Probability of less participation of powerless and marginalized people in on-the job-training</p> <p>iii) Vulnerable groups especially women are likely to be isolated from advanced computer training</p> <p>iii) Probability of brain drains</p>
DHM Institutional development and networks restructuring options	<p>i)Likelihood of unbalancing of roles and responsibilities of women and men and controlling resources at field level</p> <p>ii) Due to a several limitations in the government administrative system, it may cause a less priority for the active consultations at all levels(from central to field level) and at concerned stakeholders as well. As a result, probability of weak chance of addressing gender equality (equal rights, opportunities, and responsibilities of women and men) in developing operational guidelines and strategic road map of the department.</p>
Development of a Legal and Regularity Framework for DHM operations (testing new business models and enhancing the existing Public Private Scheme)	<p>i) Likely exclusion of small and marginalized farmers through private sectors involvement in sharing and operanilizing HM services.</p>

Subcomponents	Major Environmental and Social Implications
Operational Support from Advanced NMS	i) Likely leaving out of local community and socially, & economically marginalized ethnicities to access on-the-job training
Implementing Training Activities for Major Users Agriculture, Water resources, Energy, Health, Civil aviation, DRR	i) Possibly exclusion of vulnerable communities to involve in capacity building activities to utilize weather and water related data and information. Communities are vulnerable due to lack of coping capacity to cope with climate extremes
Development of environmental quality and needs assessment and design of air and water quality monitoring networks	i) Air quality monitoring system is based around a programmable data-logger that could not cause adverse impacts on natural systems.
Project management, Monitoring & Evaluation (managed by DHM) Program	PMU is expected to include manager, procurement specialist, administrative support, technical manager, financial management specialist, and a social scientist. In this regards, likelihood of exclusion of gender equality (economic & social rights and participation & decision making)
Technical Modernization of the Observing networks	<p>i) Automatic hydro gauging network consists of Digital Type Water level Recorder-Pressure Type/Bubbler Type/Radar type level, self contained power source system, solar panel, filled with Data Logger and it works pulse principle –a short microwave impulses through sensor system, and telemetry system. Impacts due to microwave on any natural and human systems would not be significant. However, some prequations like tolerable frequency range, radio wave detecting instruments etc need to be considered.</p> <p>E-wastes and backup power system (including batteries) may contain various types of hazardous substances including mercury, lead, sulfuric acid, nickel, cadmium etc. This poses a potential threat to human health and the environment when improperly disposed. These chemical may leach into the land and water, as well as to wildlife and human.</p> <p>ii) Gauge-house with its fencing for AHS requires about 60 sq m lands for automatic hydro-gauging station. Likewise, station of AWS requires about 25m X 25m lands (WMO Recommendation) in idle condition. The public land usually being used by individual or community or agencies and it</p>

Subcomponents	Major Environmental and Social Implications
	<p>might be barren or forest coverage.</p> <p>Likelihood of impacts of lands-private and public. But the lands to be acquired for AWS/AHS would not cause resettlement.</p> <p>iii) Mobile calibration facilities could not occupy lands for a long-time. So it does not show any adverse impacts.</p> <p>iv) The radar dish or antenna transmits pulses of radio waves or microwaves-electromagnetic radiation which bounce off any object in their path to detect the range, speed, and other characteristics of remote objects (weather parameters).</p> <p>Microwave has not been shown finally that microwaves have significant adverse biological effects at low levels.</p> <p>During the stakeholder consultation at district level, local people, leaders, planners, security forces etc are willing to guarantee that there are no any adverse impacts due to the microwaves emitted from Radar. Regarding the implication of Radar-a detailed technical survey with EIA needs to be carried out.</p> <p>vi) Likelihood of adverse impacts due to waste electrical, electronic (e-waste), and metallic equipments. Informal processing of such wastes is in practice may cause health and pollution problems. So, a great care must be taken to avoid unsafe exposure in recycling operations.</p>
Modernization of DHM communication and ICT system	<p>i) Chance of pollution due to e-waste and hazardous materials of solar panel, equipments used in telemetry system..</p> <p>For example: Solar panels generally function for 20-25 years, so the majority of panels manufactured are still in use. However, in years to come, their disposal could become an</p>

Subcomponents	Major Environmental and Social Implications
	issue. So, DHM should ensure about recycling process of such wastes.
Hydro meteorological Forecasting System	i)Likelihood of air and land pollution around the department's premises due to dusts and wastes that would be produced when restructuring/reconstruction of DHM's buildings.
One-stop-shopping for Agriculture data program	i) Farmers with large land holdings may benefit more than others. Likelihood of exclusion of powerless and economically marginalized small farmers
Agriculture, weather and climate outlook advisory systems program	i)Chances of less participation in capacity building of vulnerable communities including ethnic minorities, Dalits, women, marginal and small holders farmers etc because these ethnic groups especially Dalit and small farmers usually have hardly access to resource center.
Developing an Agriculture Insurance Scheme Program	i)Likelihood of exclusion of small land holding farmers to access insurance system because they hardly could pay premium amount for crop insurance
Raising climate resilient agriculture science, practices and applications of agriculture management information system	i)Possibility of exclusion of getting information and knowledge by illiterate farmers. ii) Likelihood of less participation of women, powerless and marginalized people in different kinds of community empowerment activities on climate change and on information dissemination system
Research and Development Program (on Drought and Flood resilient crops)	i) likelihood of exclusion of field level practitioners and marginalized farmers in research works because of several constraints like language, technical know-how, awareness, accessibility etc.
Capacity development, project management, monitoring & evaluation, and dissemination of lesson learnt and best practices program	Likelihood of less participation of women, powerless and marginalized people in different kinds of trainings

Annex 5.1: A brief process for EIA/IEE and some Templates

The assessment process will constitute a systematic approach to the evaluation of a project in the context of the natural, regulatory and environment of the area in which development is proposed as illustrated in following Figure.

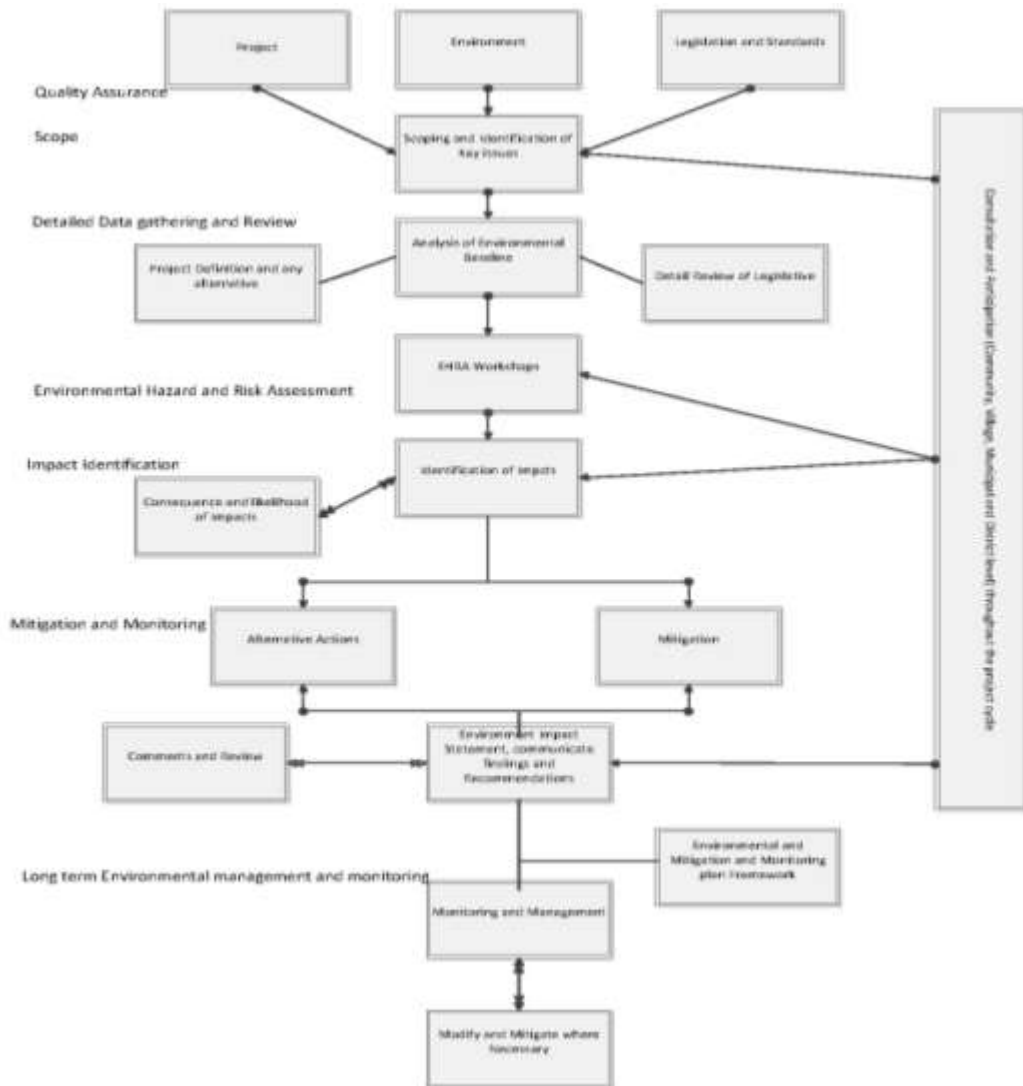


Figure 5.2: Environmental and Social Assessment Process

Quality Assurance

Soon after the commencement of planning and design process, based on desk study, reconnaissance survey and experience of earlier projects, detailed methodology and schedule should be prepared for the effective and timely execution of the Environmental and Social Assessment.

Scoping

Scoping is required for screening. The next step in the Environmental and Social Assessment Process will be to define the proposed project activities and the natural, legal and environment of the area in which development will occur. This will be achieved through Scoping. Scoping will identifies which of the activities has a potential to interact with the environment. Scoping will be conducted early in the Environmental and Social Assessment Process so that a focus on the priority issues can be established for the rest of the Environmental and Social Assessment Process.

Environmental and Social Impact Assessment

Based on the screening results, assembled legislative requirements, engineering, environmental and socio-economic data will be assessed in greater detail to ensure that all of the proposed activities and their consequences/likely impacts are considered in full. In order to identify any potential impact on and potential change to the natural and socioeconomic environments, the environmental and social baseline is necessary to be collected. For true effects prediction the following key questionnaire will be attempted to answer:

- How will a particular project activity give rise to an impact?
- How likely is it that an impact will occur?
- What will be the consequence of each impact?
- What will be the spatial and temporal extent of each impact?

Environmental hazard and risk assessment

Environmental Hazard and Risk Management EHRM is critical so that selection of any alternative is done taking care of all the components. EHRA workshops will be held to identify the potential environmental hazards associated with each proposed activity/alternative having participants comprise of key personnel's from DHM, AMIS of DOA and World Bank team. Workshop will take input from all workshop participants in the identification of potential environmental hazards associated with the project activities and the evaluation of possible alternatives and options. Further, each will used to confirm the impact assessment team understands of the project design and as an opportunity to gather additional information on the project where necessary. All hazards identified will be addressed and mitigation measures will be proposed to counter any adverse impact.

Environmental impacts identification

Based on base line data collected along with engineering and social inputs, a comprehensive study will be taken to identify the possible impact on environmental attributes. The impacts will be defined in terms of their temporal and spatial implication. Once all project environmental and social aspects will be identified, the level of impact that may result from each of the activity-receptor interactions will be assessed. In assessing the level of impact that an activity may cause, two key elements are considered

namely consequence and likelihood. Prioritization of the projects should be done with respect to positive and negative environmental implications of the project and socio-economic benefits of each alternative and finally project having minimum adverse impacts with highest benefits should be selected.

Mitigation and Monitoring Plan

Mitigation is an integral part of impact evaluation. It looks for better ways of doing things so that the negative impacts of the proposal are eliminated or minimized and the benefits are enhanced. As soon as significant adverse impacts are identified, discussions should be held to see if they can be 'designed out' through changes in project design, location or operation.

Identified severe in consequence category and or likelihood category will be further analyzed to identify additional mitigation measures that are potentially available to eliminate or reduce the predicted level of impact. Where mitigation is deemed appropriate, a proponent should strive to act upon effects, in the following order of priority, to:

- Eliminate or avoid adverse effects, where reasonably achievable.
- Reduce adverse effects to the lowest reasonably achievable level.
- Regulate adverse effects to an acceptable level, or to an acceptable time period.
- Create other beneficial effects to partially or fully substitute for, or counter-balance, adverse effects.

Environmental Management Plan

EMP consists of the set of mitigation, monitoring, and institutional measures to be taken during implementation and operation to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels. The EMP identifies feasible and cost-effective measures that may reduce potentially significant adverse environmental impacts to acceptable levels. The plan includes compensatory measures if mitigation measures are not feasible, cost-effective, or sufficient. The EMP should be developed so as to counter the impacts assessed during screening process and also the likely impacts during the construction and operational phase. For the case of High and Moderate impact level plan will be developed in EIA and IEE.

The subprojects that are not under the IEE or EIA threshold but if their implementation could have adverse environmental and social impacts; they fall under Low or negligible category. The environmental social management of subprojects and their selection criteria will ensure that any selected subproject does not adversely affect people particularly the vulnerable and poor and their environment. Meanwhile it may be difficult to assign a value to measure the social harm done by a subproject. In such situation one may have to use his cautious judgment to weigh up the magnitude of damage or loss instead of banking on entirely on the prescribed criteria. In this scenario Project management unit will prepare a general plan following the Environmental Standards, and fill Potential Impact of Project Activities as presented in Annex 5.2 . Project Management Unit (PMU)

will also fill Project Impacts and recommended Mitigation Measures as presented in the Annex 5.3 to know about the mitigation cost.

Department of Hydrology and Meteorology will be the executing Agency executing agency of the BRCRH. On a day to day basis, implementation will be coordinated by a PMU of DHM. The PMU will play a coordinating and facilitating role to all components to implement environment safeguard measures spell out in the ESMF. Environment and social specialist are recommended in a PMU support team. Their role is to review all the documents prior to sending for approval. The PMU will have overall responsibility to ensure that subproject are in compliance with framework and follow all policy principles and procedures to address environmental issues as lay down in the framework.

Sn	Project cycle	Environmental and social Steps
1	Project Identification	Preliminary environmental and social setting of sub project areas
2	Prefeasibility study	Collection of environment and social information for screening and categorization which is duly set up by environmental and social officer and endorsed by DHM, which will be Approved by PMU
3	Feasibility study	Preparation of TOR by Environment and Social officer with support from DHM TOR approval: IEE by concerned Ministry EIA by Ministry of Environment EMP by PMU
4	Appraisal	Responsibility of PMU

Potential Impact of Project Activities

Subproject Activities	Project Impacts	Impact Qualifier			Impact level
A. Construction Phase		Magnitude	Extent	Duration	
Operation Phase					

Description of Impact Qualifier: **Magnitude:** S= Small; M= Medium; L= Large; **Extent:** SS= Site Specific; R= Regional; N= National;

Duration: ST= Short term; MT= Medium term; LT= Long term

Impact level (* = non-significant, ** = significant, *** = highly significant should be calculated on the basis of Impact Qualifier)

Project Impacts and Recommended Mitigation Measures (Reporting Format)

Project Impacts	Mitigation Measures <u>1</u> /	Estimated Cost ('000 Rs)	Responsible Agencies
A. Construction Phase			
B. Operation Phase			

Annex 5.3: Eligibility Criteria for Affected People

Project Affected People (PAP): It includes any public, households regardless of their ownership status as encroachers / squatters etc that will face their living adversely affected; and/or lose their right or title on land, house, habitat, water resources or any other asset possessed, due to the subproject implementation.

Project Affected Families (PAFs): All members of a project affected household residing under one roof and operating as a single economic unit, who are adversely affected by the project or any of its components.

Significantly Project Affected Families (SPAfs): The affected Families who lose 25% or more of their land or income or a residential house because of project intervention.

Marginal Farmer: Farm families having less than 2 Ropani (0.1 ha) of land in hills and 8 Kathas.(0.25 hectare) in the Terai

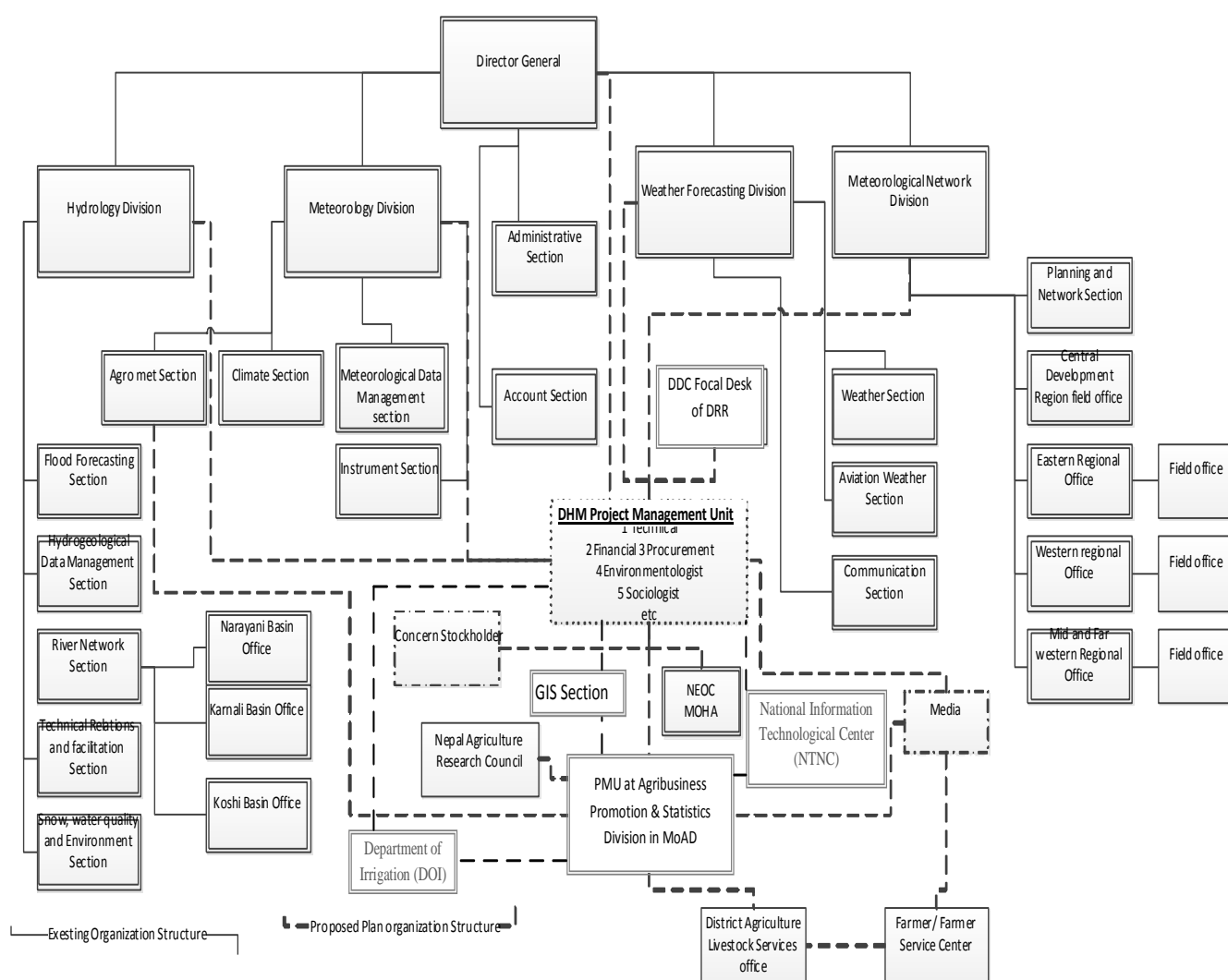
Displaced family: Any tenure holder and his family members, tenant, Government lessee or owner of property, encrocher or squatter on government land who on account of voluntary acquisition or taking of the land or other property for the project purpose, has been displaced from such land or property

Squatters: People who have occupied land violating the laws and are not entitled to compensation for lost land under this policy. But, if displaced they are entitled to resettlement assistance as well as compensation for loss of other assets except land.

Encroachers: People who have trespassed into public/private/community land to which they are not authorized.

Vulnerable Groups: Distinct groups of socially distressed people who might suffer disproportionately from the effects of resettlement. These may be ethnic minority/ indigenous groups, women headed households, the most poor (based on the poverty line), the disabled, elderly and landless/ families.

Annex 5.4 Institutional Arrangements for Implementation of ESMF



Annex 5.5: Environmental Checklist for project's screening

(Information collection, risk identification, and analysis)

- Will the subproject and/ or activity likely to affect or result risks to the following or following type?
 - Where, why, and to what extent?
 - what can be done to avoid, minimize or mitigate?
-
- Protected areas and those areas listed in world heritage sites
 - Forest types (national, community, reserves, private, core forest or fringe.)
 - Route of wildlife or wild bird movement or protected fish/aquatic life
 - High risk of floods, landslide and erosion prone areas
 - Water sources (ponds, lakes, spring, drinking water...)
 - Cultural and religious sites
 - Values natural landscape
 - Local community/vulnerable communities life line infrastructures
 - Agriculture lands (private, government), private property, local resources..
 - Risk of disasters (floods, dam breaks, fire, accidental release of chemicals ..)
 - Generate hazardous or toxic chemicals potentially posing risk to environment, wildlife, and human health
 - Pose occupation safety risks

Photographs