

Government of Nepal
Ministry of Science, Technology and Environment

Department of Hydrology and Meteorology
Community Based Flood and Glacial Lake Outburst Risk Reduction Project

FINAL REPORT

Institutional Capacity Needs Assessment Of

Department of Hydrology and Meteorology (DHM),
Department of Water Induced Disaster Prevention (DWIDP),
Department of Soil Conservation & Watershed Management (DSCWM)
Department of National Park & Wildlife Conservation (DNPWC)
Sagarmatha National Park (SNP)

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November, 2014

Acknowledgement

Innovative Support Hub (ISH) would like to express its heartfelt gratitude to the Director General of Department of Hydrology and Meteorology (DHM) Dr. Rishi Ram Sharma for his co-operation, guidance, assistance and feedback in every step of the study. Similarly, ISH is thankful to the Director General of Department of Water Induced Disaster Prevention (DWIDP) Mr. Rama Nand Prasad Yadav, the Deputy Director General of DWIDP Mr. Vidhya Sagar Mallik, the Deputy Director General of DWIDP Mr. Niranjana Dev Pande, the Director General of Department of Soil Conservation and Watershed Management (DSCWM) Mr. Prem Narayan Kandel, and the Director General of Department of National Park and Wildlife Conservation (DNPWC) Mr. Tika Ram Adhikari for their supportive behavior, time for consultative meeting and valuable feedback. Similarly, we would like to express heartfelt thanks to the Planning Officer Mr. Tulasi Ram Sharma, and the Monitoring Officer Hari Bhadra Acharya of DNPWC for their kind support and information about the Department of National Parks and Wildlife Conservation and the Sagarmatha National Park.

Its earnest thankfulness goes to the Project Director of Community Based Flood and Glacial Lake Outburst Risk Reduction Project (CFGORRP) Mr. Top Bahadur Khatri who have unfailingly offered us the most courteous assistance and support. It would like to express sincere gratitude to the Technical Advisor Dr. Govinda Acharya, the Senior Technical Advisor Mr. Prabin Maskey, the Gender Specialist Ms Husna Banu Sheikh and whole CFGORRP members for their effortless help and support.

Similarly, it would express heartfelt thanks to the Project Focal Point of DHM Mr. Rajendra Sharma, the Project Focal Point of DWIDP Mr. Shan Mukhes Chandra Amatya DWIDP, Soil Conservation Officer (Under Secretary) Mr. Arjun Kumar Thapa, Senior Divisional Engineer (SDE) Mr. Desh Bhakta Mallik and Engineer Mr. Dipak Bhardwaj of DSCWM, SDEs Mr. Pradeep Kumar Manandhar and Mr. Vijaya Chandra Khatriwada of DWIDP, Chief Conservation Officer Mr. Ganesh Pant, the Army Major Mr. Laxmi Bhakta Shrestha and Conservation Officer, Mr. Laxman Paudel of Sagarmatha National Park, Namche for their time for interview, consultative meeting and questionnaires.

Its thanks go to all the SNP members of Namche for their valuable information on their institutional capacity in terms of GLOF and flood hazards in the buffer zones. Similarly, it is kind and thankful to the communities and organizations working the buffer zones for their support in providing information about their institutional roles and duties towards natural disasters. ISH is always indebted to the people who provided feedbacks, comments, and suggestions.

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Abbreviations

ACT	Advance Course Training
AWS	Automatic Weather Station
AWS	Automatic Water Level Sensor
CBD	Convention on Biodiversity
CBEWS	Community Based Early WarningSystem
CBO	Community Based Organization
CDO	Chief District Officer
CFGORRP	Community Based Flood and Glacial Lake Outburst Risk Reduction Project
CITES	Convention on International Trade in Endangered Species
CNA	Capacity Needs Assessment
DDG	Deputy Director General
DDRC	District Disaster Relief Committee
DG	Director General
DHM	Department of Hydrology and Meteorology
DMSP	Disaster Mitigation Support Program
DNPWC	Department of National Parks and Wildlife Conservation
DPNet	Disaster Preparedness Network
DRR	Disaster Risk Reduction
DSCO	District Soil Conservation Office
DSCWM	Department of Soil Conservation and Watershed Management
DWIDP	Department of Water Induced Disaster Prevention
FNEP	Finish-Nepalese Project
GCT	General Course Training
GEF	Global Environment Facility
GESI	Gender Equality and Social Inclusion
GIS	Geological Information System
GLOF	Glacial Lake Outburst Flood
GoN	Government of Nepal
GPS	Global Positioning System
GRMC	Glacial Risk Management Committee
GTF	Global Tiger Forum
HKH	Hind Kush Himalaya
HR	Human Resource
ICAO	International Civil Aviation Organization
ICIMOD	International Center for Integrated Mountain Development
ICNA	Institutional Capacity Need Assessment
ICT	Information and Communication Technology
INGO	International Non-Governmental Organization
IPCC	Intergovernmental Panel on ClimateChange
ISH	Innovative Support Hub
JCIFM	Joint Committee of Inundation and Flood Management

LDO	Local Development Officer
MoHA	Ministry of Home Affairs
MoSTE	Ministry of Science, Technology and Environment
NCDM	National Commission for Disaster Management
NEOC	National Emergency Operation Centre
NGO	Non-Governmental Organization
OHP	Operational Hydrological Program
PPCR	Pilot Program for Climate Resilience
SAARC	South Asian Association for Regional Co-operation
SCWM	Soil Conservation and Watershed Management
SNP	Sagarmatha National Park
SWOT	Strength, Weakness, Opportunities and Threats
TOR	Terms of Reference
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
VDC	Village Development Committee
VDRMC	Village Disaster Risk Management Committee
WID	Water Induced Disaster
WLS	Water Level Sensor
WMO	World Meteorological Organization
WRS	Water Resource Strategy
WUO	Water User Organization

Executive Summary

Community Based Flood and Glacial Lake Outburst Risk Reduction Project (CFGORRPP), implemented by the Department of Hydrology and Meteorology (DHM) has carried out a study on Institutional Capacity Need Assessment of implementing agency, DHM and collaborative partners, Department of Soil Conservation and Watershed Management (DSCWM), Department of National Parks and Wildlife Conservation (DNPWC), Department of Water Induced Disaster Prevention (DWIDP) in terms of GLOF and flash flood risk reduction. The primary objective of the CFGORRPP is to reduce human and material losses from Glacial Lake Outburst Flood (GLOF) from Imja Lake in Solukhumbu district and catastrophic flooding events in the Terai and Churia Range. The CFGORRPP has therefore two components: Component I and II. The Component I focuses on the GLOF risk reduction in Solukhumbu and the Component II works in Terai and Churia regions.

The study area was Department of Hydrology and Meteorology (DHM), Department of Water Induced Disaster Prevention (DWIDP), Department of Soil Conservation and Watershed Management (DSCWM), Department of National Park and Wildlife Conservation (DNPWC) in Kathmandu and Sagarmatha National Park (SNP) in Namche, Solukhumbu.

The main purpose of the assignment is to assess the institutional capacity, identify gaps in ability to capture, manage, disseminate GLOF and flood data; to review current practices of hydrological analysis, information dissemination mechanism of the organizations. The main focus of the assessment is on the organizations' institutional capacity on GLOF and flash flood risk reduction.

Based on the assigned objectives, the primary and secondary data were collected in the areas of institutional, organizational and human resource aspects of the organizations. Primary data were collected through consultative meeting, questionnaire, interviews, field work, and observation. The secondary data were collected through governmental websites, previous reports, project documents, and journal papers. In the institutional aspects, the data have been carried out on legal mandate, policies, strategies, activities, internal external relationship of the stakeholders. The organizational data were captured on organizational set-up, internal/external communication system, leadership, and all the management aspects. Similarly, in the human resource level, it was assessed staff recruitments, KSA (knowledge, Skill and Attitude) level of the staffs to obtain the mandated objectives specially capacity in GLOF and flash flood risk reduction in CFGORRPP project areas as well as national level. Therefore, all the data collection tools were centered and focused on capturing institutional, human resource, technical, physical, communicational, managerial status of the organization to reduce the GLOF and flash flood risk. Similarly SWOT analysis technique had been used for situation analysis of the organizations.

SUMMARY OF THE ASSESSMENT

1. DHM

DHM has a mandate from Government of Nepal to monitor all the hydrological and meteorological activities; and all flood risks including GLOF. The scope of work of the department are: to establish and operate of hydro-met weather stations; to collect, analyze, manage and publish hydro-met data, to establish early warning systems, to manage GLOF risk, to provide air weather information, to monitor and analyze climate change, to check water quality and air quality, and so on. It also deals with environmental issues, particularly meteorological information management and weather forecasting. The department provides weather information in every 3 hours in regular basis and every 15 minutes in monsoon season from its websites www.mfd.gov.np, www.hydrology.gov.np.

The department is equipped central and field offices altogether with 233 human resources from which 59 are gazetted level. The DHM is functioning as a central level office and it has three basin offices under Hydrological

Network Division and three regional offices under Meteorological Network Division. Although the department has equip with and capacity to monitor snow and water quality, flood estimation and information dissemination, the coverage of the population that used the information provided by the department is still limited due to various reasons. For the authentic and reliable flood and weather information the department is in need of more real time automatic water level sensor for the monitoring of rivers and real time automatic weather stations. The DHM requires development, update and usage of new technologies and human capacity building providing knowledge and skill development trainings.

Now the department has about 800 hydro-meteorological networks, 21 AWLS and 41 AWS real time data stations. These real-time measurement data are transmitted to the website (www.hydrology.gov.np) and data can be viewed in tabular as well as graphical form. Data transmission is realized through CDMA and GPRS technology and the internet. Data captured all these networks are which provides real time weather from its two websites (www.mfd.gov.np, www.hydrology.gov.np) which are updated in every half an hour in regular basis and in every 15 minutes in critical time. Similarly, DHM has fixed warning and danger level for 7 rivers and for flood warning system, a dissemination mechanism has been developed. It works collaboration with National Emergency Operation Centre (NEOC), Ministry of Home Affaire (MoHA).

As department is implementing PPCR, CFGORRP, FNEP-2, HYCOS, Flood Forecasting Projects, its institutional capacity is relatively stronger. The department has skillful dedicated human resources. Although scattered, its weather stations covers all over the country.

However the department is equipped with high tech instruments, real time weather stations, rain gauge stations and other technical facilities, it still needs knowledge and skill enhancement supports to the human resource. The flood early warning system developed by the department is becoming successful and its coverage is also extending. To fulfill the regulatory, technological and public service delivery gaps, the department has lunched PPCR project with the aim of establishment 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. The department is in need of training on GLOF modeling, rainfall runoff modeling, social hazard and risk mapping, hydro and met telemetry instrument management, and flood risk assessment.

2. DWIDP

DWIDP is only one governmental authorized agency to reduce human loss and damage caused by water induced disaster. Therefore, it has taken strategic policies like enhance awareness level of the people to the disaster, implement programs on river basin conservation and hazard mapping, invention and development and dissemination of appropriate water induced disaster mitigation technology, increase people's ownership in water induced disaster risk reduction, allocation of resources for emergency work, preparing master plan for long term river training work, co-ordination and collaboration with stakeholders for better outcomes and institutional capacity building for strengthening the department.

Water Induced Disaster Management Policy, 2006 guides its scope of work which contains a)Emergency protection, (b) Water Induced Disaster Mitigation, (c) Natural Resource Conservation, (d) Utilization of flood plains, (e) Institutional Management and Development. As per the newly approved organizational structure, the department has three divisions, namely: i. Planning, Program & Foreign Coordination Division, ii)River Training Division and iii) Disaster Mitigation Division and eighteen sections. The divisions are headed by the Deputy Director General, first class technical officers. The department is equipped with 342 staffs; out of them 74 percent are technical staffs. The department has its own lab with the facilities of river simulation model facility, debris flow simulation model facility, soil testing facility, and concrete testing facility.

Similarly, the department has heavy equipment workshop at Baneshwor; seven division offices; five sub-division offices; and seven PEP field offices scattered all over the country.

However, the department has strong institutional mandate and its roles is increasing in national as well as global level, there are limited financial as well as skilled human resources in terms of intensity and demand of the mitigation works. Similarly, the accessibility and coverage of organizational set up is limited in terms of service delivery all over the country.

From the critically examining of TNA checklist, questionnaire, feedbacks and meetings with the DWIDP officials, the core areas of training needs for the DWIDP are application of GIS and remote sensing technology, flood hazard and risk mapping, sediment monitoring and data acquisition, rainfall-runoff and stream flow routing, application of numerical application modeling tools and GIS in flood hazard mapping, Hydro-dynamic modeling/DAMBREACH model, Bio-engineering techniques, river engineering and river training mitigation measures, flood frequencies and estimating design discharge.

3. DSCWM

DSCWM is strongly mandated: a) to assist in maintaining ecological balance by reducing pressure from natural hazards such as floods, landslides and soil erosion through conservation development of important watersheds of the country; and b) to maintain land productivity, reduce soil erosion and contribute in development infrastructure protection by scientific management of watersheds.

As per the newly approved organizational structure, the department has two divisions, namely: i. Watershed Management Division, ii) Technology Development and Extension Division and eleven branches. At present DSCWM is providing soil conservation and watershed management service to 73 out of the 75 districts of Nepal through 56 District Soil Conservation Offices (DSCO). The department is equipped with 656 staffs out of which 201 are gazetted level technical staffs.

Though the department has emphasizing watershed management using low cost technology, its knowledge and technology still are believed low in flood risk management and river bank protection works. Although department has strong institutional set up of 56 district level field offices, there is still gap of human resource development. The training needs assessment shows the core areas of training needed are watershed management, river bank protection, application of GIS and remote sensing technology in flood hazard and risk mapping, sediment monitoring and data acquisition, rainfall-runoff and stream flow routing, use of bio-engineering techniques in watershed management activities and flood protection works.

4. DNPWC and SNP

DNPWC is mandated to conserve the country's major representative ecosystems, unique natural and cultural heritage and give protection to the valuable and endangered wildlife species. The main objectives of the department are: to conserve rare and endangered wildlife, including floral and faunal diversity by maintaining representative ecosystems, to conserve and manage outstanding landscapes of ecological importance; to support the livelihood of the local people through buffer zone and conservation area management programs; and to promote ecotourism consistent with biodiversity conservation. Therefore it has expected to encourage scientific research for the conservation of genetic diversity, National Parks Management, Wildlife Reserve Management, Conservation Area Management, Hunting Reserve Management, Buffer Zone Management, Hattisar Management and Non Timber Forest Products Management.

The department has 20 protected areas out of them 10 are national parks, , 6 are conservation areas, 3 are wildlife reserves and 1 is hunting reserve.

Though the department has adequate human resource to preserve and reserve the wildlife and national parks, still they are not familiar with the risk of losses from disaster like GLOF and flash flood. It is far enough to tackle the risk

of extreme events due to climate change. Though there are some mechanism to preserve wildlife and national park from poacher, but still not any mechanism to preserve wildlife from the disaster. Therefore the department is needed to have thematic and proficiency trainings in all level and all dimensions of disaster risk and mitigation measures, early warning system considering its mandated roles and responsibilities in one hand and the project's objectives on the other. As per the critically examining of TNA checklist, questionnaire, feedbacks and meetings during assessment, the suggested trainings for the DNPWC personnel are community based early warning system, climate change adaptation and risk knowledge.

Similarly, Sagarmatha National Park (SNP), one of the national parks of DNPWC aims to protect and preserve National Park and wildlife. It has the objectives of: conservation of biodiversity, conservation of landscape, management of tourism, management of buffer zone, fosters the economic and social well-being of local communities within the National Park. The Park consists of 38 human resources from chief warden to game scouts. Though there are many organizations working in eco tourism and biodiversity sectors, it lacks the organizations working in the field of disaster risk reduction. Allocated human resource for the SNP are sufficient but not motivated to stay longer time and have no innovational programs to preserve and reserve the national park and endangered wildlife from natural disaster. On the basis of training needs assessment of Sagarmatha National Park, the personnel are required the exposures on damage assessment and response/rescue work, climate change and adaptation, risk knowledge, community based early warning system trainings, mock drill on rescue activities.

5. Cross Cutting

In the areas of cross cutting sector, most of the respondents expressed a need to develop analytical skills on social issues, Gender and Social Inclusion Initiatives, and Political interest. All most all executive personnel emphasized the need of co-ordination and collaboration within the stakeholders for synergic outcomes. The vast majority of local community member of Sagarmatha National Park Buffer Zone expressed to conserve biodiversity and wildlife from people and save the people from wildlife.

CHAPTER – ONE

INTRODUCTION: DESCRIPTION OF THE WORK

1.1 Background

Community Based Flood and Glacial Lake Outburst Risk Reduction Project (CFGORRP) is a joint undertaking of the Government of Nepal (GoN), Global Environment Facility (GEF) and the United Nations Development Programme (UNDP). The project is being implemented by the Department of Hydrology and Meteorology (DHM) under the Ministry of Science, Technology and Environment (MoSTE) as the lead Implementing Agency.

The primary objective of the CFGORRP is a) to reduce human and material losses from Imja Glacial Lake Outburst Flood (GLOF) events in three Village Development Committees (VDCs) of Solukhumbu district and b) to reduce catastrophic flooding events in eight VDCs of four Tarai districts namely; Mahottari, Siraha, Saptari and Udayapur, encompassing three river basins of the Ratu, Khando and Gagan and two tributaries basins of the Trijuga River, the Hadiya and Kong. The CFGORRP has therefore two components: Component I. and II. The Component I. focuses on the GLOF risk reduction in Solukhumbu and the Component II works in Terai and Churia regions. The three VDCs; Chaurikharka, Khumjung and Namche in Solukhumbu are the main working areas under the first Component likewise eight VDCs; Sarpallo and Nainhi VDCs in Mahottari district, Didhawa and Pakari in Saptari district, Tulsipur and Pipara in Siraha district and Jogidaha and Hadia in Udayapur district are the main working areas under the second Component of the Project.

The Department of Water Induced Disaster Prevention (DWIDP), Department of Soil Conservation and Watershed Management (DSCWM) and the Department of National Parks and Wildlife Conservation (DNPWC) are the three collaborating partners of the project. The project has been working in close coordination and consultation with DWIDP and DSCWM in the Terai and Churia districts and with Sagarmatha National Park (SNP) under DNPWC for Glacial Lake Outburst flood (GLOF) risk reduction in Imja Lake. DWIDP, DSCWM and DNPWC are responsible for providing inputs to planning, technical oversight and monitoring of the field activities of the project.

The project aims not only capacity development on Flood and GLOF risk reduction at community level but also at the national level primarily the DHM, DSCWM, DWIDP, DNPWC and SNP. It is therefore essential to strengthen DHM and other collaborating partners' capacity to evaluate GLOF and Flood risks and communicate GLOF/Flood warnings to key partners such as Village Disaster Risk Management Committee (VDRMC), GLOF Risk Management Coordination Committee (GRMCC), District Disaster Relief Committee (DDRC) and National Emergency Operation Centre (NEOC) via Ministry of Home Affairs (MoHA). In this connection, a concise capacity need assessment at the technical level of DHM and its collaborating partners is being sought by CFGORRP. The CFGORRP aims to further design and conduct training/capacity building packages for the implementing and collaborating partners based on the recommendations made by this study.

1.2 Statement of the Problem

DHM has the mandate to monitor all flood risks in Nepal but has limited technical capacity for monitoring, capturing and managing recurrent flood and GLOF data particularly real time data. The department is not fully capacitated with expertise to efficiently capture, manage, analyze and communicate the real-time rainfall and basin level discharge data to assess the level discharge data of flood risks and other potential impacts in a given geographical area. It is of key importance to capacitate the department's experts on real time database management so as to

channelize and communicate flood risk warnings to the MoHA, NEOC, DWIDP and other relevant departments and communities. Hence, it is highly needful to assess DHM's institutional strength at disseminating GLOF related information to the relevant institutions like NEOC, MOHA, DDRC and the local communities. DHM's institutional capacity of monitoring Water Level Sensors (WLS), Automatic Weather Station (AWS), GLOF sensors also need to be assessed. Department's human resource strength in terms of experience of structural measures for mitigating GLOF risks is another area that needs to be properly explored to identify the type and nature of training to be conducted.

Likewise, DWIDP has limited technical experts to fulfill its mandate to reduce human loss and damage caused by water induced disaster in flood prone areas, therefore it is needed to increase its ability in a systematic and comprehensive manner. Although DSCWM has been emphasizing its efforts on watershed management, its knowledge on flood risk management is still believed to be low. It is also important to analyze how hydrological analysis and design of structural mitigation measures are conducted within DWIDP and DSCWM for flash flood risk management. GLOF risk management is a relatively new topic to DNPWC and SNP. Hence, it is very important to assess SNP's capacity on GLOF risk reduction to wild life and National Park since significant project activities related to Imja lake lowering are planned in SNP/Khumbu region.

To meet the objectives of the project in a long term solution and identify the barriers to achieving the solution, the project has taken a strategy to assess the capacity needs of the collaborative partners that identified by the project. Therefore, the project would be able to mobilize the existing strengths of the partners to get greater opportunities for synergic outcome and reduce the threats by lessening the weaknesses. Therefore, the study questions of the work are;

- a) What are the existing institutional capacities in terms of GLOF and flood risk reduction of the implementing and collaborative partners (they are; DHM, DWIDP, DSCWM, and DNPWC/SNP)?
- b) What is the gap between existing and acquired capacity of human resources in terms of knowledge, skills and attitude to address GLOF and flood risk?
- c) What are the institutional, human, technological, organizational and logistic gaps of the organizations to address GLOF and flood risk?

1.3 Rational and Objectives

A need is considered as a gap between “what is” and “what should be”, and is an essential element required to strengthen capacity. Defining needs is often difficult, subjective and also influential depending on who asks the question and who responds. Therefore, **participation, intelligibility and a logical** approach are essential in assessing needs and prioritizing resources to meet these needs.

The Capacity Needs Assessment (CNA) process mainly focuses on institutional, organizational, human and technological aspects of the institution. Institutional aspect covers mandate of the organization governed by policy, rules, regulations, procedures, laws and by-laws. Human capacity answers whether existing human resource is enough to perform the mandated roles and responsibilities or to fulfill the defined objectives. It focuses to identify the knowledge, skill and attitudes that the human resources have to perform the required responsibilities. Similarly, technology and organizational set-ups are the additional factors that influence the effectiveness of the service delivery.

Further, identifying gaps between existing and required capacity can be carried out by situation analysis. A Capacity Needs Assessment (CNA) is not only about recognizing gaps, but also about identifying existing capacity and latent capacity – current capacity that is neither used nor recognized – and ensuring that both are enhanced and clearly linked with outcomes to achieve a desired result.

Therefore the main objective of the study is to undertake Institutional Capacity Need Assessment (ICNA) of DHM, DSCWM, DWIDP, DNPWC and SNP at the institutional and technical level for building their capacities in the areas of GLOF and Flood Risk Reduction.

Specific objectives of the work include to:

- Assess DHM's existing mechanisms on capturing, managing and disseminating real time GLOF data from Automatic Weather Station (AWS) and Water Level Sensor (WLS) and flood data, flood and GLOF hazard modeling calibration and validation.
- Capture current practices of hydrological analysis used within DHM, DWIDP and DSCWM for their institutional needs such as structural design, watershed management, bio-engineering etc. and recommend appropriate mechanism to address and upgrade them.
- Document and gather the existing practices on sediment monitoring and analysis at DHM, DWIDP and DSCWM.
- Assess the existing technical capacity of DNPWC and SNP on sharing GLOF related data to MOHA, NEOC, DHM and other partners.
- Based on the review, found gap and its analysis, recommend targeted training packages for the collaborating departments in the areas of GLOF and Flood risk management.

CHAPTER – TWO

METHODOLOGY: WAY TO ACHIEVE OBJECTIVES

2.1 Methodology

2.1.1 Desk Review

A desk review was undertaken to obtain baseline information of the organizations; prepare questionnaires, checklist of interviews, and formats of SWOT analysis; and develop charts and tables for gathering primary information and data. The desk review was focused on assessment of institutional aspects of DHM, DWIDP, DSCWM, DNPWC and SNP based on effective service delivery in terms of GLOF and Flood which includes: i) policy, legal frameworks, strategies, programs; ii) organizational structure; iii) human resource; iv) field office infrastructure; and v) linkages with key stakeholders. This included all relevant documents; departmental homepages; and reports, booklets, project documents, unpublished documents, brochures, leaflets etc. made available by the departments and field office.

2.1.2 Capacity Needs Assessment Tools used in Assessment Process

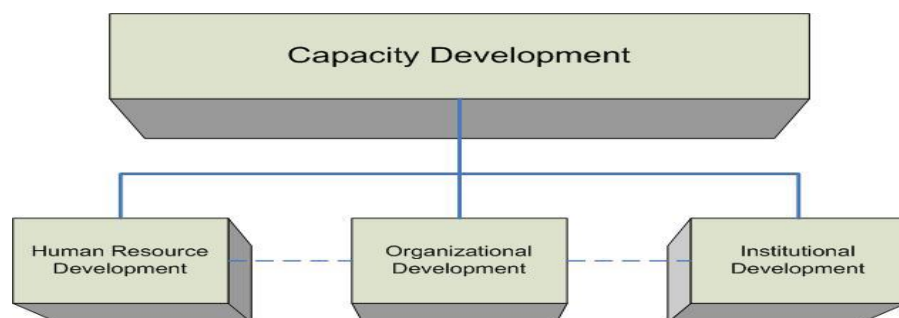
There are many tools to gather information about capacity and training need assessment of an organization which work best in different circumstances. Among them the following tools which can capture information on organizational capacity need assessment were applied.

- **Literature Review:** Literature review focused on objectives tried to fix baseline and identify the mandate of implementing and the collaborative partner organizations regarding to GLOF and flash flood risk management.
- **Interviews:** By using a series of predetermined questions, opinions and perceptions of the employees have been gauged; available human, capital, and technical capacity have been measured. This tool had allowed the employee to comment on their performance, and had allowed the interviewer to ask in depth questions about performance of an individual as well as organization.
- **Observation:** First hand observation and analysis in a setting in which the observer is not interfering with normal productivity have been used to gather first hand data about an organization's strengths and weaknesses.
- **Questionnaires:** Preset questionnaires were supplied to the focal group of the respective departments and thus information regarding institutions, organization and human resource level was gathered. As a part of institutional strengthening initiatives, this checklist has been designed to gather data and information for assessing training needs of key actors of relevant government agencies engaged directly and indirectly in GLOF and flash flood at central and field levels.
- **Job Descriptions:** Study of all responsibilities of a certain job to define an employee's expectations and responsibilities, allowing for more thorough training and supervision.

An outline was designed for use in discussions with the individuals and teams within the organizations. Note was taken as of mentioned in the Terms of Reference to undertake the capacity needs assessment during the design of the template. The final template was customized to suit the needs of the assessment. The templates used are contained in Annex 1, 2, 3, 4, 5, 6. The template was useful in establishing a framework for the Needs

Assessment Report as depicted in Figure 1. The Institutional Assessment Expert used these as a framework for discussions.

Figure 2.1 Aspects of Capacity Development



2.1.3 SWOT Analysis

A SWOT analysis of DHM, DWIDP, DSCWM, DNPWC and SNP had been undertaken. The format of SWOT analysis had already been prepared at the time of desk review. At first, SWOT formats were fulfilled through discussion with the respondents, then requested to check whether captured information are correct or not. Information of the SWOT from different departments was analyzed to get internal gaps as well as external gaps, i.e. gaps within the organization and among the organizations. Summaries of the SWOT Analyses of individual organization are given in the Capacity Needs Assessment Chapters of the respective organization.

2.1.4 Meetings and Visits

Under the guidance and supervision of the National Project Director (NPD), National Project Manager (NPM) and in close consultation and coordination with Senior Technical Advisor (STA) of Component I and Technical Advisor (TA) of Component II of the CFGORRP, meetings and discussions were held with the focal group/person of DHM, DWIDP, DSCWM, DNPWC and SNP. **Annex 11** gives a list of the people that were consulted during the field work.

Visits were made to the targeted four departments in Kathmandu and SNP in Namche, Solukhumbu District. Discussions took place with the Director Generals, Deputy Director Generals, Senior Officers, Officers, Chief Conservation Officer, Assistant Conservation Officer and Army Major. Similarly, meetings were also held with the personnel of SNP at Namche, chairperson of Buffer Zone Management Committee and local community people in Khumbu region which provided valuable insights about Imja GLOF risk.

2.1.5 Indicative Scoring of Capacity Needs

The indicative score format ranging from 'no capacity need at all' to 'profound capacity need' had been developed with the indicative information on institutional, organizational and human resources. The indicative score format had been filled up on the basis of the findings of consultative meetings, observation, SWOT analysis, and interviews. The logic of such scores and the criteria for determining indicative scores are given in Annex 6 to 10.

CHAPTER – THREE

INSTITUTIONAL CAPACITY NEED ASSESSMENT: DEPARTMENT OF HDROLOGY AND METEOROLOGY

Capacity is “the ability of individuals, institutions and societies to perform functions, solve problems and set objectives in a sustainable manner” UNDP 2006.

3.1 Conceptual Frame Work on Capacity Needs Assessment

A broad definition of “capacity” is the ability to execute tasks and generate outputs, to define and solve problems and make knowledgeable choices. Capacity is important because it strengthens the performance of organizational systems, plans, objectives, strategies, and procedures.

Capacity needs express themselves in many different ways and they need to be understood in relation to the goals, objectives and targets of the concerned organization. However, it is possible to identify a number of aspects of capacities that are usually relevant. The study ranks in the context of this assessment as per the criteria mentioned in Table no 3.1 had been applied in identifying and assessing capacity needs.

This inevitably requires an element of judgment, based on a thorough understanding of the relevant policy framework, specific tasks to be carried out and the context of the organization. Such judgments tend to be qualitative rather than quantitative, and need to be validated both with staff of the concerned organization and with other analysis. For the sake of analysis and discussion of this study, the following five indicative rankings in the following three dimensions have been developed. The detail of the format is attached in the **Annex 6 - 10** at the end of the report.

1. Good capacity (No significant capacity needs that hamper achieving objectives);
2. Some Needs (capacity needs that affect achieving objectives);
3. Moderate Needs (capacity needs that reduce the ability to achieve objectives);
4. Major Needs (capacity needs that negatively affect the ability to achieve objectives);
5. Profound Needs (capacity needs that present serious obstacles towards achieving objectives).

The Assessment was focused on following three dimensions;

- a) **Institutional Development:** this relates to policies, overall rules, inter-organizational relationships and mandates of organizations (in this case in the GLOF and flash flood risk reduction);
- b) **Organizational Development:** this relates to the structure, systems procedures and resources of specific organizations
- c) **Human Resources Development:** this relates to competence, skills, knowledge and attitudes of staff, their recruitment, management and incentives.

The table below summarizes the criteria that were used to determine the capacity needs.

Table: 3.1 Criteria for Assessing Capacity Needs

Particular	Criteria
<u>Institutional aspects</u>	
1. Legal Mandate	Comprehensive Regularity and stability Reflection of actual situations Certainty
2. Policies	Clarity, comprehensiveness and practicality Rationality with mandate Resource viable Consensus and understanding
3. Strategies	Regularity with mandates and policies Resource viable
4. Relationships with Development Partners	Harmony and stability Realism of expectations
<u>Organizational aspects</u>	
5. Structure	Clarity Consistency Correctness
6. Systems:	
6.1. Information & Communication Technology (ICT) hardware & software	Availability of appropriate hard- and software, skills and willingness to utilize ICT
6.2. Planning	Coherence with policies and strategies
6.3. Data collection	Up-to-date Reliability of collection recording and analysis Completeness
6.4. Monitoring	Skill to track inputs, activities, outputs and effects
7. Management	Consistency, clarity and focus on goal and objectives Timeliness and coherence of decisions, connection to objectives as well as practice Continuity and firmness
8. External Communication	Handling Swiftness and reliability Acceptance by targeted groups
9. Internal Communication	Handling Swiftness and reliability Acceptance by targeted groups and individuals
10. Procedures:	
10.1. Budgeting	Timeliness Responsiveness to goals and objectives
10.2. Accounting	Trustworthiness and lawfulness Vulnerability to corruption
10.3. Record keeping	Completeness and reliability Timeliness and opportunity costs Use of modern technology Consolidation of data

11. Leadership	Reflection of goals and objectives Dynamism and creativeness Responsiveness of needs
12. Resources	
12.1. Financial Resources	Adequacy and timeliness Responsiveness to needs and opportunities
12.2. Infrastructure	Adequacy to tasks
12.3. Equipment	Adequacy to tasks and skills
12.4. Transport	Adequacy to demands
<u>Human Resources Aspects</u>	
13. Staffing:	
13.1. Approved positions	Job descriptions Proportionality to scope and tasks Rationality of groupings
13.2. Vacant positions	Proportion of approved positions filled Duration of vacancies
13.3. Gender	Proportion of women at all levels
14. HR Management:	
14.1. Recruitment	Promptness and efficiency
14.2. Selection	Relevant criteria
14.3. Incentives	Encouragement of performance Attractiveness to staff Attractiveness to staff
15. Staff:	
15.1. Knowledge	Relevance of educational background Suitability to tasks
15.2. Skills	Abilities to perform key tasks Utilization of technologies
15.3. Attitudes	Motivation for tasks Responsiveness to central objectives Appropriateness of dealing with seniors, colleagues and clients

3.2 Mandate of DHM

The Department of Hydrology and Meteorology (DHM) of the Ministry of Science, Technology and Environment (MoSTE) is mandated to monitor all the hydrological and meteorological activities in Nepal. No agency is entitled to carry out such activities without a proper liaison with DHM. The scope of work includes monitoring of river hydrology, climate, agro-meteorology, sediment, air quality, water quality, limnology, snow hydrology, glaciology, wind and solar energy. DHM provides general and aviation weather forecasts, forecasting and early warning of hydro-meteorological hazards; and contributes to the global exchange of meteorological data on a regular basis as a member of the World Meteorological Organization (WMO).

DHM actively participates in the programs of relevant international organizations, such as, the UNESCO's International Hydrological Program (IHP) and WMO's Operational Hydrology Program (OHP). In the past, DHM has hosted several regional and international workshops, symposia, seminars and meetings on different aspects of

meteorology, hydrology, sediment, and snow hydrology. The department is also a focal point for the Intergovernmental Panel on Climate Change (IPCC) and for the meteorological activities of the South Asian Association for Regional Co-operation (SAARC). The International Civil Aviation Organization (ICAO) has recognized DHM as an authority to provide meteorological services for international flights.

3.3 Principal Activities of DHM

- Collect and disseminate hydrological and meteorological information for water resources, agriculture, energy, and other development activities.
- Issue hydrological and meteorological forecasts for public, mountaineering expedition, civil aviation, and for the mitigation of natural disasters.
- Develop operational flood forecasting and early warning system for major flood prone rivers of Nepal.
- Conduct special studies required for the policy makers and for the development of hydrological and meteorological sciences in the region.
- Promote relationship with national and international organizations in the field of hydrology and meteorology

3.4 On-going Major Projects of DHM

3.4.1 Establishment of a Regional Flood Information System in the HKH Region

The overall objective of the Hindu Kush Himalaya (HKH) region- Hydrological Cycles Observing System Project is to minimize loss of lives and livelihoods by reducing flood vulnerability in the HKH region with specific reference to the Ganges-Brahmaputra Meghna and Indus river basins. The Project's purpose is to create timely exchange of flood data and information within and among participating countries through an established and agreed platform which is accessible and user friendly.

3.4.2 Finnish-Nepalese Project (FNEP2)

Finnish-Nepalese Project for Improved capability of the Government of Nepal to respond to the increased risks related to the weather-related natural disasters caused by climate change. FNEP2 has the overall objective: "Improved capability of the Government of Nepal to respond to the increased risks of natural disasters related to weather and climate"

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

The main objective of the project is to enhance government capacity to mitigate climate related hazards by improving the accuracy and timeliness of weather and flood forecasts and warnings for climate-vulnerable communities, as well as developing agricultural management information system services to help farmers mitigate climate-related production risks. The project will be coordinated by the Ministry of Science, Technology and Environment (MoSTE) and implemented by the Department of Hydrology and Meteorology (DHM) and Ministry of Agriculture Development (MoAD).

3.4.4 Community Based Flood and Glacial Lake Outburst Flood Risk Reduction Project

Through this project – CFGORRP; GLOF risks arising from Imja Lake posing threat to local communities, material assets and tourists visiting Khumbu region will have significantly lower the lake level through an artificial drainage system combined with a community-based early warning system (CBEWS).

The CFGORRP targets to increase the adaptive capacity of the four flood prone districts in the Tarai and Churia Range namely, Mahottari, Siraha, Saptari and Udayapur, specially concentrated in the eight VDCs of three river basins (Ratu, Khando, Gagan) and two tributaries Hadiya and Kong through locally-appropriate structural and non-structural measures, including flood-proofed water and sanitation systems, a sediment control programme, river bank and slope stabilization and the implementation of CBEWS.

3.4.5 Flood Forecasting Project

The major activities of this project are;

- Establish, operate and manage flood forecasting stations and upgrade them with real time telemetric system.
- Assess hazards, vulnerabilities and risks due to floods in major river basins.
- Develop river flow forecasting models for major rivers of Nepal.
- Establish flood early warning systems on major flood prone rivers of Nepal.
- Prepare manuals and guidelines for flood early warning systems.
- Coordinate with national, regional and international organizations involved in disaster risk management.

3.5 Hydro-meteorological Observation Network

In order to cope up with the growing demand for hydro-meteorological information/services and the fast technological advancement, automation in the DHM is a necessity. It is therefore critical that there is a national vision, development plan and strategy to improve the network of monitoring and production of weather and climate services in order to meet the basic need of environment protection through the provision of accurate weather forecasts. The establishment and maintenance of an efficient network of observation stations is essential to the production of accurate weather forecasts on which early warnings must be based. It is responsible for the operation and maintenance of all the meteorological observation and measurements, issuance of weather forecasts and severe weather warnings all over the country. It provides weather services to aviation and land transportation, agriculture and other sectors. It plays a vital role in disaster management being a member of the Central Disaster Relief Committee (CDRC) to assist in decision making for taking prompt actions toward hydro-meteorological induced disasters.

The density and instruments used for such network is guided by the temporal and spatial scale of the phenomena or parameter to be predicted.

3.5.1 Meteorological Network

DHM maintains 282 meteorological observation stations nationwide, mostly for climate study. Out of these, 7 sites are for synoptic (that is for weather forecasting), 18 sites are for agro-meteorological, 6 sites for aeronautical applications and 1 site for automatic weather station (AWS). The network also includes 78 climatology stations and 172 precipitation monitoring stations. These observational networks are in general well distributed in lower altitude regions to higher regions of the country, however, at higher altitude regions the number of stations decreases rapidly. (Source: <http://w.w.w.dhm.gov.np/meteorological-Station>)

3.5.2 Hydrological Network

The department has been maintaining 170 gauging stations including 20 sediment monitoring stations. Based on instrumentation, the current status of these 170 stream gauging stations is as follows:

- 28 stations with staff gauge only,
- 101 stations with staff gauge and cable-way,
- 10 stations with staff gauge, cable-way and water level recorder,

- 8 stations with staff gauge, cable-way, water level recorder, and wireless communication,
- 1 station with staff gauge and wireless communication,
- 1 station with staff gauge, cable-way, and wireless communication, and
- 21 stations with staff gauge and water level recorder.

At present, the flood forecasting section of DHM operates 61 real-time measuring stations for water level and precipitation. Of these, 20 stations measure both river water level and rainfall, while the remaining 41 measure only precipitation. These real-time measurement data are transmitted to the website (www.hydrology.gov.np) every 5 minutes, and data can be viewed in tabular as well as graphical form. Data transmission is realized through CDMA and GPRS technology and the internet.

3.6 Organization and Human Resource of DHM

The DHM is functioning in central level to address the demands of the nation on hydrology and meteorology aspects. As per the newly approved organizational structure, the department has four divisions namely, i) Hydrology Division, ii) Meteorology Division, iii) Weather Forecasting Division and iv) Meteorological Network Division. The Director General heads the department and the divisions are headed by the Deputy Director Generals. The Hydrology Division has five sections as Flood Forecasting Section, Hydrological Data Management Section, River Network Section, Technical Relations & Facilitation Section and Snow, Water Quality & Environment Section, similarly the Meteorology Division has four section as Agro-met Section, Climate Section, Meteorological Data Management Section and Instrument Section, likewise the Weather Forecasting Division has three sections namely, Weather Section, Aviation Weather Section and Communication Section and the Meteorological Network Division has Planning and Network Section. The Administration Section and Account Section directly function under the Director General.

There are three Meteorological Regional Offices as Eastern Regional Office at Dharan, Western Regional Office at Pokhara and Mid & Far Western Regional Offices at Surkhet and sixteen Metrological Field Offices. Likewise, the department has three Basin Offices in three major river basins namely, Koshi, Narayani and Narayani.

There are altogether 233 staff within the department out of which 59 are Gazetted and rest are Non-gazetted and others. The details of staffs distribution in central and field as well as composition by service are given in Figure 3.1, 3.2 and the details of organizational structure is given in Figure 3.3.

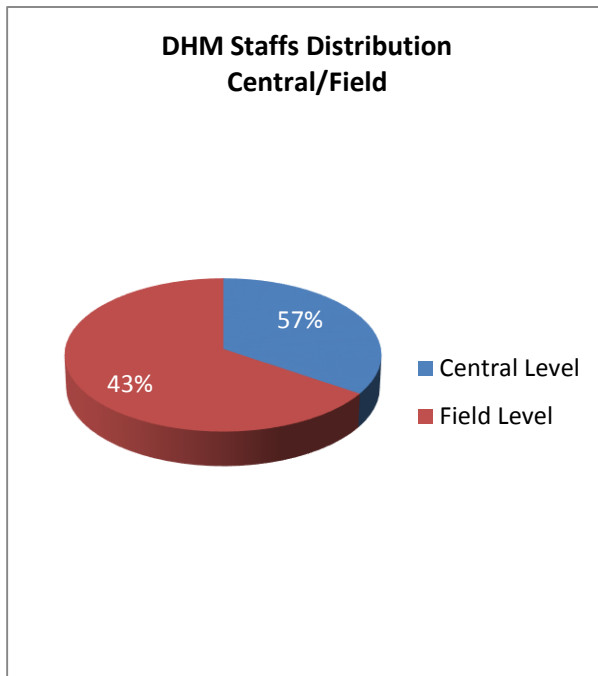


Figure 3.1: DHM Staff Distribution at Central and Field Level

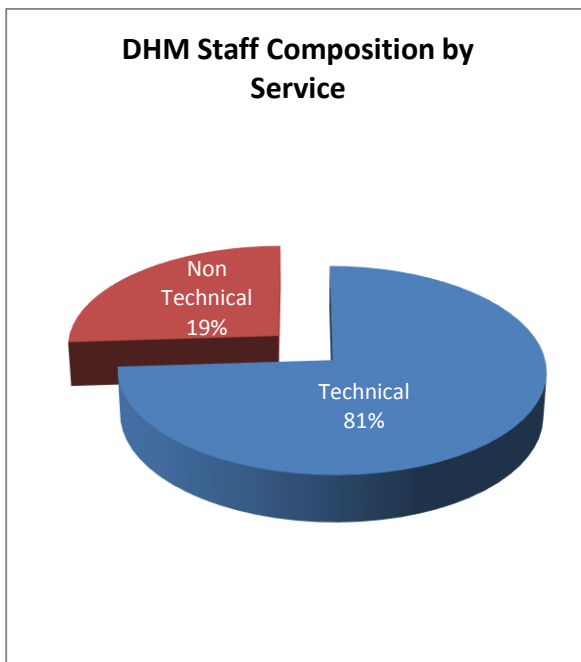
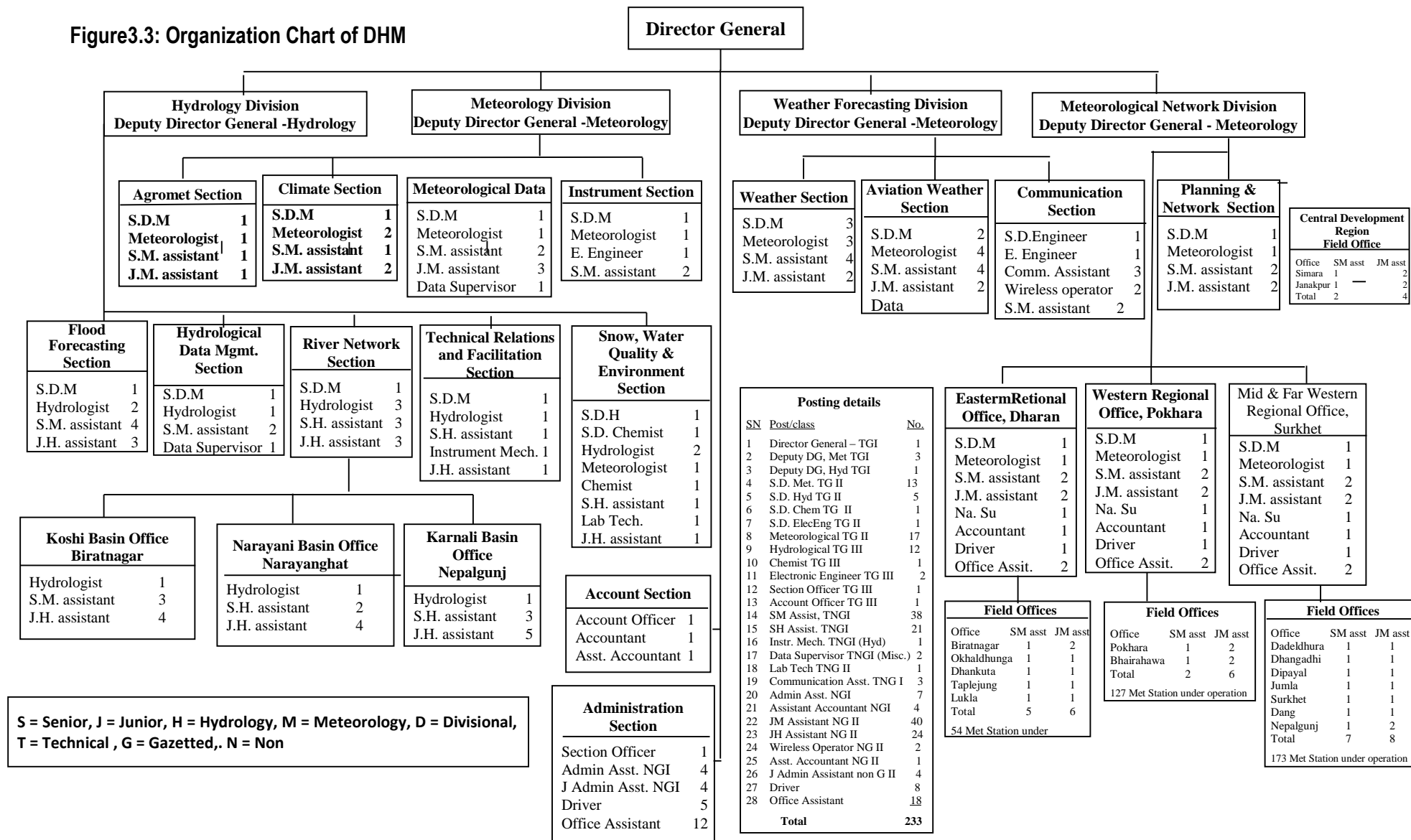


Figure 3.2: Types of Staff Distribution

Figure3.3: Organization Chart of DHM



S = Senior, J = Junior, H = Hydrology, M = Meteorology, D = Divisional, T = Technical, G = Gazetted, N = Non

3.7 Situation Analysis

The situation analysis of the department had been done through SWOT analysis. The output of the SWOT is given below in the Table 3.2.

Table 3.2: Situation Analysis of DHM

Internal Situation	External Situation
<u>Strength</u> <ul style="list-style-type: none"> - Mandated as central government agency to monitor all hydrological and meteorological activities in Nepal - Staffing; multi-disciplinary, experienced - Having with resourceful projects (PPCR/BRCH, CFGORRP, FNEP-2, HYCOS) - Guided by policy, strategy, rules and regulation, procedures, norms, - Implementing regular and project based programs on climate change, hydrology and meteorology - Institutional set-up in departmental and field level - Extensive participation of stakeholders - Continual capacity building activities for the officials - Its own home page/IT supported information management system exist - Flood Forecasting - Real time data acquisition - Establishment of hydrological and meteorological Early Warning System 	<u>Opportunities</u> <ul style="list-style-type: none"> - Donors' interest in climate change environmental safeguard measures - Government's increased budgetary allocation - Government and media has given more space to the information dissemination produced by DHM - Expansion of knowledge base and ICT - Participation of Stakeholders - Available of financial resources in the global (GEF, Climate Investment Fund) - Increasing Road networks – Good accessibility to remote area - Increasing people's awareness in hydro-meteorological early warning
<u>Weakness</u> <ul style="list-style-type: none"> - Inadequate communication coverage in high Himalayas and remote areas - Lacking human resource for hydro-meteorological real time data computer processing and analyzing as well as radar data management, application and operation & maintenance of automatic telemetry equipment - Hydro-meteorological Policy, Strategy and Act, Directives and Manuals - Conventional program / little research base - Inadequate knowledge on hydrological data capturing/assessing and analysis - Limited knowledge on hydrological modeling and validation - Limited knowledge on climate change and its impact on river system 	<u>Threats</u> <ul style="list-style-type: none"> - Climate change with new disaster risks - Culture – insensitivity to vulnerability and hazards - Shifting of scare resources to more productive sectors - Political instability - delays in formulating policies / law - Lack of laws and regulation regarding land use in flood areas - No practices are exist in dividing responsibilities among government organization and the public to reduce possibilities of severe flood and GLOF risk. - Least knowledge on technical auditing - Security issues, loss of equipment/ sensors installed in the site

<ul style="list-style-type: none"> - Inadequate knowledge on application of GIS and remote sensing - Least knowledge and skill in Glacial Lake monitoring and risk reduction - No significant in monitoring and evaluation system - Needs to increase knowledge and skill in GLOF and flash flood risk reduction - No experience in GLOF risk mitigation 	
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3.8 Summary of Assessment of DHM

3.8.1 General

At the **institutional level**, DHM has a clear mandate and wide range of policy, rules and regulations implemented by Government of Nepal as well as affiliated international laws, recognition by the International Civil Aviation Organization (ICAO), good relations with national and international development partners and other stakeholders and who are committed to working and supporting the organization. At the **organizational level**, there is strong leadership from the DG and the DDGs. There is a need to (i) develop and establishing a Legal and Regulatory Framework in order to legally institutionalize the DHM in carrying out its regular works and services (ii) develop clear and effective Monitoring and Evaluation (M&E) systems, procedures, manuals, directives etc. At the **human resource level** there is a need to develop HR systems in both motivational and attitudinal aspects to retain the skilled human resources. There is also need of creating new positions of experts as System Analyst/IT Expert, Computer Programmer, Electronic Engineer and Mechanical Engineer to establish modernized/latest and effective real time based automated hydro-meteorological monitoring station. There is also need of environmental, social and mechanical human resources to address the issues raised in these fields. The summary of capacity need of DHM is attached in **Annexe 6**.

3.8.2 Specific: GLOF and Flash Flood Risk Reduction

The major activities of DHM regarding disaster risk reductions are: a) issuing hydrological and meteorological forecasts for public, mountaineering expedition, civil aviation; b) developing operational flood forecasting and early warning system for major flood prone rivers of Nepal. The department has installed Automatic Water Level Sensor (AWLS) in twenty locations of major flood prone rivers and developed forty one Automatic Weather Stations (AWS) in the country. These real time telemetric systems are effectively running on flood forecasting and hazard warning. The DHM started sediment monitoring in twenty river systems however only five river systems are functioning. In hydrological data capturing and early warning system of the department, the assessed needs are:

- Installation of more AWLS station in other vulnerable flood prone rivers,
- Installation of more AWS
- Continuing sediment monitoring as well as database management
- Monitoring the most vulnerable glacial lake
- Automated accessibility of flood and weather watch real time data to the relevant organizations (MoHA, DWIDP, DSCWM and DNPWC/SNP),
- Creation and recruitment of positions for Computer Programmer, System Analyst/IT Expert, Electronic Engineer, Mechanical Engineer to run and manage real time telemetric systems,
- Knowledge and skill are needed in rainfall run-off modeling and data validation, GLOF modeling/ Dam Breach Modeling and data validation,
- Skill development training on telemetric system operations and management to the related personals.

3.9 Training Need Assessment of DHM

An attempt was done to determine if a training need exists and, if it does, what training is required to fill the gap in conducting GLOF and flash flood risk reduction services of DHM. The gap between the present status and desired status can be reduced by training and equipping the participants with knowledge and skills and encouraging them to build and enhance their capabilities.

Keeping in view the status of GLOF and flash flood risk management in the country and hydro-meteorological data capturing, analyzing and disseminating information to the concerns, following steps were taken for conducting training needs assessment to determine whether any training is needed, the areas in which training needed, the gap to be bridged and desired training outcomes.

1. Consultation with DG, DDGs, project focal point and other Officials on deficiency in the hydro-meteorological services and gap in their capabilities to take corrective measures.
2. Developed a special questionnaire to assess individual feedback on the training needs, target specific training needs, tested and used. The checklist developed for training needs assessment is kept in **Annex 4**.

3.10 Critical Examination of Training Needs

Hydro-meteorological monitoring network development, data capturing and analyzing, disseminating/ forecasting activities of DHM are directly related to flood risk reduction. Flood hazard and risk mapping, glacial lake monitoring, sediment monitoring and data acquisition, establishing early warning system are also concerned with GLOF and flood risk reduction. Automatic Real Time data are the most effective and reliable source for weather and flood forecasting. Thus, modernization of hydro-met networking system of the department is foremost needed. Simultaneously, the capacities of human resource have also been enhanced in these areas. As per the critically examining of TNA checklist, questionnaire, feedbacks and meetings; real time data management, application of GIS and remote sensing technology in flood hazard and risk mapping, sediment monitoring and data acquisition, rainfall-runoff and stream flow routing, application of numerical application modeling tools and GIS in flood hazard mapping, Hydro-dynamic modeling/DAMBREACH model, found core areas of training needs.

3.11 Suggested Training

In line with the areas of training needs, the types of training programs to be designed and conducted by CFGORRP are suggested below indicating their thematic focus and duration. The types of programs for senior policy level officials would include seminar, workshop, interaction, orientation and field observation or excursions covering the policy issues on GLOF and flash flood risk reduction. Likewise, the types of training programs for mid-level officers / managers would be training-cum-workshop, interactions and excursions with coverage of themes as mentioned in the **Table 3.3** below.

In order to improve and strengthen training programs for the full filling the gaps in human resource level in conducting GLOF and flash flood risk reduction services of DHM, some specific recommendation is presented below based on interaction with the concerned officials as well as training needs assessment.

Table 3.3 Suggested Trainings for DHM

SN	Training Needs (Subjects arranged according to preference level)	Target Group	Duration of Training (Day)	Indicative Budget (NRs in '000)
1	<ul style="list-style-type: none">▪ Training to upload hydrological and GLOF related data in DHM web portal (Please check if 2 day training is enough) - Developing data base	Hydrologist Engineer and Meteorologist (15 nos.)	2	300

	<ul style="list-style-type: none"> - Data entry and processing - GIS based map display showing water level and rainfall status - Uploading in web portal - Automatic statistics generation 			
2	<ul style="list-style-type: none"> ■ Training on GLOF and Flood Risk Management for the DHM Technical Officers (Here we should be specific rather than generic what training is relevant to DHM official) - Flood risk management: Concepts, Policies and Strategies - Climate change adaptation - Risk knowledge - Community based early warning system - Hydro dynamic modeling - Sediment Monitoring and data management - Rainfall- Runoff modeling - Flood Frequencies and Estimating Design Discharge - GESI and Disaster 	Hydrologist Engineer and Meteorologist (20 nos.)	4	600
3	<ul style="list-style-type: none"> ■ Seminar on Community Based Flash Flood and Glacial Lake Outburst Flood Risk Reduction Project: Roles & Responsibilities of Implementing Agency and Collaborative Partners and Issues 	DGs, DDGs, Focal Points and Office in-charge of DHM, DWIDP, DSCWM and DNPWC (30 nos.)	1	200

CHAPTER – FOUR

INSTITUTIONAL CAPACITY NEED ASSESSMENT: DEPARTMENT OF WATER INDUCED DISASTER PREVENTION

4.1 Background

DWIDP is a focal agency for water induced disasters mitigation activities. It has a vision of reducing social and economic losses caused by water induced disaster (WID) to the standard of developed nations. The major goal of the department is to minimization of human casualties and losses of physical properties and infrastructure caused by water induced disaster (*e.g., floods, landslides, debris, glacier-related disaster, etc.*) through appropriate WID mitigation and management. The department is mandated to reduce the human deaths by implementing the programs of river and river basins conservation, applying appropriate technology, development of research and information systems, strengthening human resource and institutional development activities, raising public awareness of communities and so on.

Guidelines for addressing the issues on water induced disaster mitigations have been adopted from the Water Resources Strategy - 2002 and the National Water Plan - 2005, the government's main documents which have laid out the short, medium and long term strategies, plans, activities and resources for mitigation and management of water induced disasters.

These documents have given DWIDP the leading role to implement the mitigation and risk reduction measures and coordinate with other related agencies. Based on these strategic visions, Water Induced Disaster Management Policy - 2006 has been formulated with policy provisions: (a) to mitigate water induced disasters and reduce loss of lives and property, (b) to enhance institutional strengthening of DWIDP and (c) establish network with the associated institutions and agencies to cope with potential disasters.

Water Resources Strategy - 2002 (WRS 2002) has defined ten strategic outputs to contribute the overall national goal as "living conditions of Nepalese people are significantly improved in a sustainable manner" by achieving short, medium and long term purposes. "Effective measures to manage and mitigate water induced disasters are functional"- is one of those ten outputs, concerned of DWIDP.

The WRS-2002 also identified the indicators (specific targets and dates) that can be used to achieve the above strategic output related to disaster as following water induced disaster targets;

- By 2007, potential disaster zones are identified by type and are located on district maps;
- By 2007, emergency relief materials are available in all five regions;
- By 2017, infrastructures for mitigating predictable disaster are put into place in twenty districts;
- By 2017, warning systems are established and functioning, encompassing the country; and
- By 2027, social and economic losses reduced to the levels experienced in other developed countries.

4.2 Strategies of DWIDP

WRS-2002 puts forward the following activities to carry out the strategy to achieve the targets:

- Prepare and implement a water-induced disaster management policy and plan.
- Conduct risk/vulnerability mapping and zoning.
- Strengthen the disaster networking and information system.
- Establish disaster relief and rehabilitation systems.
- Carry out community awareness/education on disaster management.
- Activate Inundation Committee (s) with respect to neighboring countries.
- Prepare and implement floodplain action plans.
- Implement disaster reduction/mitigation measures.
- Strengthen institutional set-up and capacity.

4.3 Major Programs and Projects under DWIDP

A. Disaster Prevention Program (Prakop Niyantaran Karyakram)

This program has been initiated to cope with the water induced disaster and probable short and long term remedies in mitigation measures. Under this program following activities are carried out:

i. River Training Program (Nadi Niyantaran Karyakram)

To manage and mitigate the water induced disasters such as bank erosions and inundation caused by the medium and small size rivers and other water induced disasters emergency works throughout the country is carried out by the Divisions and Sub-divisions.

ii. Study Based, Disaster Prevention (Adhdyayan Gari Garine Prakop Niyantaran Karyaharu)

For the continuation of the ongoing projects that have already been studied, budget is being allocated continually. These works are being conducted by the division and sub division offices throughout the country.

iii. Preparation of Master Plan

Master plan for various smaller and bigger rivers is prepared by division and sub division offices throughout the country to carry out disaster prevention work systematically. At present master plan is being prepared for 18 different rivers.

iv. People's Embankment Program (JanatakoTatbandha Karyakram)

Government of Nepal has realized the importance of river training works in Terai region in order to reduce the flood and inundation problems in low lying areas. Since fiscal year 2066/067 a new river training program known as "JanatakoTatabandha" has been commenced. Janta Ko Tatbandha Karyakram has the following specific objectives:

- Land reclamation in the flood plain
- Employment generation during project period
- Reduction of loss of life and property

This program targeted to implement phase-wise in accordance with the master plan prepared for the particular river basin. Engineering structures with the bio-engineering applications are being used in order to provide sustainable and effective combination as potential counter measures. Concerned people in this program are expected to participate with great enthusiasm. Janata KoTatbandh is the river training project based on peoples' participation. Under this program 14 big rivers are incorporated for implementation now. They are Kankai river in Jhapa district, Ratuwa-Mawa in Jhapa Morang Districts, Rato river in Mahotari district, Aurahi and Jalad rivers in Dhanusha District, Lakahandehi and Jhim rivers in Sarlahi district, East Rapti river in in Makawanpur and Chitawan Districts, Narayani river in MakawanpurChitwan and Nawalparasi districts, Danav-Tinau rivers in Rupendehi district, West Rapti river in Dang and Banke districts, Karnali River in Bardia and Kailali Districts and Dhoda and Mahakli river in Kanchanpur district.

v. Landslide Management

About 83% of Nepal is covered by the hills and mountains so the country is prone to landslides and debris flows. These landslides and debris flows are activated due to natural phenomena or due to human factor. If these landslides are not addressed in time it will have an adverse effect in the flat land of Terai. So, the Department and its division and sub-division offices have focused and allocated budget regularly for managing and controlling these landslides every year.

vi. Institutional Infrastructure Development

Under this program, the activities such as central level monitoring and evaluation, institutional strengthening, capacity enhancement of office personnel, construction of office buildings and maintenance of the infrastructures etc. are being conducted in different districts.

B. Disaster Mitigation Support Program (DMSP)

DMSP is a model program for comprehensive sediment management. Following major concerns are related to the DMSP:

- Education and public awareness campaign
- Development of appropriate and cost effective technology
- People's participation in disaster mitigation
- Preparation of hazard maps of the watersheds
- Rehabilitation program
- Institutional development
- Survey and loss estimation
- Emergency rehabilitation – model site development
- Development of information technology and its dissemination
- Organizing seminars and trainings
- Preparation and amendment of policies and regulations
- Watershed/sub-watershed management

In order to implement above stated themes, local and improved technologies are to be adopted in such a way that they are less expensive and they support to resolve the problems like landslide, soil erosion, debris flow and sedimentation. Recently, Lothar Khola watershed in Chitwan and Makawanpur districts, Kerunge Khola watershed

in Nawalparasi district and Bhotekoshi(Lyangkhola) watershed in Sindhupalchowk district have been selected for developing model sites. Moreover, various training and seminars are being conducted to raise peoples' awareness about the consequences of water induced disasters, preparation of the hazard maps, landslide control works and settlement protection measures etc. have been carried out under the DMSP program.

The DMSP is also being involved in the protection of existing infrastructure like transportation, hydroelectric plant etc. of the country. In this regard, regular maintenance programs along Muglin-Narayanghat road section and Sindhuli-Bardibas road section are being carried out in order to reduce debris flow and landslides that cause harm to human life and property. For the sustainability of the water induced disaster mitigation and control measures along these road sections and smooth flow of the traffic the department has made a policy to allocate sufficient budget for regular maintenance. Similarly, protection of Marsyangdi Hydroelectric Project Powerhouse, Ruwa River Management Program and conservation of the archeological site – Mankamana temple has already been implemented

C. India Supported River Training Program (Bharatiya Sahayogma Sanchalit Nadi Niyantaran Yojana)

The big to small sized rivers that flow through the Terai to India occurring floods and inundation problems during monsoon season are considered major disasters - destroying human life and property. Embankments have been constructed in some of the rivers based on agreement and understanding between Nepal and India. Joint Committee of Inundation and Flood Management (JCIFM) plays an important role to initiate the program in particular river. JCIFM is being steered by a high level team from DWIDP (Nepal) and Ganga Flood Control Commission (India) and along with the representatives from Ministry of Finance and Ministry of Foreign Affairs from both the countries. Ongoing projects are Sunsari, Gagan, Kamala, Lal Bakaiya, Bagmati and Banganga.

D. River Terrace, Settlement/Bazaar Protection Program (Bastira Tar Bazar Samrakshan Karyakram)

This program is focused to implement in hills and mountains where there lies tars and bazaars vulnerable to floods, landslide and debris flow. This program is being implemented by the division and sub division offices.

E. Brief on Water Induced Disaster Management Policy of DWIDP

Government of Nepal has approved "Water Induced Disaster Management Policy 2006" on 28 March 2006. In this policy following subjects are highlighted.

- (a) Emergency protection
- (b) Water Induced Disaster Mitigation
- (c) Natural Resource Conservation
- (d) Utilization of flood plains
- (e) Institutional Management and Development

4.4 Organization and Human Resource of DWIDP

To adapt the changes in the development activities, address the demands of the nation on water induced disaster mitigation, following innovative and appropriate technologies, DWIDP is functioning in central level and Division/Sub-division offices and field offices are in district/field level. As per the newly approved organizational

structure, the department has three divisions, namely, i.) Planning, Program & Foreign Coordination Division, ii) River Training Division and iii) Disaster Mitigation Division and eighteen sections. The divisions are headed by the Deputy Director General, first class technical officers. The detail of organization chart is given in **Figure 4.1** and DWIDP staff distribution on the basis of central and field level as well as staff composition by service in **Figure 4.2** and **Figure 4.3**. For the smooth functioning of the departmental activities the department consists of multi-disciplinary professions of different levels. The human resource details are tabulated in **Table 4.2**.

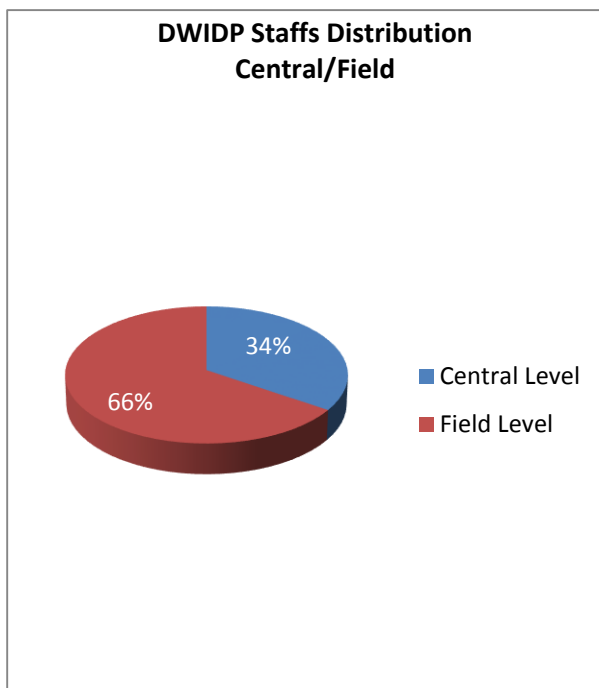


Figure 4.1: Staff Distribution Pattern in DWIDP

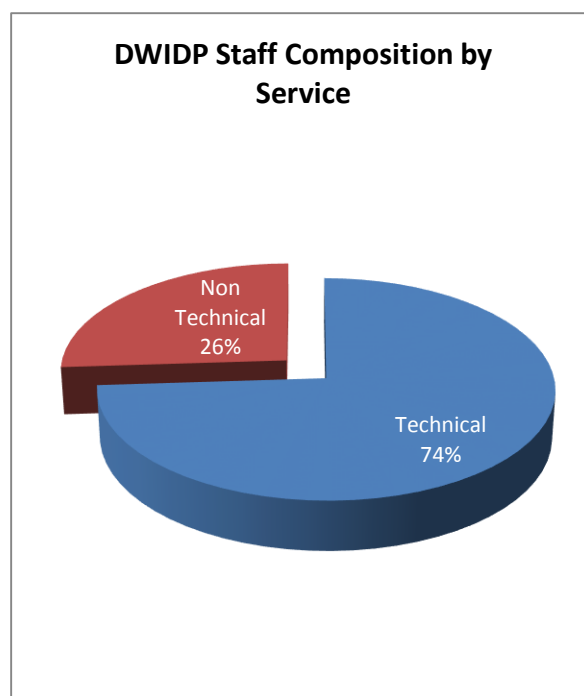
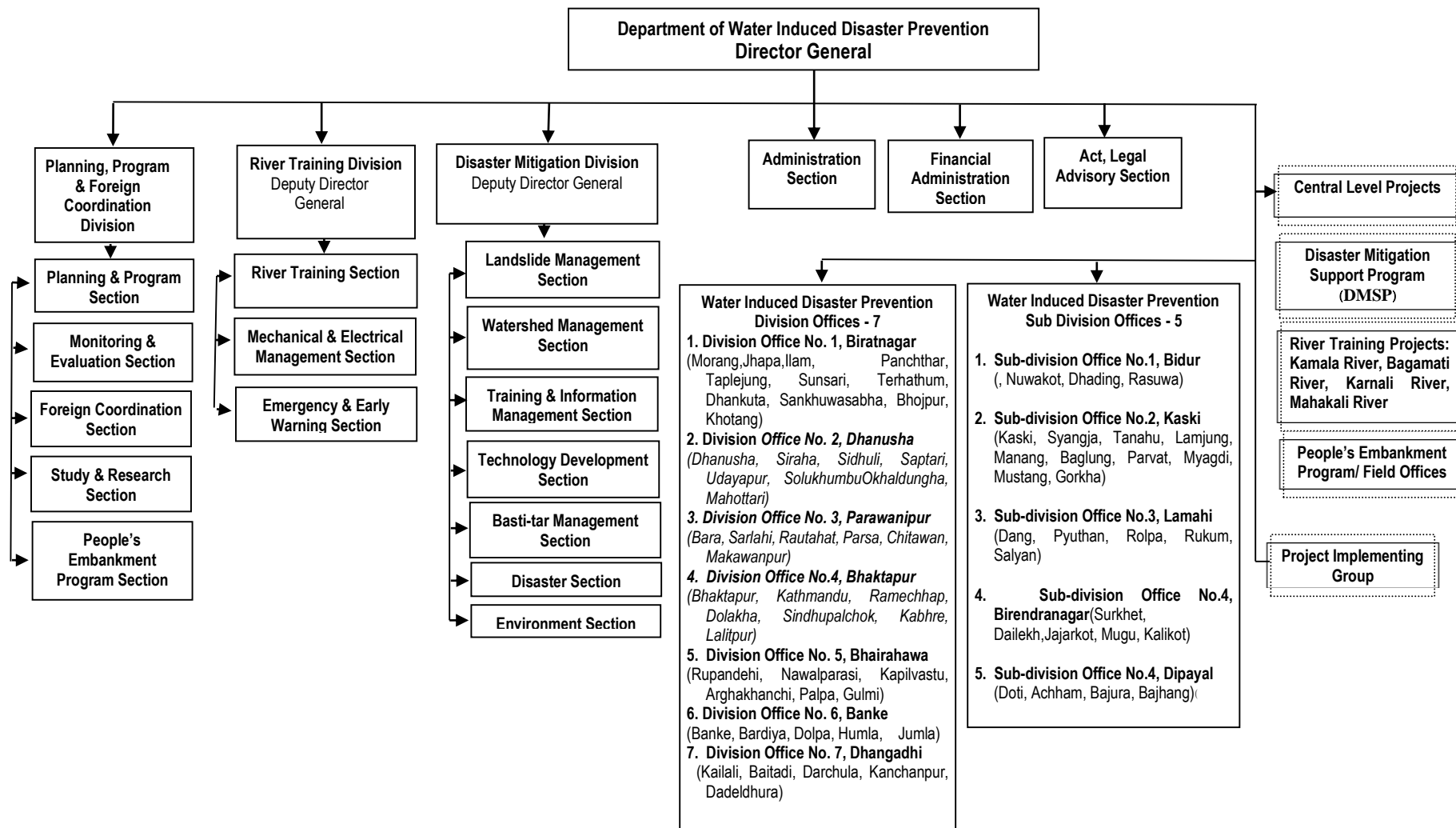


Figure 4.2: Staff Distribution Pattern in the DWIDP

Table 4.1 Human Resource of DWIDP

S.N.	Description	Department		Division	Sub-Division	Total
		Pool	Regular			
1	Gazetted I (Tech.)	-	4	-	-	4
2	Gazetted II (Tech.)	11	15	7	5	38
3	Gazetted II (Acnt)		1			1
3	Gazetted III (Tech.)	44	17	91	31	183
4	Gazetted III	-	3	7	2	12
5	Non-Gazetted I (Tech.)	1	8	4	12	25
6	Non-Gazetted		8	10	4	22
7	Non-Gazetted II (Tech.)	-		1	-	1
8	Non-Gazetted II (Tech.)	-	1	5	5	11
9	Driver (class less)	-	-	-	1	1
	Non-classified	-	5	30	9	44
	Total	56	62	155	69	342

Figure 4.3 Organization Chart of DWIDP



4.5 Physical Facilities of the DWIDP

1. Central office at Pulchowk
2. Hydraulic Laboratory at Godawari, having the following facilities,
 - River simulation model facility
 - Debris flow simulation model facility
 - Soil testing facility
 - Concrete testing facility
3. Heavy equipment workshop at Baneshwor. It will be shifted to Division No. 5, Bhairahawa in the near future.
4. Seven division offices, five Sub-division offices and seven PEP Field offices at different districts all over the Country.

4.6 Situation Analysis of DWIDP

Attempt has been made to assess the gaps in institutional and technical capacity of DWIDP for GLOF and flash flood risk reduction in the country based on existing situation, future needs and its opportunities and constraints. These gaps have been assessed in three important levels - i) institutional level, ii) organizational level and iii) human resource level. The situation analysis of the department had been done through SWOT analysis. The findings of SWOT analysis for identification of gaps and constraints are summarized below in Table 4.2.

Table 4.2: SWOT Analysis of DWIDP

Internal Situation	External Situation
<u>Strength</u>	<u>Opportunities</u>
<ul style="list-style-type: none"> - Mandated as central government agency for WID risk reduction - Staffing; multi-disciplinary, experienced - Using simple technology - Building physical structures - Creating Institutional base - Guided by policy, strategy, rules and regulation, directives, guidelines, procedures, norms - Implementing regular and project based programs on water induced disaster mitigation mainly in flood and inundation risk reduction - Institutional set-up in departmental and field level - Equipped with heavy equipment and material testing/hydraulic lab - Extensive participation of stakeholders - Continual capacity building activities for the officials - Its own homepage/IT supported information management system exist - Use of local construction material 	<ul style="list-style-type: none"> - Donors' interest in environmental safeguard measures - Govt's increased budgetary allocation - Growth of multiple institutions with concerns for WIDM - Expansion of knowledge base and ICT - Participation of stakeholders - Increasing demand of support in disaster risk reduction - Increasing road networks – Good accessibility to remote area - Increasing people's awareness in water induced disaster
<u>Weakness</u>	<u>Threats</u>

<ul style="list-style-type: none"> - No legal base for river protection / built-in infrastructures - Not fitting in with the larger national DRM framework - Imbalance focus (geo coverage / disaster types) - No action plan for WIDM policy 2006 - Conventional program / little research base - Lack of river training/flood risk reduction manual - Inadequate awareness raising program on flood risk - Inadequate knowledge on hydrological data capturing/accessing and analysis - Limited knowledge on hydrological modeling and validation - Insufficient skill and knowledge on climate change and its impact on river system - Inadequate knowledge on application of GIS, remote sensing and HECRAS - No legal base of infrastructural development for flood risk reduction - Needs effective monitoring and evaluation system to develop and apply - Lack of working environment - Needs to increase knowledge, skill and positive attitude level in GLOF and flash flood risk reduction - No experience in GLOF risk mitigation - Limited use and application of disaster management information 	<ul style="list-style-type: none"> - Climate change with new disaster risks - Culture – insensitivity to vulnerability and hazards - Shifting of scare resources to more productive sectors - Physical infrastructure - encroaching natural systems - Political instability - delays in formulating policies / law - Environmentally disturb with local road construction - Unbalance extraction of River bed material - Lack of laws and regulation regarding land use in flood areas - No practices exist in dividing responsibilities among government organization and the public to reduce possibilities of severe flood and GLOF risk. - Least knowledge on technical auditing - Lengthy contractual procedure. - Lack of budget to reduce likelihood of severe flood and GLOF risk
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4.7 Summary of Assessment

4.7.1 General

At the **institutional level**, DWIDP has a clear mandate and wide range of plan, policy, strategy rules and regulations implemented by government of Nepal, good relations with national and international development partners and other stakeholders and who are committed to working and supporting the organization. At the **organizational level**, there is strong leadership from the DG and the DDGs. There is a need to (i) develop and establishing a Legal and Regulatory Framework in order to legally institutionalize the DWIDP in carrying out its regular works and services (ii) develop clear and effective Monitoring and Evaluation (M&E) systems, procedures, manuals, directives etc. At the **human resource level** there is need to develop human resource systems enhancing knowledge and skill on flood risk mitigation and in both motivational and attitudinal aspects. There is also need of environmental, social and mechanical human resources to address the issues raised in these fields. The summary of capacity need of DWIDP is attached in **Annexes- 7** at the end of the report.

4.7.2 Specific: GLOF and Flash Flood Risk Reduction

The major activities of DWIDP regarding disaster risk are: a) design and execute policies and programs relating to water-induced disaster management, b) prepare hazard maps and risk zoning, c) strengthen the network for

disaster mitigation and disaster information systems, d) conduct community awareness programs and trainings on water-induced disaster management, e) activate Indo-Nepal Inundation committee(s), f) prepare and implement Flood Area Action Plan, g) implement disaster mitigation measures, h) undertake institutional development, human resource development and capacity building, i) identify environment-friendly water-induced disaster mitigation measures and construction methodology, j) institutionalize and strengthen water-induced disaster rehabilitation system, k) develop disaster information system and disseminate the disaster information and l) perform the capability-building of the Government and community for water-induced disaster mitigation works

The department has been implementing river training program, master plan based river training works, People's Embankment Program, disaster mitigation support program, India supported river training program and river terrace, settlement/bazar protection program. All these activities are focused on flood risk reduction minimizing casualties and losses of properties as well as damages of infrastructures. The DWIDP has not yet started hydrological modeling, sediment monitoring and early warning system in its flood risk mitigation purposes. All engineering mitigation designs/analysis are based on general principle of civil engineering/river engineering/ river hydrology. The DWIDP engineers frequently use in estimating of design flood and flood frequencies are a) for gauged rivers: Statistical Analysis (Flood Frequency Analysis) of Time Series Data of Discharge of the Stations; the standard methods are; i. Gumbel Distribution, ii. Log Normal Distribution and iii. Pearson's Distribution b) for un-gauged streams i. Rational Methods, ii. Empirical Methods (Dicken's Formula, Ryves Formula), iii. Regional Flood Relationship Method (WECS Method), iv) Medium Irrigation Project (MIP) Methods. The organizational, institutional and technical present capacity of DWIDP regarding GLOF and flash flood risk reduction was assessed and the needs are:

- Regular program on GLOF risk mitigation/reduction
- Preparation of flood risk and social hazard mapping
- Community awareness program on flood risk
- Use of flood hazard computer-based modeling tools,
- Knowledge, skill and positive attitude enhancement training on GLOF and flood risk reduction mitigation
- Capacity building in hydrological analysis and hydrological modeling and data validation.
- Develop effective monitoring and evaluation system
- Develop effective IT supported information management system
- Build organizational culture

4.8 Training Need Assessment of DWIDP

From the institutional assessment on human resource level of DWIDP found gaps in conducting GLOF and flash flood risk mitigation services and gap in their capabilities are to take corrective measures by DWIDP. An attempt was done to determine what training is required to fill the gap in conducting GLOF and flash flood risk reduction services of DWIDP. Consultation with Directors, CFGORRP's collaborative focal point and other Officials as well as their individual feedback through the checklist on the target specific training needs are on knowledge, skill and attitudes. The checklist developed for training needs assessment is kept in **Annex 4**.

4.9 Critical Examination of Training Needs

Water induced disaster risk/vulnerability mapping and zoning, disaster networking and information system, community awareness/education on disaster management, activating Inundation Committee (s) with respect to neighboring countries, preparing and implementing floodplain action plans and implementing disaster reduction/mitigation measures activities of DWIDP are directly related to flood risk reduction. Flood hazard and risk mapping, glacial lake monitoring, sediment monitoring and data acquisition, establishing early warning system, structural and non-structural measures are also concerned with GLOF and flood risk reduction. As per the critically examining of TNA checklist, questionnaire, feedbacks and meetings; real time data management, application of GIS and remote sensing technology in flood hazard and risk mapping, rainfall-runoff and stream flow routing, application of numerical application modeling tools and GIS in flood hazard mapping, Hydro-dynamic

modeling/DAMBREACH model, Bio-engineering techniques, river engineering and river training mitigation measures, flood frequencies and estimating design discharge found core areas of training needs.

4.10 Suggested Training

In line with the areas of training needs, the types of training programs to be designed and conducted by CFGORRP are suggested below indicating their thematic focus and duration. The types of programs for senior policy level officials would include seminar, workshop, interaction, orientation and field observation or excursions covering the policy issues on GLOF and flash flood risk reduction. Likewise, the types of training programs for mid-level officers / managers would be training-cum-workshop, interactions and excursions with coverage of themes as mentioned in the table 4.4 below.

Table 4.3 Suggested Trainings for DWIDP

SN	Training Needs (Subjects arranged according to preference level)	Target Group	Duration of Training (Day)	Indicative Budget (NRs in '000)
1	<ul style="list-style-type: none"> ▪ <u>Training on GLOF and Flood Risk Management for the DWIDP Technical Officials</u> <ul style="list-style-type: none"> - Flood risk management: Concepts, Policies and Strategies - Climate change adaptation - Risk knowledge - Community based early warning system - Flood hazard and risk mapping - Hydro dynamic modeling - Sediment Monitoring and data management - Training on planning, survey, design of flood risk mitigation - Training on bio-engineering techniques used in river training - Flood Frequencies and Estimating Design Discharge - GESI and Disaster - Design of River Training Structures 	Technical Officials (20 nos.)	6	900

CHAPTER – FIVE

INSTITUTIONAL CAPACITY NEED ASSESSMENT: DEPARTMENT OF SOIL CONSERVATION AND WATERSHED MANAGEMENT

5.1 Background

Soil erosion is an inherent characteristic of Nepal's physio-climatic and socio-economic conditions. Sharp physiographic and climatic contrasts in combination with other natural phenomena contribute to the fragility of Nepalese mountains. The combined effect of geologically unstable, steep and rugged mountain topography and intense monsoon rainfall make the country prone to high soil erosion rates. Cultivation of marginal hill slopes to meet the demands of increasing population further aggravates the naturally high soil erosion rate. Deforestation, overgrazing and poorly maintained marginal lands contribute to the degradation of our watersheds. In addition, other human activities such as improper land use, unscientific cultivation practices and construction of development infrastructures without integrating conservation measures have also exacerbated the problems of soil erosion, landslide, flooding and environmental degradation.

In recognition of critical situation of soil erosion and watershed degradation in the country, Government of Nepal established the Department of Soil and Water Conservation in August, 1974 under the then Ministry of Forests. In 1980, it was renamed as Department of Soil Conservation and Watershed Management (DSCWM) to better represent its roles and responsibilities of watershed management. Since its establishment, various efforts have been continuing to meet the challenges of soil erosion and watershed degradation faced by the country. Reorganization of the Departmental structure was carried out in 1993 and 1997.

DSCWM plans, implements, and monitors soil conservation programs and activities based on the principles of integrated watershed management. This multidisciplinary approach encompasses aspects of forestry, agriculture, civil engineering, chemistry, and geology. The DSCWM extends its various services on soil conservation and integrated watershed management to 73 of Nepal's 75 districts through 56 District Soil Conservation Offices (DSCO) (Source: DSCWM).

5.2 Mandate

5.2.1 Goal and Objectives

DSCWM's goal is to contribute to the livelihood and well-being of the people through sustainable watershed management of the river basins. The department has mainly two objectives, they are:

- to assist in maintaining ecological balance by reducing pressure from natural hazards such as floods, landslides and soil erosion through conservation and development of important watersheds of the country.
- to maintain land productivity, reduce soil erosion and contribute in development infrastructure protection by scientific management of watersheds.

5.2.2 Policies and Strategies

DSCWM has adopted the following policies and strategies for Soil Conservation and Watershed Management:

- Ensure proper land use by rational land use planning.
- Implement integrated package programs that include vegetative, agronomic and water management measures to tackle erosion problems taking the sub-watershed area as the unit of planning, implementation and management.

- Ensure the multiple usages of land and water to fulfill diverse needs.
- Operate Soil Conservation and Watershed Management (SCWM) programs in line with the integrated watershed management approach.
- Establish linkages and networking with all other related sectors like forestry, agriculture, livestock, water and land resources.
- Ensure people's participation through conservation, extension education and demonstration of appropriate technologies.
- Adopt ways and means of minimum damage to the environment during the construction of development infrastructures.
- Protect important watersheds (e.g. upstream of hydroelectric dams, irrigation systems) and riverbanks through plantation and the other conservation measures.
- Expand and institutionalize SCWM services in all districts of Nepal.
- Focus on conservation activities in the Siwalik region and other marginal lands.

5.2.3 Water Resource Strategy, 2002 and Watershed Management

For the sustainable development of water resources, requires emphasizing the development of the country's water resources from a holistic perspective that brings environmental considerations into the mainstream of the Water Resources Strategy and subsequent implementation. The emphasis will be to strengthen institutional capacity for watershed and aquatic ecosystem protection and management. Department of Soil Conservation and Watershed management (DSCWM) and the Department of National Parks and Wildlife Conservation (DNPWC) will be designated to act as lead agencies for the design and implementation of programs for critical priority watersheds and aquatic ecosystems identified for inclusion in strategic pilot scale programs. A participatory environmental mitigation program will also be implemented as a component of all water resources projects. In the subsequent ten years, watershed and ecosystem management activities will be implemented in full scale in all priority watersheds and aquatic ecosystems. This should result in improvement in the quality of stream flows, increasing their ability to meet the long-term requirements of social and ecological sustainability in the priority watersheds. Within 25 years, major watersheds and aquatic ecosystems will be managed by all the users in a sustainable manner. Development projects in all sectors will be in full compliance with strategic and project-specific EIAs, which will specify effective environmental protection measures to be carried out during construction and operation phases.

To carry out the Strategy and achieve the targets, the following nine activities relating to watershed management and aquatic ecosystems in Nepal will be undertaken.

1. Improve environmental database system.
2. Map important, critical and priority watersheds and aquatic ecosystems.
3. Develop water and wastewater quality standards and regulations.
4. Implement a water conservation education program
5. Implement watershed and aquatic ecosystem protection, rehabilitation and management program.
6. Develop and implement Strategic Environmental Assessment in water resources management.
7. Ensure compliance with environmental regulations.
8. Promote community participation.
9. Enhance institutional capacity and coordination.

DSCWM will be appointed as lead agency for the second and fifth activities. The second activity is intended to prepare environmental sensitivity mapping for important watersheds in Nepal. This mapping activity will be a useful tool in the identification of priorities for environmental protection, conservation, management and development. It will also be useful for the evaluation of prioritized activities and strategic policy revisions, if necessary. It will also provide input to the environmental database and information relevant to the strategy for water pollution control. The scope of activities will include mapping of human activities, pollution sources, ecological sensitivity and trends in the principal wetlands of Nepal. This activity will also lead to the identification of data gaps, opportunities and priorities for water management.

The DSCWM will be appointed as lead agency to initiate, coordinate and implement activities in consultation with other relevant and non-government agencies. These will involve:

- Identification and justification of principle watershed basins;
- Definition and selection of parameters to be mapped;
- Completion of data tables after all available information has been collected; and
- Preparation of Geographic Information System (GIS) sensitivity maps

Under the fifth activity it is stated that while numerous government and other agencies are working to improve the situation, there is a dire need to streamline and coordinate their efforts, improve the formulation and enforcement of policies, and increase efficiency in the implementation of priority watershed protection, conservation and management activities.

The objectives of fifth activity include:

- Implementation of watershed protection programs to improve downstream surface and groundwater quality and availability;
- Compulsory implementation of watershed protection restoration and enhancement activities for all major development projects; and
- Increased cooperation among agencies.

The activity will identify, design and implement programs starting with pilot watershed in which aquatic ecosystem protection, rehabilitation and management will be demonstrated (e.g., Kulekhani watershed). Following completion of the pilot project, this activity will be propagated nationwide with vigor and intent.

DSCWM and DNPWC will be the lead agencies for the design and implementation of both pilot and full-scale programs to enhance watersheds and aquatic ecosystems. The following indicators have been identified to track whether the outputs have been achieved:

- Nepal has competent institutions that are able to enforce standards;
- There are high levels of stakeholder participation in program;
- Watershed and aquatic ecosystems are meeting environmental standards; and
- Rivers have improved stream flows to meet the long-term ecological and social demands of the river basin.

Key pre-condition to the implementation of this component of the Strategy is enhancement of institutional capacity in outcome level. Such capacity should be developed at the central, district, and community levels. A major risk is poverty which will divert people's concern for protecting or enhancing the environment. The Strategy assumes that awareness programs and adequate funding will enable all communities and relevant stakeholders to actively participate and cooperate in the environmental and water conservation programs.

5.2.4 Major Activities

- Identifying nationally important critical and vulnerable watersheds
- Developing technical directives of procedures to identify landslides, soil erosion/disaster including soil conservation/ watershed management planning.
- Formulating program to assist watershed management activities.
- Project formulating on soil conservation/watershed management.
- Coordinating with the concern donor agencies of programs.
- Developing virtual monitoring system to examine whether progress achieved or not as of target, purpose and expected returns including adjusting evaluating and feed back to improve the programs.
- Developing financially suitable technology in watershed management, testing technical models and certifying to implement and upgrading the technology.
- Enhancing skill and capacity of medium and upper level technical man power.

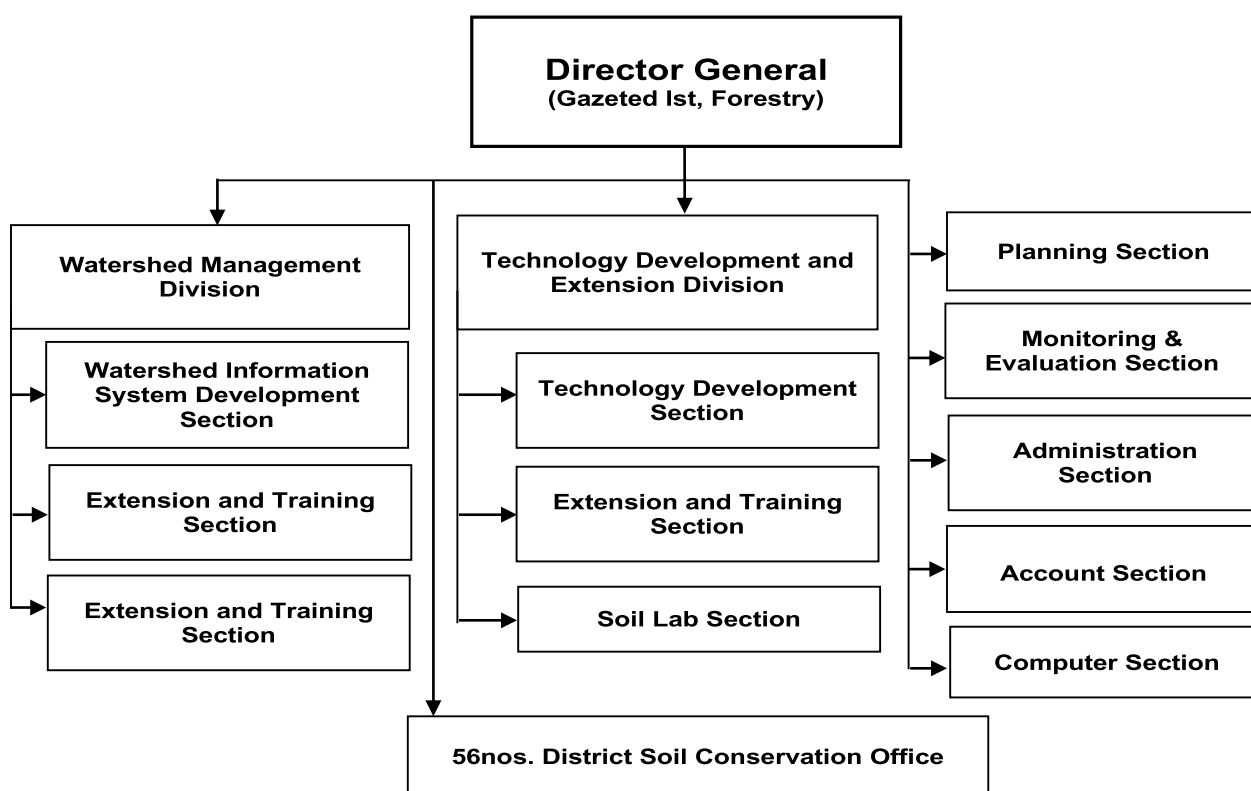
- Selecting, formulating and developing of suitable awareness activities to provide knowledge regarding importance, effectiveness and fruitfulness of watershed management.
- Disseminate through talks and interactions, exhibitions, seminars as well as audiovisuals in the national level.

5.3 Organizational Structure

5.3.1 Organizational Setup of Department

Department of Soil Conservation and Watershed Management is functioning as a central level office located in Kathmandu and District Soil Conservation Offices are at district level. As per the newly approved organizational structure, the department has two divisions, namely, i) Watershed Management Division, and ii) Technology Development and Extension Division with eleven branches. The divisions are headed by the Deputy Director General, i.e. first class technical officer. The Watershed Management Division has three sections: Information System Development Section, Soil Conservation Section and Climate Change Management Section. Similarly, the Technology Development and Information Division has also three sections: Technology Development Section, Information & Training Section, and Soil Lab Section. The rest Planning Section, Monitoring and Evaluation Section, Administration Section, Account Section and Computer Section directly function under the Director General.

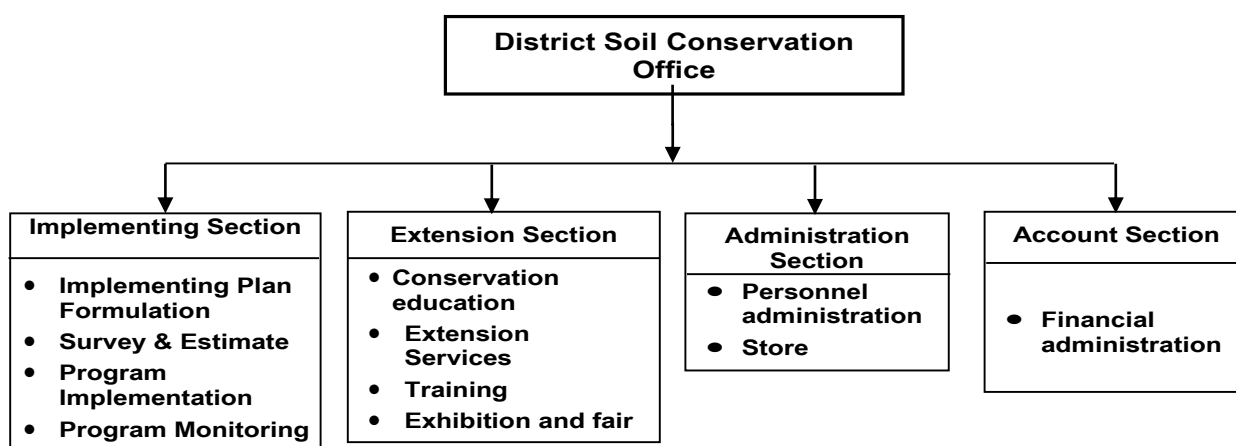
Figure 5.1 Organization Chart of DSCWM



5.3.2 Organizational setup of District Offices

At present DSCWM is providing soil conservation and watershed management service to 73 out of the 75 districts of Nepal through 56 District Soil Conservation Offices (DSCO) including 11 temporary offices. The DSCOs have also been classified into *Ka* (headed by a Gazetted Class II Officer) and *Kha* (headed by a Gazetted Class III Officer) categories. Out of 56 district offices, 39 are under *Ka* category and 17 under *Kha* category. There are 11 temporary offices, 8 in *Ka* and 3 in *Kha* category.

Figure 5.2 Organization Chart of DSCOs



5.3.3 Staff Details

There are altogether 656 staffs within the department out of which 533 are permanent and 123 are temporary.

Table 5.1 Staff Details of DSCWM and DSCOs

SN	Class	Permanent Post			Temporary Post	Total of Permanent and Temporary
		Department	District	Total		
1	Gazetted First (Technical)	3	-	3	–	3
2	Gazetted Second (Technical)	14	31	45	8	53
3	Gazetted Second (Admin)	2	-	2	–	2
4	Gazetted Third (Technical)	18	116	134	11	145
5	Gazetted Third (Admin)	2	1	3	–	3
6	Non-Gazetted First (Technical)	4	83	87	49	136
7	Non-Gazetted First (Admin)	9	76	85	11	96
8	Non-Gazetted Second (Admin)	2	26	28	11	39
9	Light Vehicle Driver (Classless)	4	28	32	11	43
10	Office Helper	11	103	114	22	136
Total		69	464	533	123	656

5.4 Situation Analysis

Attempt has been made to assess the gaps in institutional and technical capacity of DSCWM for GLOF and flash flood risk reduction in the country based on existing situation, future needs and its opportunities and constraints. These gaps have been assessed in three important aspects of DSCWM in GLOF and flood risk reduction - i) institutional level, ii) organizational level and iii) human resource level. The situation analysis of the department had been done through SWOT analysis. The findings of SWOT analysis for identification of gaps and constraints are summarized below in **Table 5.4**

Table 5.2 SWOT Analysis of DSCWM

Internal Situation	External Situation
<u>Strength</u> <ul style="list-style-type: none"> - Mandated as central government agency for soil conservation and watershed management - multi-disciplinary staff with high experienced - Using simple technology - Building physical structures - Creating Institutional base - Guided by policy, strategy, rules and regulation, directives, guidelines, procedures, norms, - Implementing regular and project based programs on soil conservation and watershed management - Institutional set-up in departmental and field level - Strong institutional set-up in departmental and district level (56 districts) - Specialize in soil conservation, watershed management, river bank erosion control - Extensive participation of stakeholders - Continual capacity building activities for the officials - Its own home page/IT supported information management system exist - Use of local construction material as well as bio-engineering techniques 	<u>Opportunities</u> <ul style="list-style-type: none"> - Donors' interest in environmental safeguard measures and watershed management - Governmental increased budgetary allocation - Growth of multiple institutions with concerns for watershed management - Expansion of knowledge base and ICT - Participation of Stakeholders - Increasing demand of support in land degradation risk reduction - Increasing Road networks – Good accessibility to remote areas - Increasing people's awareness in soil erosion and watershed degradation - Working opportunity on climate change, adaptation and mitigation
<u>Weakness</u> <ul style="list-style-type: none"> - Conventional program / little research base - Lack of river training/flood risk reduction manual - Lack of awareness raising program on flood risk - Inadequate knowledge on hydrological data analysis - Inadequate knowledge on climate change and its impact on watershed/river basin - Limited use and application of disaster management information 	<u>Threats</u> <ul style="list-style-type: none"> - Climate change with disaster risks - Culture – insensitivity to vulnerability and hazards - Physical infrastructure - encroaching natural systems - Political instability - delays in formulating policies / law - Unpredicted extensive rainfall - Unbalance extraction of natural resources - Lack of laws and regulation regarding land use in soil conservation and watershed management

5.5 Summary of the Assessment

5.5.1 General





At the ***institutional level***, DSCWM has a clear mandate and wide range of plan, policy, strategy rules and regulations implemented by the Government of Nepal. It has good relations with national and international development partners and other stakeholders who are committed to working and supporting the organization. At the ***organizational level***, there is strong leadership from the DG and the DDGs. There is a need to (i) develop and establishing a Legal and Regulatory Framework in order to legally institutionalize the DSCWM in carrying out its regular works and services (ii) develop clear and effective Monitoring and Evaluation (M&E) systems, procedures,

manuals, directives etc. At the **human resource level** there is need to develop human resource systems enhancing knowledge and skill on flood risk mitigation and in both motivational and attitudinal aspects. The summary of capacity needs assessment of DSCWM is attached in **Annexes- 8** at the end of the report.

5.5.2 Specific: GLOF and Flash Flood Risk Reduction

The major activities of DSCWM regarding soil conservation and watershed management are indirectly related to flash flood risk reduction minimizing casualties and losses of properties as well as damages of infrastructures. Sediments generated from the watershed and floods get deposited in the river course of flat land and surrounding areas. Continuous mass wasting in up-hill slopes and flooding in the down streams have created many flood risk such as rise of bed level, bank cuttings, damage of highly fertile lands and existing physical infrastructures and also threatened to the downstream settlements. If the water induced hazards such as landslides, debris flows and floods of the watershed are not addressed in time, it may generate a big threat to the downstream. The deterioration of watershed is also a triggering factor of flood disaster. The other triggering factors are geo-morphology, landforms, rains and local community themselves. The human intervention is also playing a significant role to deteriorate the watershed. Thus the soil conservation and watershed management indirectly plays a vital role in GLOF and flash flood risk reduction. It is a preventive measure of flood risk reduction.

The organizational, institutional and technical capacity of DSCWM regarding GLOF and flash flood risk reduction was critically assessed, the study has found:

-  Inadequate experience, knowledge and skill on technical aspect of GLOF and flash flood risk mitigation
-  Lack of knowledge and skill in flood vulnerability and risk mapping
-  Inadequate community awareness program on watershed management and flood risk
-  Inadequacy knowledge and skill in sediment monitoring, analyzing and data management

5.6 Training Need Assessment of DSCWM

An attempt was done to determine if a training need exists and, if it does, what training is required to fill the gap in conducting GLOF and flash flood risk reduction services of DSCWM. The gap between the present status and desired status can reduce by training equipping the participants with knowledge and skills and encouraging them to build and enhance their capabilities.

Keeping in view the importance of watershed management in GLOF and flash flood risk reduction in the country, following steps were taken for conducting training needs assessment to determine whether any training is needed, the areas in which training needed, the gap to be bridged and desired training outcomes.

1. Consultation with Directors, project focal point and other Officials on deficiency- in the watershed management services and gap in their capabilities to take corrective measures.
2. Developed a special questionnaire to assess individual feedback on the training needs, target specific training needs, tested and used. The checklist developed for training needs assessment is kept in **Annex 4**.

5.7 Critical Examination of Training Needs

Watershed management activities are preventive measures of flood risk. The activities minimize continuous mass wasting in up-hill slopes and retard deposition of sediments in the river course of flat land and surrounding areas and helps to minimize flood generated risks. As per the critically examining of TNA checklist, questionnaire, feedbacks and meetings; watershed management, river bank protection, application of GIS and remote sensing technology in flood hazard and risk mapping, sediment monitoring and data acquisition, rainfall-runoff and stream flow routing, use of bio-engineering techniques in watershed management activities and flood protection works are found core areas of training needs.

5.8 Suggested Training

In line with the areas of training needs, the types of training programs to be designed and conducted by CFGORRP are suggested below indicating their thematic focus and duration. The types of programs for senior policy level officials would include seminar, workshop, interaction, orientation and field observation or excursions covering the policy issues on GLOF and flash flood risk reduction. Likewise, the types of training programs for mid-level officers/managers would be training-cum-workshop, interactions and excursions with coverage of themes as mentioned in the table 5.5 below.

Table 5.3 Suggested Trainings for DSCWM

SN	Training Needs (Subjects arranged according to preference level)	Target Group	Duration of Training (Day)	Indicative Budget (NRs in '000)
1	<ul style="list-style-type: none"> ▪ <u>Training on GLOF and Flood Risk Management for the DSCWM Technical Officials</u> <ul style="list-style-type: none"> - Flood risk management: Concepts, Policies and Strategies - Climate change adaptation - Risk knowledge - Community based early warning system - Flood hazard and risk mapping - Sediment Monitoring and data management - Watershed Management - Training on planning, survey, design of flood risk mitigation - Flood Frequencies and Estimating Design Discharge - GESI and Disaster - Design of River Training Works 	Technical Officials (20 nos.)	6	900

CHAPTER – SIX

INSTITUTIONAL CAPACITY NEED ASSESSMENT: DEPARTMENT OF NATIONAL PARKS AND WILDLIFE CONSERVATION/SAGARMATHA NATIONAL PARK

6.1 Department of National Parks and Wildlife Conservation

6.1.1 Mandate

Works on national parks and wildlife conservation had begun with the establishment of Conservation Section under the Department of Forest in 1972. In the context of growing importance of the national parks and the wildlife reserves in the country, and with the objectives of improving its institutional structure, further strengthening and making the management of the National Parks and Wildlife Reserves more effective, the Department of National Parks and Wildlife Conservation was set up as a separate entity under the Ministry of Forest and Soil Conservation in 1980. The DNPWC is the administrative authority in Nepal of the Ramsar Convention; management authority of the fauna under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); and focal institution of the World Heritage Convention (UNESCO), Global Tiger Forum (GTF) and Convention on Biodiversity (CBD).

- The overall goal of the DNPWC is to conserve wildlife and outstanding landscapes of ecological importance for the well-being of the people. The primary objective of the Department is to conserve the country's major representative ecosystems, unique natural and cultural heritage and give protection to the valuable and endangered wildlife species. It encourages scientific research for the conservation of genetic diversity. In achieving its objectives, the Department implements regular programmes, National Parks Management, Wildlife Reserve Management, Conservation Area Management, Hunting Reserve Management, Buffer Zone Management, Hattisar Management and Non Timber Forest Products Management that includes key activities such as Habitat Management, Species Conservation, Anti-poaching Operations, Conservation Education, Ecotourism Promotion in and around the Protected Areas. The specific objectives of the department are:
 - To conserve rare and endangered wildlife, including floral and faunal diversity, by maintaining representative ecosystems
 - To conserve and manage outstanding landscapes of ecological importance
 - To support the livelihood of the local people through buffer zone and conservation area management programs
 - To promote ecotourism consistent with biodiversity conservation

Policies & Strategies

- Nepal Biodiversity Strategy, 2002
- National Wetland Policy, 2013
- Sustainable Development Agenda for Nepal, 2003
- Working policy on Wild Animal Farming, Breeding and Research, 2003
- Herbs and Non Timber Forest Products Development Policy, 2004
- Working Policy on Construction and Operation of Development Projects in Protected Areas 2008.

Figure 6.1 Organization Chart of DNPWC

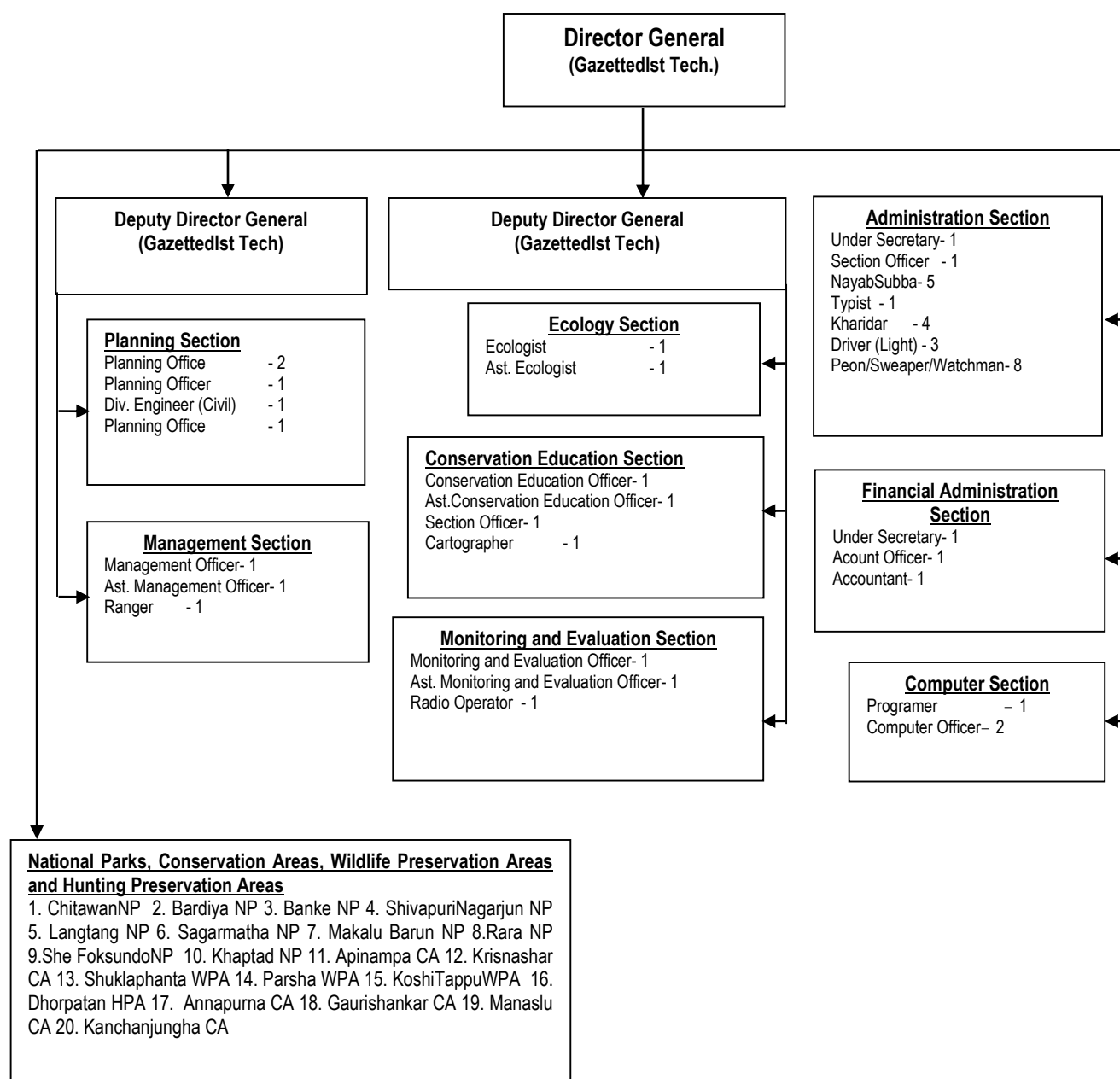


Table 6.1 Protected Areas in Nepal

SN	Name of Protected Areas	Gazetted year	Area (Sq.km.)
National Parks			
1	Chitwan National Park (World Heritage Site 1984)	1973	932.00
2	Langtang National Park	1976	1710.00
3	Rara National Park	1976	106.00
4	Sagarmatha National Park (World Heritage Site 1979)	1976	1148.00
5	SheyPhoksundo National Park	1984	3555.00
6	Khaptad National Park	1984	225.00
7	Bardia National Park	1984	968.00
8	Makalu Barun National Park	1991	1500.00
9	ShivapuriNagarjun National Park	2002	159.00
10	Banke National Park	2010	550.00
Sub Total			10853.00
Wildlife Reserve			
1	Suklphanta Wildlife Reserve	1976	305.00
2	Koshi Tappu Wildlife Reserve (Ramsar Site 1987)	1976	175.00
3	Parsa Wildlife Reserve	1984	499.00
Sub Total			979.00
Hunting Reserve			
1	Dhorpatan Hunting Reserve	1987	1325.00
Sub Total			1325.00
Conservation Areas			
1	Annapurna Conservation Areas	1992	7629.00
2	Kanchanjunga Conservation Areas	1997	2035.00
3	Manaslu Conservation Areas	1998	1663.00
4	Krisnhasar Conservation Areas	2009	16.95
5	Gaurisankar Conservation Areas	2010	2179.00
6	Api Nampa Conservation Areas	2010	1903.00
Sub Total			15425.95
Buffer Zones			
1	Chitwan National Park	1996	750.00
2	Bardia National Park	1996	507.00
3	Langtang National Park	1998	420.00
4	Shey Phoksundo National Park	1998	1349.00
5	Makalu Barun National Park	1999	830.00
6	Sagarmatha National Park	2002	275.00
7	Suklphanta Wildlife Reserve	2004	243.50
8	KoshiTappu Wildlife Reserve	2004	173.00
9	Parsa Wildlife Reserve	2005	298.17
10	Rara National Park	2006	198.00
11	Khaptad National Park	2006	216.00
12	Banke National Park	2010	343.00
Sub Total			5602.67
Grand Total			34185.62

6.1.2 Situation Analysis

Attempt has been made to assess the gaps in institutional and technical capacity of DNPWC in the country based on existing situation, future needs and its opportunities and constraints. These gaps have been assessed in three important aspects of DNPWC in GLOF and flood risk reduction - i) institutional level, ii) organizational level and iii) human resource level. The situation analysis of the department had been done through SWOT analysis. The findings of SWOT analysis for identification of gaps and constraints are summarized below in **Table 6.2**

Table 6.2 SWOT Analysis of DNPWC

Internal Situation	External Situation
<u>Strength</u>	<u>Opportunities</u>
<ul style="list-style-type: none"> - Mandated as central government agency to conserve rare and endangered wildlife, including floral and faunal diversity, by maintaining representative ecosystems - Staffing; experienced - Building physical structures - Guided by policy, strategy, rules and regulation, directives, guidelines, procedures, norms, - Implementing regular and project based programs on wildlife conservation and national parks development - Institutional set-up in departmental and field level - Specialize in conserving the country's major representative ecosystems, unique natural and cultural heritage and give protection to the valuable and endangered wildlife species. - Extensive participation of stakeholders - Its own home page/IT supported information management system exist 	<ul style="list-style-type: none"> - Donors' interest in environmental safeguard measures - Government's increased budgetary allocation - Growth of multiple institutions with concerns to promote ecotourism consistent with biodiversity conservation - Expansion of knowledge base and ICT - Participation of Stakeholders - Increasing people's awareness in wildlife conservation - Working opportunity on climate change, adaptation and mitigation
<u>Weakness</u>	<u>Threats</u>
<ul style="list-style-type: none"> - No mandate in GLOF & flash flood risk reduction - In adequate knowledge and skill on natural disaster like GLOF and flash flood risk reduction - Low staff motivation - Lack of awareness raising program on GLOF and flood risk - In adequate knowledge on hydrological data capturing/accessing and analysis - No legal base of infrastructural development for flood risk reduction - Needs effective monitoring and evaluation system - Inadequate knowledge on climate change and its impact on wild life. - Needs to increase knowledge, skill and positive attitude level 	<ul style="list-style-type: none"> - Climate change with new disaster risks - Culture – insensitivity to vulnerability and hazards - Physical infrastructure - encroaching natural systems - Political instability - delays in formulating policies / law

- | | |
|--|--|
| - Limited use and application of disaster management information | |
|--|--|

6.1.3 Summary of Assessment

6.1.3.1 General

At the **institutional level**, DNPWC has a clear mandate and wide range of plan, policy, strategy rules and regulations implemented by government of Nepal, good relations with national and international development partners and other stakeholders and who are committed to working and supporting the organization. At the **organizational level**, there is strong leadership from the DG and the DDGs. There is a need to (i) develop and establish a Legal and Regulatory Framework in order to legally institutionalize the **DSCWM** in carrying out its regular works and services (ii) develop clear and effective Monitoring and Evaluation (M&E) systems, procedures, manuals, directives etc. At the **human resource level** there is need to develop HR systems in both motivational and attitudinal aspects to retain the skilled human resources. The summary of capacity need of DNPWC is attached in **Annexes- 9**.

6.1.3.2 Specific: GLOF and Flash Flood Risk Reduction

The major activities of DNPWC regarding wildlife protection and conservation of ecosystem and natural and cultural heritage are: a) Conserving and manage outstanding landscapes of ecological importance, b) Conserving rare and endangered wildlife, including floral and faunal diversity, by maintaining representative ecosystems, c) Promoting ecotourism consistent with biodiversity conservation and d) Supporting the livelihood of the local people through buffer zone and conservation area management programs.

All the above mentioned DNPWC activities are not related to flash flood risk reduction. But in previous days, several damages and losses happened in preserved areas from GLOF and flash flood. Thus, it is being essential to incorporate the water generated risk reduction activities, a regular program to cope GLOF and flood risk should be introduced. For this, knowledge, skill and attitude based exposures should be supported to the DNPWC personnel.

The current capacity on organizational, institutional and technical issues of DNPWC regarding GLOF and flash flood risk reduction was assed and the needs are:

- Development of information technology and its dissemination
- Knowledge, skill and positive attitude enhancement training on GLOF and flood risk reduction mitigation.
- Develop effective monitoring and evaluation system
- Develop effective IT supported information management system
- Build organizational culture

6.1.4 Suggested Training

In line with the areas of training needs, the types of training programs to be designed and conducted by CFGORRP are suggested below indicating their thematic focus and duration. as mentioned in the **Table 6.3** below.

Table 6.3 Suggested Trainings for DSCWM

SN	Training Needs (Subjects arranged according to preference level)	Target Group	Duration of Training (Day)	Indicative Budget (NRs in '000)
1	<ul style="list-style-type: none"> ▪ <u>Training on GLOF and Flood Risk Management for the DNPWC Technical Officials</u> <ul style="list-style-type: none"> - Flood risk management: Concepts, Policies and Strategies - Climate change adaptation - Risk knowledge 	Technical Officials (20 nos.)	4	600

	<ul style="list-style-type: none"> - Community based early warning system - Disaster Risk Management Cycle 			
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6.2 Sagarmatha National Park (SNP)

6.2.1 Mandate

The National Parks and Wildlife Conservation Act (1973), the Himalayan National Park Regulations (1979) and the Buffer Zone Management Guidelines (1996, 1999) provide the legal guidelines to protect the bio-diversity of the park. Creation of a National Park was proposed by the FAO Wildlife Management Adviser in 1971 and approved in principle by the Government in 1972. Funds for its development were given by the Government of New Zealand for a five year period, from 1975 to 1980 (FAO, 1980). Laws were enforced with the assistance of the army and a strategy for achieving self-sufficiency in resources and conserving nature was developed (Milne, 1997). In 2002, to promote the biodiversity of the region, the DNPWC proposed seven ecological corridors linking Makalu Barun National Park and Kanchenjunga Conservation Area in the east with Rolwaling in the west and Qomolangma Nature Preserve in the Tibetan Autonomous Region to the north (DNPWC, 2003). The Park is managed by the Sagarmarha National Park Authority of the Department of National Parks & Wildlife Conservation. The adoption of western management methods initially failed to address the actual environmental problems, and undermined existing indigenous resource management practices.

The Park has total 36 staffs including both technical and general which consists one Chief Conservation Officer, one Assistant Conservation Officer, one Account Officer, one Section Officer, two Rangers, one accountant, three Senior Game Scouts, one *Kharidar*, twenty four Game Scouts, and one Horse Care Taker. The office staff and training need to be strengthened (DNPWC, 2003). One company of 250 Royal Nepal Army soldiers is on protective guard in 9 posts.

6.2.2 Sagarmatha National Park and Buffer Zone Support Project

Sagarmatha National Park and Buffer Zone Support Project (SNPBZSP) was implemented in the Sagarmatha National Park and Buffer Zone from July 2006 under the framework of the Sacred Himalayan Landscape. It has been jointly implemented by the Department of National Parks and Wildlife Conservation (DNPWC) and WWF Nepal. The project covers an area of 1,423 km² spanning over three village development committees and has a population of more than 6,000 residing in more than 1,450 households.

After more than a decade of WWF Nepal's intervention in Sagarmatha National Park and Buffer Zone (SNPBZ) in partnership with Department of National Parks and Wildlife Conservation/Government of Nepal, WWF Nepal took the approach of collaborative management by partnering with Sagarmatha National Park Buffer Zone Management Committee (SNP BZMC) and other locally based Non-Governmental Organizations (NGOs) for continuing conservation efforts in the Sagarmatha region.

Successful completion of Ghatte micro-hydro scheme, 70kW and Chhuserma micro-hydro scheme, 35 kW have benefitted over 150 households (HHs) by providing fuel wood alternatives. On the other hand, direct pressure on forest has also been reduced due to the implementation of the two micro hydro schemes.

Similarly, since past 21 years, Sagarmatha Pollution Control Committee (SPCC) has been implementing various waste management activities in Khumbu region to keep the region clean and help preserve its environment. The involved organizations in Khumbu region development are:

- Ministry of Culture, Tourism and Civil Aviation (MoCTCA)
- Department of National Park and Wildlife Conservation (DNPWC)

- Sagarmatha National Park (SNP)
- Sagarmatha National Park Buffer Zone (SNPBZ)
- Nepal Mountaineering Association (NMA)
- Different Village Development Committees
- WWF Nepal
- Eco Nepal
- Himalayan Trust of Japan
- KhumbuMulti Purpose Co-operative Limited
- World Wildlife Fund Nepal

The Villages within the KhumbuRegion are;

- Dingboche
- Kunde
- Khumjung
- Lobuche
- Lukla
- Namche Bazzar
- Tengboche
- Phortse
- Thame
- Thamo
- Pangboche
- Phakding
- Monjo

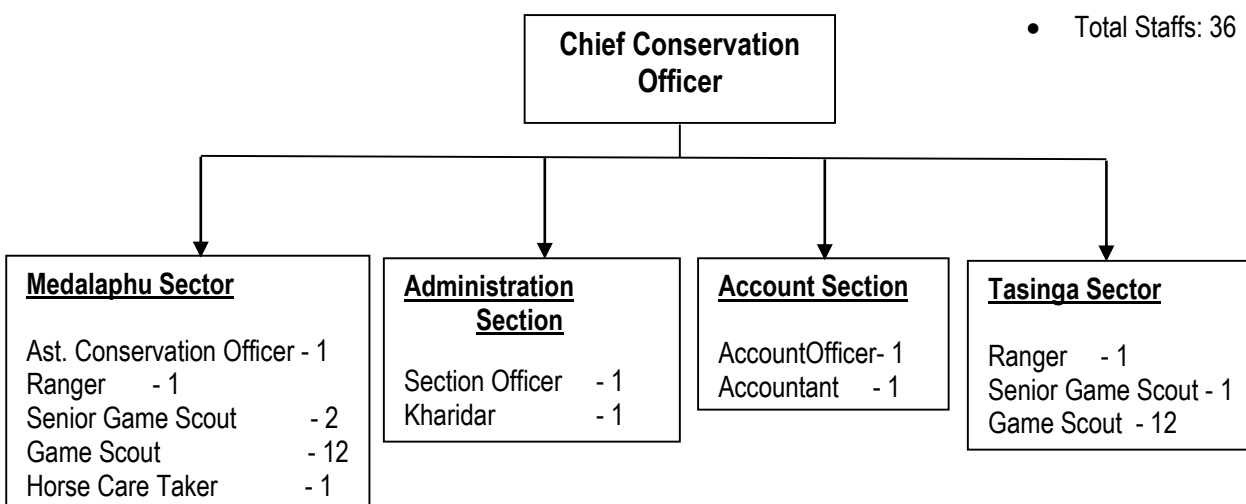
6.2.3 Objectives of SNP

- Conservation of Biodiversity
- Conservation of Landscape
- Tourism Management
- Management of Buffer Zone
- Seek to foster the economic and social wellbeing of local communities within the National Parks

6.2.4 Activities of SNP

- National Park Management
- Collection of Royalty from Tourist
- Construction and Management of Trekking Routes
- Construction and Management of Bridge
- Management of Buffer Zone
- Allocating budgets to buffer zone management committee from revenue generated by SNP
- Providing guidance and support to buffer zone management to create annual and five years plan as well as to utilize revenue provided to buffer zone management committee.
- To keep mount Everest as well as buffer zone area clean
- To monitor/control/stop poaching activities in the national park

Figure 6.2 Organization Chart / Staffs of SNP



Note: Beside this, one company of Royal Nepal Army soldiers is on protective guard as a part of SNP security Battalion

6.2.5 Key Findings

- Buffer zone covers three VDCs of the Khumbu region i.e. Khumjung, Namche and Chaurikharka.
- Formation of Buffer zone management committee: First of all buffer zone user groups are formed in each VDCs. In each buffer zone user group working committee is formed which consists of Chairman, Secretary, Treasurer and committee members. There are 10 buffer zone groups in Chaurikharka VDC whereas there are nine buffer zone user groups each in Namche and Khumjung VDC. From these user groups buffer zone user committee is formed in each VDCs in which one member each from buffer zone user group represents their respective user group. From the representatives of these three buffer zone user committees one buffer zone management is formed which consist of Chairman, Secretary, Treasurer and members. Warden of SNP acts as a secretary of management committee.
- SNP use to provide 10-30% of total revenue generated by the national park annually to buffer zone management committee as an annual budget. From the budget provided by SNP, buffer zone management committee plan their annual budget and allocate it for different purpose.
 - 30% for conservation
 - 30% for social development
 - 20% for income generating activities/skill development
 - 10% conservation education
 - 10% administration
- Sagarmatha National Park
1979: Inscribed on the World Heritage List under Natural Criterion vii.
- International Designation International Designation
2007: Gokyo and Associated Lakes designated a Wetland of International Importance under the Ramsar Convention (7,770 ha).
- IUCN Management Category IUCN Management Category
II National Park
- Bio-geographical Province Bio-geographical Province
Himalayan Highlands (2.38.12)
- Geographical Location Geographical Location
In the Himalayan Mountains on the border with the Tibetan Autonomous Region of China in the upper catchment of the Dudh Kosi River 140 km east of Kathmandu, centered on 27°57'55"N by 86 °54'47"E.

- Dates and History Of Establishment Es And History Of Establishment Es And History Of Establishment (???)

1976: Created a National Park;

2002: Buffer zone added (27,500 ha);

2007: Gokyo lakes designated a Ramsar site.

Ranges from 2,845m at Mondzo to 8,848m (Mt Everest / Sagarmatha).

6.2.6 Situation Analysis

Attempt has been made to assess the gaps in institutional and technical capacity of SNP based on existing situation, future needs and its opportunities and constraints. These gaps have been assessed in three important aspects of SNP in GLOF and flood risk reduction - i) institutional level, ii) organizational level and iii) human resource level. The situation analysis of the Sagarmatha National Park had been done through SWOT analysis. The findings of SWOT analysis for identification of gaps and constraints are summarized below in Table 6.4.

Table 6.4 SWOT Analysis of SNP

Internal Situation	External Situation
<u>Strength</u>	<u>Opportunities</u>
<ul style="list-style-type: none"> - Mandated as central government agency to conserve biodiversity and landscape, tourism management, buffer zone management and to nurture the economic and social wellbeing of local communities within the Sagarmatha National Parks - Staffing; Existence of experienced specialists and support staffs - Building physical structures - Creating Institutional base - Guided by policy, strategy, rules and regulations, directives, guidelines, procedures, norms, - Implementing regular and project based programs on national park conservation and ecotourism and buffer zone management - Strong institutional set-up in departmental and field level for conservation of rare and endangered wildlife including flora and fauna - Specialize in conserving the country's major representative ecosystems, unique natural and cultural heritage and give protection to the valuable and endangered wildlife species. - Extensive participation of stakeholders - Continual capacity building activities for the staff - Community involved buffer zone management committee 	<ul style="list-style-type: none"> - Donors' interest in environmental safeguard measures and watershed management - Government's increased budgetary allocation - Growth of multiple institutions with concerns to promote ecotourism consistent with biodiversity conservation - Expansion of knowledge base and ICT - Increasing local people's awareness in bio-diversity conservation - Working opportunity on climate change, adaptation and mitigation - Increasing support in conservation of habitats, wild life and ecotourism. - Increasing Road networks – Good accessibility to remote area - Increasing people's awareness in buffer zone development.
<u>Weakness</u>	<u>Threats</u>
<ul style="list-style-type: none"> - No natural disaster preparedness response - No mandate in GLOF & flash flood risk reduction - Inadequate knowledge and skill on natural disaster like GLOF and flash flood risk reduction 	<ul style="list-style-type: none"> - Climate change with new disaster risks - Culture – insensitivity to vulnerability and hazards - Physical infrastructure - encroaching natural systems

<ul style="list-style-type: none"> - No or inadequate human resources to deal with GLOF related matters - Lack of awareness raising program on GLOF and flood risk - Inadequate knowledge on hydrological data capturing/accessing and analysis - Needs effective monitoring and evaluation system - Inadequate knowledge on climate change and its impact on wild life. - Needs to increase knowledge, skill and positive attitude level in GLOF and flash flood risk reduction - Limited use and application of disaster management information 	<ul style="list-style-type: none"> - Political instability - delays in formulating policies / law - Unpredicted extensive rainfall - No practices exist in fixing responsibilities among government organization and the public to reduce possibilities of severe GLOF risk. - No provision of budget to reduce likelihood of severe GLOF risk
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6.2.7 Summary of Assessment of SNP

6.2.7.1 General

At the **institutional level**, DNPWC has a clear mandate and wide range of plan, policy, strategy rules and regulations implemented by Government of Nepal, development partners and other stakeholders and who are committed to working and supporting the organization. At the **organizational level**, there is strong leadership from the Chief Conservation Officer and Conservation Officer. There is a need to develop clear M&E systems, procedures, manuals, directives etc. At the **human resource level**, there is need to develop HR systems in both motivational and attitudinal aspects to retain the skilled human resources. The summary of capacity need of SNP is attached in **Annexes- 10**.

6.2.7.2 Specific: GLOF and Flash Flood Risk Reduction

The major activities of SNP regarding National Park protection and conservation of ecosystem and natural habitats and cultural heritage are:

a) National Park Management, b) Collection of Royalty from tourist, c) Construction and management of trekking routes, d) Construction and management of trail bridge, e) Management of Buffer Zone, f) Allocating budgets to buffer zone management committee from revenue generated by SNP, g) Providing guidance and support to buffer zone management to create annual and five years plan as well as to utilize revenue provided to buffer zone management committee and h) To keep mount Everest as well as buffer zone area clean

All the above mentioned SNP activities are not related to flash flood risk reduction. But in previous days, Dig-Sho glacial lake outburst flood had happened several damages and losses in the park and buffer zone area. Thus it is being essential to incorporate the water generated risk reduction activities as a regular program to cope GLOF and flood risk. For this, knowledge, skill and attitude based exposures should be supported to the SNP personnel and Buffer Zone management.

The organizational, institutional and technical present capacity of SNP regarding GLOF and flash flood risk reduction was assed and the needs are:

- Inadequate experience, knowledge and skill on GLOF and flash flood risk mitigation
- Development of information technology and its dissemination
- Knowledge, skill and positive attitude enhancement training on GLOF and flood risk reduction mitigation.
- Develop effective monitoring and evaluation system
- Public awareness in GLOF to Buffer Zone Managements and community people.
- Develop effective IT supported information management system

- Build organizational culture
- Rapport building with community in Imja GLOF risk reduction

6.2.8 Training Need Assessment

Regarding GLOF and flash flood, it is found that the human resources working in the park do not have enough knowledge, skills and attitudes towards fulfilling their assigned duties and responsibilities as well as inadequate in preserving the park and wildlife from GLOF and flash flood risk. The officer level staffs are need of thematic as well as proficiency training on community based early warning system, climate change adaptation, disaster damage assessment and response/rescue operation. Similarly support staffs as well as game scouts are need of damage assessment and response/rescue work, community based early warning system trainings, mock drill on rescue activities training, and community based GLOF risk management training for 3 to 5 days. It is also suggested training of trainer on GLOF risk reduction and community based early warning system

SN	Training Needs (Subjects arranged according to preference level)	Target Group	Duration of Training (Day)	Indicative Budget (NRs in '000)
1	<ul style="list-style-type: none"> Training on GLOF and Flood Risk Management for the DNPWC Technical Officials <ul style="list-style-type: none"> Flood risk management: Concepts, Policies and Strategies Climate change adaptation Risk knowledge Community based early warning system Disaster Risk Management Cycle 	Technical Officials (20 nos.)	4	600
	<ul style="list-style-type: none"> Training to Game Scouts <ul style="list-style-type: none"> Light Search and Rescue Damage Assessment CBEWS 			

6.3 Cross Cutting Issues

Gender is a key consideration in DRR. Evidence from past disasters, seems to point to a disproportionate impact on women and girls. The death toll was much higher among women and girls for reasons ranging from higher levels of unpreparedness to not being allowed to make decisions at household or community levels. Due to their different roles in society, women and men may have different priorities and ideas on the priorities and actions to be taken to reduce the risks. Enabling the voices of both women and men, girls and boys, to be heard, and to participate and to make decisions is central to effective disaster risk reduction.

Men, women and children with disabilities are often invisible in DRR processes; however they have specific vulnerabilities and capacities which need taking into account when planning and implementation of intervention. Lack of accessibility of disaster related services such as early warning systems, shelters and healthcare, are key issues to be addressed. Gender issues are to be considered when preparing policy, program and activities. Similarly, traditional knowledge and the historical memory of the older people of the community may be valuable source of guidance in disaster risk reduction. Men, women and children with disabilities are often invisible in DRR processes; however they have specific vulnerabilities and capacities which need taking into account when planning and implementation of intervention. All these crosscutting issues of DRR was considered in the process of accessing institutional capacity need assessment.

CHAPTER – SEVEN

CONCLUSION AND RECOMENDATION

7.1 Conclusion

Community Based Flood and Glacial Lake Outburst Risk Reduction Project (CFGORRP) is a joint undertaking of the Government of Nepal (GoN), Global Environment Facility (GEF) and the United Nations Development Program (UNDP). As being implementing agency of CFGORRP, the DHM has been working in close coordination and consultation with DWIDP and DSCWM in the Terai and Churia districts and with Sagarmatha National Park (SNP) under DNPWC for glacial lake outburst flood (GLOF) risk reduction in Imja Lake. DWIDP, DSCWM and DNPWC are responsible for providing inputs to planning, technical oversight and monitoring of the field activities of the project.

The purpose of this study is to assess the capacity building needs for CFGORRP implementation, and based on the findings, suggest capacity development intervention strategies, with a particular focus on implementing agency and collaborative partners who have mandatorily, or are likely to be responsible for GLOF and flash flood risk reduction.

The “Capacity” of an institution is ability to execute task and produce outputs, to classify and solve problems and make knowledgeable choices which strengthen the performance of organizational system, plans, objectives and procedures. It is essential because “Capacity Needs” express themselves in many different ways and they need to be understood in relation to the goals, objectives and targets of the concerned organization. The study ranks in the institutional capacity needs of this assessment was focused on three dimensions, i) Institutional Development, ii) Organizational Development and iii) Human Resource development of DHM, DWIDP, DSCWM and DNPWC/SNP. Furthermore, training needs of assessment of each agencies regarding GLOF and flash flood risk reduction was conducted focusing on knowledge, skill and attitudinal development of the human resource on the specific target.

The organizational, institutional and technical capacity of implementing agency and collaborative partners regarding GLOF and flash flood risk reduction was critically assessed, the study has found:

- a. **DHM:** It has a clear mandate, broader policies, rules and regulations implemented by the Government of Nepal, as well as affiliated with international laws, recognition by ICAO, good associations with national and international development partners and other stakeholders. There is strong leadership and nationwide coverage of networks. Still some gaps exist to develop and establishing a legal and regulatory framework in carrying out its works and services. It is also needed to develop an effective monitoring and evaluation systems, procedures, manuals, directives etc. At the human resource level, there is gap of knowledge, skills and attitudinal enhancement on hydro-met data capturing, analysis and information dissemination and GLOF and flash flood risk reduction activities and services. There is also need of creating new positions of experts to establish modernized/latest and effective real time based automated hydro-meteorological monitoring station.
- b. **DWIDP:** At the institutional level, it has a clear mandate, wide range of plan, policy, strategy, rules regulations implemented by the Government of Nepal, good relations with national and international development partners and other stakeholders. At the organizational level it has a strong leadership and nationwide coverage of networks. It is required to develop and establish legal and regulatory framework in order to legally institutionalize in carrying out its services and works. It is also gap to develop effective monitoring and evaluation system, guidelines, manuals and directives to conduct flood risk management. At the human resource level, there needed to enhance knowledge, skill and attitudinal development on GLOF and flash flood risk mitigation.

- c. **DSCWM:** It has a clear mandate and wide range of plan, policy, strategy rules and regulations implemented by the government of Nepal and good relations with national and international development partners and other stakeholders. There is strong leadership and nationwide networks. It is needed to develop effective monitoring and evaluation (M&E) systems, manuals, guidelines on flood risk mitigation. Knowledge and skill development is needed on flood risk management.
- d. **DNPWC/SNP:** The DNPWC/SNP is not mandatorily responsible for GLOF and flood risk reduction. But in years back ago, Dig-Sho glacial lake outburst flood had happened several damages and losses in the SNP park areas and Buffer Zone. Likewise, the Imja Lake is most vulnerable to the SNP, local community of SNP Buffer zone and park visitors/tourists. Thus it is being essential to incorporate the water induced disaster mitigation as a regular program to cope GLOF risk reduction.
- e. **Cross Cutting Issues:** The capacity of CFGORRP implementing agency and collaborative partners in cross cutting issues for the GLOF and flash flood risk reduction was based on the assessment of following indicator on gender and social inclusion aspects,
 - To encourage recruitment and participation of women, marginalized and other vulnerable communities in its activities
 - To have competent and inclusive workforce to deliver its mandate
 - Whether the current organizational structure is gender responsive and supportive for effective achievement of specified objectives

7.2 Recommendations

A considerable amount of data has been collected in this study, which has been condensed, summarized and used for formulating certain recommendations in this chapter. The study made wrapping up that the following capacity enhancement is required to the respective departments.

7.2.1 Enhance DHM Capacity on Organizational and Human Resource Level:

- Develop and establishing a Legal and Regulatory Framework in order to legally institutionalize the DHM in carrying out its regular works and services
- Develop effective Monitoring and Evaluation (M&E) systems
- Develop procedures, manuals, directives on GLOF and flood risk reduction
- Establish optimized hydrological and meteorological observation network with sustained functional mode
- Enhance capacity on assessing, monitoring, analyzing and predicting/forecasting hydrological and Meteorological extremes
- Establish AWS at remote and important places in the beginning and expand it to all other stations gradually/as per needs
- Enhance capacity in developing community based early warning system
- Enhance capacity on having proper instrumentation at all the observatories
- Enhance capacity on GLOF and flood data recording and transmission
- Enhance capacity on linkages with other government/ non-government organizations, local authorities and local communities
- Automated accessibility of flood and weather watch real time data to the collaborative partners (DWIDP, DSCWM and DNPWC/SNP)
- Creation and recruitment of post of Computer Programmer, System Analyst/IT Expert, Electronic Engineer, Mechanical Engineer to run and manage real time telemetric systems
- Knowledge and skill are need in rainfall run-off modeling and data validation, GLOF modeling/ Dam Breach Modeling and data validation
- Skill development training on telemetric system operations and management to the related personals

7.2.2 Enhance DWIDP Capacity on Organizational and Human Resource Level:

- Develop and establishing a Legal and Regulatory Framework in order to legally institutionalize the DWIDP in carrying out its regular works and services
- Implement regular program on GLOF risk mitigation/reduction
- Preparation of flood risk and social hazard mapping
- Community awareness program on flood risk
- Use of flood hazard computer-based modeling tools
- Knowledge, skill and positive attitude enhancement training on GLOF and flood risk reduction mitigation
- Capacity building in hydrological analysis and hydrological modeling and data validation
- Develop effective monitoring and evaluation system
- Develop effective IT supported information management system
- Enhance knowledge and skill to build organizational culture

7.2.3 Enhance DSCWM Capacity on Organizational and Human Resource Level:

- Develop and establishing a Legal and Regulatory Framework in order to legally institutionalize the DSCWM in carrying out its regular works and services
- Develop effective monitoring and evaluation system
- Develop effective IT supported information management system
- Enhance knowledge and skill on watershed management regarding GLOF and flash flood risk mitigation
- Enhance knowledge and skill in flood vulnerability and risk mapping
- Enhance knowledge and skill in community awareness techniques on watershed management and flood risk
- Enhance knowledge and skill to build organizational culture

7.2.4 Enhance DNPWC/SNP Capacity on Organizational and Human Resource Level:

- Develop and establishing a Legal and Regulatory Framework in order to legally institutionalize the DNPWC in carrying out its regular works and services
- Develop effective monitoring and evaluation system
- Knowledge, skill and positive attitude enhancement training on GLOF and flood risk reduction mitigation
- Knowledge, skill and positive attitude enhancement training on GLOF and flood risk reduction mitigation
- Enhance knowledge and skill on community based early warning system, climate change adaptation, disaster damage assessment and response/rescue operation, community based early warning system, mock drill on rescue activities, community based GLOF risk management

7.2.5 Cross-cutting Issues:

- Encourage recruitment and participation of women, marginalized and other vulnerable communities in its activities
- Revisit the employment framework to recruit competent and inclusive workforce to deliver its mandate
- Revisit the current organizational structure whether it is gender responsive and supportive for effective achievement of specific objectives

References

- Adapt Nepal**, (2012). Development of Early Warning Systems for Climate Risk Management, Final Report submitted to Department Hydrology and Meteorology.
- Adhikari, B. 2013.** Flooding and Inundation in Nepal Terai: Issues and Concerns. *Hydro Nepal, Issue 12*. Pp 59-65.
- Bajacharya, S. R.** 2009. Glaciers, glacial lakes and glacial lake outburst floods in the Mount Everest region. *Annals of Glaciology* 50(53), Pp 81-87.
- Bryman, Alan.** (2008). *Social Research Methods* (3rd Ed). New York: Oxford University Press.
- Budathoki, P.**, 2003. Nepal's Conservation in Crisis: Empowering People to Secure Natural Resources. *Journal of Forest and Livelihood*, 2(2) February.
- DHM Project Document**, 2012. Environmental and Social Management Framework for implementation of Building Resilience to Climate related Hazards Pilot Programme for Climate Resilience-PPCR under environmental Impact Assessment Programme Project Document
- DPNet, 2013.** Nepal Disaster Report 2013.
<http://www.dpnet.org.np/index.php?pageName=publicationdetail&pid=23>. Accessed 13 Oct 2014.
- European Commission**, 2013. Disaster Risk Reduction Increasing Resilience by reducing disaster risk in humanitarian action. http://ec.europa.eu/echo/files/policies/prevention_preparedness/DRR_thematic_policy_doc.pdf. Accessed 14 Oct 2014.
- Gautam, D. K. & Anup G. Phaiju**, 2013. Community Based Approach to Flood Early Warning in West Rapti River Basin of Nepal. *Journal of Integrated Disaster Risk Management* ISSN: 2185-8322.
- Germanwatch**, 2004. Glacial Lake Outburst Floods in Nepal and Switzerland – New Threats Due to Climate Change. *Germanwatch*.
- GIO, UNDP**, 2008. *Trainings of Trainers Manuals on Gender Mainstreaming in Disaster Risk Management*. GIO UNDP disaster Risk Management Program. <http://www.undp.org/content/dam/india/docs/gndrmmainstreami.ngdm.pdf>. Accessed 12 Oct, 2014
- GoV Nepal**, National Park and Conservation Act, 1973.
- GoV, Nepal**, MoFSC, Buffer Zone Management Guideline, 2009.
- GoV Nepal**, Buffer Zone Management Rules, 2052 (1996).
- GoV, Nepal** National Planning Commission, 2013, AN APPROACH PAPER TO THE THIRTEENTH PLAN (FY 2013/14 – 2015/16).
- International Federation of Red Cross and Red Crescent Societies.** Analysis of legislation related to disaster risk reduction in Nepal. *Australian Government AusAid*. <http://www.drr-law.org/resources/Nepal-Case-Study.pdf>. Accessed 11 Oct, 2014.
- ICIMOD**, 2013. *Case Studies on Flash Flood Risk Management in the Himalayas In support of specific flash flood policies*. International Centre for Integrated Mountain Development. International Centre for Integrated Mountain Development. <http://lib.icimod.org/record/27767/files/Case-study-on%20%20FFRM.pdf>. Accessed 10 Oct 2014.
- ICIMOD**, 2011. Glacial Lakes and Glacial Lake Outburst Floods in Nepal.
http://www.icimod.org/dvds/201104_GLOF/reports/final_report.pdf. Accessed 10 Oct, 2014.
- Kabir, D.S.** 2005, Wildlife Biodiversity in Bhawal National Park: Management Techniques and Drawbacks of Wildlife Management and Nature Conservation. *Our Nature*, Pp 83-90.
- MoFSC, REDD**, 2011. Role of Forest on Climate Change Adaptation.
- MoFSC**, 2009. *Nepal Fourth National Report to the Convention on Biological Diversity of Nepal*. Ministry of Forests and Soil Conservation

Manfredi, E. C., Flury, B., et. al. 2010. Solid Waste and Water Quality Management Models for Sagarmatha National Park and Buffer Zone, Nepal. BioOne Research Evolved. *International Mountain Society*.
Mckinsey, 1980. McKinsey's 7S Model. http://www.mindtools.com/pages/article/newSTR_91.htm. Accessed Oct 24, 2014.

Nepal Country Report, 1999. <http://www.adrc.asia/countryreport/NPL/NPLeng99/Nepal99.htm>. Accessed Oct 27, 2014.

Nepal Redcross Society, Disaster Management Strategic Framework 2010-2015.

Parsra,, K. 2007. *OECS Protected Areas and Associated Livelihoods Project Capacity Building for Protected Areas Planning and Management and Associated Livelihoods Protected Areas Training Needs Assessment*. Grenada Country Report.

Paudel, N.S., Hemanta Ojha, & Sushila Rana, 2010. *Capacity Building Needs Assessment and Training Strategies for Grassroots REDD Stakeholders in Nepal*. Reported to RECOFTC, The Centre for People and Forests, Bangkok. Shrestha, A.B.; Reynolds, J.M.; Aryal, R.; Pokhrel, A.P.; Budhathoki, K.P. (2000): Hazard assessment of the Tsho Rolpa Glacier Lake and ongoing remediation measures. *Journal of Nepal Geological Society*, Vol. 22, 563-570.

The Mountain Institute, 2010. *FINAL REPORT ON "SACRED SITES IN KHUMBU REGION OF NEPAL" PROJECT*

SAGARMATHA NATIONAL PARK IN (MOUNT EVEREST REGION) NEPAL. TOURISM CARES FOR TOMORROW

USA.

UNICEF, 2010, *INSTITUTIONAL CAPACITY ASSESSMENT DEPARTMENT OF SOCIAL SERVICES MINISTRY OF LABOUR AND SOCIAL SERVICES*. Zimbabwe, Final Report.

United Nations Development Program, 1981. *National Parks and Wildlife Conservation. Afghanistan A Contribution to a Conservation Strategy, Volume I*.

United Nations Environment Program World Conservation Monitoring Centre, 2007. *World Heritage Sites, The Sagarmatha*. UNEP and WCMC.

UNDP Report, 2008. *National Strategy for Disaster Risk Management in Nepal*.

UNDP, 2010. *Disaster Risk Reduction, Governance & Mainstreaming*. Bureau for Crisis Prevention and Recovery.

UN-REDD 2012. *Capacity Needs Assessment of Government Institutions at Central, Regional, District and Local Levels for the Establishment and Management of a REDD+ Scheme in Tanzania*. LTS International Ltd.

Pentlands Science Park, Bush Loan Penicuik, EH26 0PL United Kingdom.

UNICEF, (2010). *Institutional Capacity Assessment*. Final Report.

USAID, 2011, *Performance Monitoring*

Williems, S. And Gavin B. (2003). *Institution Capacity and Climate Action*, OECD.

Governmental Websites

www.dhm.gov.np

www.dhm.gov.np/cfgorpp

www.dscwm.gov.np

www.dwidp.gov.np

www.dnpwc.gov.np

Annexes

(Checklists, Questionnaires, Formats, Summary of Capacity Needs Assessment)

Annex – 1

General questionnaire to the project collaborative partner agencies

Name of Organization:

1. Brief on national/river basin level policies, strategies, programs, activities, laws, by-laws regarding to flood and GLOF risk reduction.
2. To what extent are laws and regulations regarding land use in flood prone areas implemented?
3. What types of structural and nonstructural mitigation measures are taken to reduce likelihood of severe flood and GLOF risk?
4. How are responsibilities divided among governmental authorities and the public to reduce possibility of severe flood and GLOF risk?
5. Mention practice of capturing Flood and GLOF data, Early Warning System and process of disseminations
6. Are governmental as well as public authorities well prepared for early warning?
7. Are the allocated resources adequate?
8. Mention adopted Hydrological analysis models and validation system used in the organization.

Note: All above questions can give general overviews on disaster management of each respondent. Along with these general questions, specific questions related to flood and GLOF risk reduction will be asked with the respondents. The specific questions will be made link with their mandatory activities by which organizational and technical capacities and gaps will be come out. The areas of specific question will be;

- *Capturing Flood and GLOF data, Early Warning System and process of disseminations,*
- *Hydrological analysis and use in structural design, hydrological models and validation*
- *River basin and community based flood and GLOF risk reduction activities or program*
- *Trainings and awareness building activities*
- *GESI in disaster risk reduction activities.*

Annex- 2

Open-ended Questionnaire/interview checklist for key personnel

1. Central level programs/activities to reduce GLOF and flash flood risk including complete annual programs.
2. Field level programs/activities to address GLOF and Flood risk including annual program of CFGORRP implemented districts (Solukhumbu, Mahottari, Saptari, Siraha and Udayapur)
3. Problems if any in institutional/policy level, structural level, process, practicality, human resource, facilities, instrument, networking, software, hardware etc. to address the objectives.
4. Relation between activities and human resource (in terms of availability, quality, skill etc)
5. Financial availability
6. Cross cutting issues
7. Capturing, managing and disseminating real time data of GLOF and Flood
8. Is the organization working in sediment monitoring?
9. How the information disseminate?

Annex – 3

Institutional and Technical Needs Assessment of Project Collaborating Agencies

Organization	Description	Institutional	Response	Technical	Response
DHM	Capturing, managing and disseminating real time data of GLOF and Flood				
	GLOF Hazard Modeling, Calibration and Validation				
Current Practices of Hydrological Analysis & Hydrological modeling and validation					
DHM					
DWIDP					
DSCWM					
Sediment Monitoring					
DHM					
DWIDP					
DSCWM					
Information Dissemination					
DHM					
DWIDP					
DSCWM					
DNPWC					
SNP					

Annex – 4

Checklist for Human Resource Assessment and Training Need Assessment

As a part of institutional strengthening initiatives, this checklist has been designed to gather data and information for assessing training needs of key actors of relevant government agencies engaged directly and indirectly in GLOF and flash flood at central and field levels. It will enable the organizations in designing and delivering training services in line with the training needs of concerned actors and help improve capacity in reducing GLOF and flood risk reduction.

All the concerned government organizations are requested to support the present need assessment attempt by providing useful information and data in a format as suggested below (*you may also attach relevant documents organizational profile and training needs, if available, to supplement information / data you provide below*):

1. Name of organization:
2. Staff profile, with training in the field of GLOF and flood risk reduction or water-induced disaster management:

2.1 Staff at central level

<u>Position level:</u>	<u>Number</u>	<u>Training</u>
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2.2 Number staff at field level:

<u>Position level:</u>	<u>Number</u>	<u>Training</u>
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3. How would you rate the knowledge, skills and attitudes presently possessed by your organizational staff or members in general for engaging in reducing GLOF and flash flood risk?

Adequate ()

Not so adequate ()

Inadequate ()

4. Mention existing training programs organize to the office personnel to enhance knowledge, skills and attitude specially in the area of real time data capturing and dissemination, hydrological analysis, hydrological modeling and validation, water induced disaster mitigation, GLOF and flood hazard mapping, awareness building on GLOF and flood hazard/vulnerability/risk, information management, hydrological data analysis and geo-information related computer trainings, motivational trainings, and disaster management (risk assessment, preparedness planning, damage assessment, response/ rescue work, public awareness) etc.

Level of Staffs	Training Program	duration	Type (KSA)
Senior officers (equivalent to Gazetted level I and II)			
Officers (equivalent to Gaz III)			

Officers (equivalent to Gaz III)			
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5. In view of generally perceived level of their existing knowledge, skills and attitudes on GLOF and flash flood what do you think are the training needs of staff / members working in your organization for developing human resource capacity for disaster management?

5.1 Need in terms of knowledge enhancement

Level of Staff	Subjects / areas of knowledge requirement (risk assessment, preparedness planning, damage assessment, response / rescue work, etc.)
Senior officers (equivalent to Gazetted level I and II)	
Officers (equivalent to Gaz III)	
Support staff (equivalent to Non-gazetted)	

5.2 Need in terms of skill possession

Level of Staff	Subjects / areas of skill development (risk assessment, preparedness planning, damage assessment, response / rescue work, etc.)
Senior officers (equivalent to Gazetted level I and II)	
Officers (equivalent to Gaz III)	
Support staff (equivalent to Non-gazetted)	

5.3 Need in terms of attitude formation / awareness creation

Level of Staff	Areas of attitudes /awareness (perception of hazard, safety, risk, preparedness, etc.)
Senior officers (equivalent to Gazetted level I and II)	
Officers (equivalent to Gaz III)	
Support staff (equivalent to Non-gazetted)	

6. How do you assess the training needs in terms of training skills or facilitation skills on the part of staff of organization to transfer knowledge, skills and attitudes to other stakeholders (community leaders / member of vulnerable group, etc.).

Level of Staff	Areas of Trainer's training	
	Content (subject areas)	Process (facilitation skills)
Senior officers (equivalent to Gazetted level I and II)		
Officers (equivalent to Gaz III)		
Support staff (equivalent to Non gazetted)		

7. How would you elaborate your organization's training need further in terms of its types, thematic focus and duration in line with the areas of training as identified above? Please provide information on the following format.

Level of Staff	Types of training (training / workshop / interaction)	Major Thematic Focus (social hazard mapping, risk assessment, preparedness plan, response or rescue techniques, other structural / non-structural measures, etc.	Duration
Senior officers (equivalent to Gazetted level 1 and II)			
Officers (equivalent to Gaz III)			
Support staff (Non gazetted)			

8. Identify the other organizational management improvement needs of your organization, apart from training needs that require to be fulfilled in order to build your organizational capacity to deal with GLOF and flood risk reduction effectively.

Annex – 5

SWOT Analysis

Name of Organization:

	<u>STRENGTHS:</u> (Characteristics of the organization that give it an advantage over others) 1 2 3 4	<u>WEAKNESS:</u> (Characteristics that place the organization at a disadvantage relative to others) 1 2 3 4
<u>OPPERTUNITIES:</u> (Elements that the organization could exploit to its advantage) 1 2 3 4 5	<u>OPPORTUNITY – STRENGTH STRATEGY</u> Use strengths to take advantage of opportunities 1 2 3 4	<u>OPPORTUNITY – WEAKNESS STRATEGY</u> overcome weaknesses by taking advantage of opportunities 1 2 3
<u>THREATS:</u> (Elements in the environment that could cause trouble for the organization) 1 2 3 4	<u>THREAT – STRENGTH STRATEGY</u> Use strengths to avoid threats 1 2 3 4	<u>THREAT – WEAKNESS STRATEGY</u> Minimize weaknesses and avoid threats 1 2 3 4

Annex 6

Summary of Capacity Needs in Department of Hydrology and Meteorology (DHM)

	Extent of Capacity Needs					
	Good capacity	Some needs	Moderate needs	Major needs	Priority needs	Findings
Institutional aspects						
1 Legal Provision/ Mandate	√					<ul style="list-style-type: none"> Mandate as central government agency to monitor all the hydrological and meteorological activities
2 Policies		√				<ul style="list-style-type: none"> Policy on land acquisition, data dissemination etc. are needed.
3 Strategies		√				<ul style="list-style-type: none"> To address new technological affairs
4 Relationships with stakeholders / Development Partners			√			<ul style="list-style-type: none"> Needs to form steering committee in central level and coordination committee in field level of collaborative partners.
Organizational aspects						
5 Structure		√				<ul style="list-style-type: none"> On-going need to improve structures and roles for promptly and effectively service delivery
6 Systems						
6.1 Information & communication technology (ICT) hardware & software				√		<ul style="list-style-type: none"> Needs development of ICT skill to the staffs Needs implementing quality management information system (QMIS) system Needs upgrading equipment and software
6.2 Planning		√				<ul style="list-style-type: none"> Needs to improve planning unit
6.3 Data collection			√			<ul style="list-style-type: none"> Needs more data transfer could be automated Limited capacity for supervision of data collection is affecting quality of data
6.4 Monitoring & Evaluation			√			<ul style="list-style-type: none"> Needs timely data collection, evaluation and planning

	Extent of Capacity Needs					
	Good capacity	Some needs	Moderate needs	Major needs	Priority needs	Findings
7 Management		√				<ul style="list-style-type: none"> Needs staff motivation, reduction in senior staff workload Needs to build management capacity at lower levels
8 Leadership			√			<ul style="list-style-type: none"> Higher level has clear vision and strong leadership Lower level has need to develop leadership to perform allocated roles and responsibilities
9 External Communications			√			<ul style="list-style-type: none"> Need for improve two-way communication system
10 Internal Communications			√			<ul style="list-style-type: none"> Needs to improve communications between inter divisions/ sections/ units, information dissemination system
11 Procedures						
11.1 Budgeting	√					<ul style="list-style-type: none"> Applies to government budgetary system
11.2 Accounting		√				<ul style="list-style-type: none"> Applies to government accounting system Staff training needs, e.g. software use, technical auditing, monitoring
11.3 Reporting		√				<ul style="list-style-type: none"> Applies to government institutions calendar, procedures and templates – attention has to pay timely accomplished Needs skills development in research, data analysis and evaluation
11.4 Record keeping			√			<ul style="list-style-type: none"> Need to improve storage and retrieval systems
12 Culture			√			<ul style="list-style-type: none"> Upper level staffs are dedicated with high ambitions Needs motivating at lower level
13 Resources						
13.1 Financial Resources			√			<ul style="list-style-type: none"> Applies to government budgetary system

	Extent of Capacity Needs					
	Good capacity	Some needs	Moderate needs	Major needs	Priority needs	Findings
						<ul style="list-style-type: none"> Significant resource constraint to meet goal, objective and targets
13.2 Infrastructure		√				<ul style="list-style-type: none"> Sufficient working space Needs to upgrade facilities
13.3 Equipment			√			<ul style="list-style-type: none"> Needs to upgrades to equipment (hardware and software) Gaps in internet connectivity
13.4 Transport		√				<ul style="list-style-type: none"> Applies to government provided facilities Needs to improve for lower level staffs
Human Resources Aspects						
14 Staffing						
14.1 Approved positions		√				<ul style="list-style-type: none"> Applies to government approval All staff have Job Descriptions, and there are some inconsistencies needs to improve Staff numbers not proportional to scope of tasks
14.2 Vacant positions	√					<ul style="list-style-type: none"> Applies to government procedures
14.3 Gender			√			<ul style="list-style-type: none"> Women representation in moderate.
15 HR Management						
15.1 Recruitment , HRM & HRD		√				<ul style="list-style-type: none"> Applies to government procedures Needs timely recruitment and motivating
15.2 Incentives		√				<ul style="list-style-type: none"> Needs for providing incentives for excellent performance
16 Staff:						
16.1 Knowledge		√				<ul style="list-style-type: none"> Needs knowledge on glaciology including glacial lake monitoring, GLOF risk reduction, Hydrological and metrological modelling, community based early warning system management

	Extent of Capacity Needs					
	Good capacity	Some needs	Moderate needs	Major needs	Priority needs	Findings
16.2 Skills		√				<ul style="list-style-type: none"> Needs skill development in GLOF risk reduction, real time data handling and management, glacial lake monitoring, telemetric system handling and management
16.3 Attitudes			√			<ul style="list-style-type: none"> Positive, dedicated staff at top level Needs to enhance positive attitude

Annex 7:

Summary of Capacity Needs in Department of Water Induced Disaster Prevention (DWIDP)

	Extent of Capacity Needs					
	Good capacity	Some needs	Moderate needs	Major needs	Priority needs	Findings
Institutional aspects						
1. Legal Provision/ Mandate	√					<ul style="list-style-type: none"> Mandate as central government agency for water induced disaster risk reduction
2. Policies		√				<ul style="list-style-type: none"> Needs policy on reclaimed land use, role of disaster affected group Needs action plan for WIDM Policy 2006
3. Strategies		√				<ul style="list-style-type: none"> Strategy is needed in - community hazard mapping Landslide inventory etc
4. Relationships with stakeholders/ Development Partners			√			<ul style="list-style-type: none"> Needs to form steering committee in central level and coordination committee in field level of collaborative partners. Reflection in action is needed
Organizational aspects						
5. Structure		√				<ul style="list-style-type: none"> On-going need to improve structures and roles for promptly and effectively service delivery
6. Systems						
Information & communication technology (ICT) hardware & software				√		<ul style="list-style-type: none"> Needs development of ICT skill to the staffs

	Extent of Capacity Needs					Findings
	Good capacity	Some needs	Moderate needs	Major needs	Priority needs	
						<ul style="list-style-type: none"> Needs implementing quality management information system (QMIS) system Needs upgrading equipment and software
-Planning		√				<ul style="list-style-type: none"> Needs to improve planning unit
-Data collection			√			<ul style="list-style-type: none"> Inventory on landslide, rivers embankment etc. is needed
- Monitoring & Evaluation			√			<ul style="list-style-type: none"> Needs timely data collection, evaluation and planning
7. Management		√				<ul style="list-style-type: none"> Needs staff motivation, reduction in senior staff workload Needs to build management capacity at lower levels
8. Leadership			√			<ul style="list-style-type: none"> Strong leadership skill to coordinate nationally and internationally is needed.
9. External Communications			√			<ul style="list-style-type: none"> Need for improve two-way communication
10. Internal Communications			√			<ul style="list-style-type: none"> Needs to improve communications between inter divisions/ sections/ units
11. Procedures						
-Budgeting		√				<ul style="list-style-type: none"> Applies to government budgetary system
-Accounting		√				<ul style="list-style-type: none"> Applies to government accounting system Staff training needs, e.g. software use, technical auditing, monitoring
-Reporting			√			<ul style="list-style-type: none"> Applies to government institutions calendar, procedures and templates – attention has to pay timely accomplished Needs skills development in research, data analysis and evaluation
-Record keeping				√		<ul style="list-style-type: none"> Need to improve storage and retrieval systems
12. Culture			√			<ul style="list-style-type: none"> Some of the Upper level staffs are dedicated with high ambitions Needs motivating at lower level
13. Resources						

	Extent of Capacity Needs					Findings
	Good capacity	Some needs	Moderate needs	Major needs	Priority needs	
-Financial Resources			√			<ul style="list-style-type: none"> Applies to government budgetary system Significant resource constraint to meet goal, objective and targets
-Infrastructure		√				<ul style="list-style-type: none"> Sufficient working space Needs to upgrade facilities
-Equipment			√			<ul style="list-style-type: none"> Needs to upgrades to equipment (hardware and software) Gaps in internet connectivity
-Transport		√				<ul style="list-style-type: none"> Applies to government provided facilities Needs to improve for lower level staffs
Human Resources Aspects						
14. Staffing						
-Approved positions		√				<ul style="list-style-type: none"> Applies to government approval All staff have Job Descriptions, and there are some inconsistencies needs to improve Staff numbers not proportional to scope of tasks
-Vacant positions	√					<ul style="list-style-type: none"> Applies to government procedures
-Gender				√		<ul style="list-style-type: none"> Low
15. HR Management						
-Recruitment, HRM & HRD		√				<ul style="list-style-type: none"> Applies to government procedures Needs timely recruitment and motivating
-Incentives					√	<ul style="list-style-type: none"> Needs for providing incentives for excellent performance
16. Staff:						
-Knowledge		√				<ul style="list-style-type: none"> Needs knowledge on disaster risk management, theoretical knowledge estimation risk assessment, design etc.
-Skills			√			<ul style="list-style-type: none"> Needs skill development in low cost technology landslide mitigation, river training works, leadership skill etc
-Attitudes		√				<ul style="list-style-type: none"> Positive, dedicated staff at large project Needs to enhance positive attitude in departmental level

	Extent of Capacity Needs					
	Good capacity	Some needs	Moderate needs	Major needs	Priority needs	Findings
						who has limited work responsibilities

Annex 8:

Summary of Capacity Needs in Department of Soil Conservation and Watershed Management (DSCWM)

	Extent of Capacity Needs					
	Good capacity	Some needs	Moderate needs	Major needs	Priority needs	Findings
Institutional aspects						
-Legal Provision/Mandate	√					<ul style="list-style-type: none"> Applies to all government ministry/Department
-Policies		√				<ul style="list-style-type: none"> Needs policy on collaborative management of watershed with community level
-Strategies		√				<ul style="list-style-type: none"> Needs to be strengthened and improvement of strategies for sustainable watershed management
-Relationships with stakeholders/ Development Partners			√			<ul style="list-style-type: none"> Needs to form steering committee in central level and coordination committee in field level of collaborative partners.
Organizational aspects						
-Structure		√				<ul style="list-style-type: none"> On-going need to improve structures and roles for promptly and effectively service delivery
-Systems						
-Information & communication technology (ICT) hardware & software				√		<ul style="list-style-type: none"> Needs development of ICT skill to the staffs Needs implementing quality management information system (QMIS) system Needs upgrading equipment and software
-Planning		√				<ul style="list-style-type: none"> Needs to improve planning unit

	Extent of Capacity Needs					
	Good capacity	Some needs	Moderate needs	Major needs	Priority needs	Findings
-Data collection			√			<ul style="list-style-type: none"> Needs more data transfer could be automated Limited capacity for supervision of data collection is affecting quality of data
Monitoring & Evaluation			√			<ul style="list-style-type: none"> Needs timely data collection, evaluation and planning
-Management		√				<ul style="list-style-type: none"> Needs staff motivation, reduction in senior staff workload Needs to build management capacity at lower levels
-Leadership			√			<ul style="list-style-type: none"> Higher level has clear vision and strong leadership Lower level has need to develop leadership
-External Communications			√			<ul style="list-style-type: none"> Need for improve two-way communication
-Internal Communications			√			<ul style="list-style-type: none"> Needs to improve communications between inter divisions/ sections/ units
-Procedures						
Budgeting		√				<ul style="list-style-type: none"> Applies to government budgetary system
Accounting		√				<ul style="list-style-type: none"> Applies to government accounting system Staff training needs, e.g. software use, technical auditing, monitoring
Reporting			√			Reporting system looks not strong, many good works have been not but are in shadow, need to improve reporting system
-Record keeping				√		<ul style="list-style-type: none"> Need to improve storage and retrieval systems
-Culture			√			<ul style="list-style-type: none"> Motivation is lower, need motivational strategies in central level
Resources						
-Financial Resources			√			<ul style="list-style-type: none"> Applies to government budgetary system Significant resource constraint to meet goal, objective and targets
-Infrastructure		√				

	Extent of Capacity Needs					
	Good capacity	Some needs	Moderate needs	Major needs	Priority needs	Findings
-Equipment			√			<ul style="list-style-type: none"> Needs to upgrades to equipment (hardware and software) Gaps in internet connectivity
-Transport		√				<ul style="list-style-type: none"> Applies to government provided facilities Needs to improve for lower level staffs
Human Resources Aspects						
Staffing						
Approved positions		√				<ul style="list-style-type: none"> Applies to government approval All staff have Job Descriptions, and there are some inconsistencies needs to improve Staff numbers not proportional to scope of tasks
Vacant positions	√					<ul style="list-style-type: none"> Applies to government procedures
Gender				√		<ul style="list-style-type: none"> Women representation is low
HR Management						
Recruitment, HRM & HRD		√				<ul style="list-style-type: none"> Applies to government procedures Needs timely recruitment and motivating
Incentives					√	<ul style="list-style-type: none"> Needs for providing incentives for excellent performance
Staff:						
Knowledge					√	<ul style="list-style-type: none"> Low cost technological knowledge is needed Local community knowledge management is needed
Skills					√	<ul style="list-style-type: none"> Low cost technology and design Information dissemination knowledge and skill is needed
Attitudes				√		<ul style="list-style-type: none"> Motivational strategy is needed to develop positive attitude Needs to enhance positive attitude on work performance

Annex 9:

Summary of Capacity Needs in Department of National Park and Wildlife Conservation (DNPWC)

	Extent of Capacity Needs					
	Good capacity	Some needs	Moderate needs	Major needs	Priority needs	Findings
Institutional aspects						
Legal Provision/Mandate	√					<ul style="list-style-type: none"> Applies to all government ministry/Department
Policies		√		√		<ul style="list-style-type: none"> Policies on use of national parks, biodiversity, NGOs working the buffer zones etc are needed
Strategies		√				<ul style="list-style-type: none"> Needs to be strengthened for effective fulfillment of goal and objectives
Relationships with stakeholders/ Development Partners			√			<ul style="list-style-type: none"> Co-ordination committee in field level of collaborative partners.
Organizational aspects						
Structure		√				<ul style="list-style-type: none"> Need to improve structures and roles for prompt and effective outcomes
Systems						
-Information & communication technology (ICT) hardware & software				√		<ul style="list-style-type: none"> Needs development of ICT skill to the staffs Needs implementing quality management information system (QMIS) system
Data collection			√			<ul style="list-style-type: none"> Up to date data collection is needed
Monitoring& Evaluation			√			<ul style="list-style-type: none"> Needs timely data collection, evaluation and planning
Management		√				<ul style="list-style-type: none"> Needs staff motivation, office management for senior and file management in junior staff
Leadership						<ul style="list-style-type: none">
External Communications			√			<ul style="list-style-type: none"> Need for improve two-way communication
Internal Communications			√			<ul style="list-style-type: none"> Needs to improve communications between inter divisions/ sections/ units
Procedures						
Budgeting		√				<ul style="list-style-type: none"> Applies to government budgetary system
Accounting		√				<ul style="list-style-type: none"> Applies to government accounting system Staff training needs, e.g. software use, technical auditing, monitoring

	Extent of Capacity Needs					
	Good capacity	Some needs	Moderate needs	Major needs	Priority needs	Findings
Reporting			√			<ul style="list-style-type: none"> Needs skills development in research, data analysis and evaluation
Record keeping				√		<ul style="list-style-type: none"> Need to improve storage and retrieval systems
Culture			√			<ul style="list-style-type: none"> Moderate motivated
Resources						
Financial Resources			√			<ul style="list-style-type: none"> Applies to government budgetary system Significant resource constraint to meet goal, objective and targets
Infrastructure		√				<ul style="list-style-type: none"> Sufficient working space Needs to upgrade facilities (CC camera)
Equipment			√			<ul style="list-style-type: none"> Needs to upgrades to equipment (hardware and software) Gaps in internet connectivity
Transport		√				Applies to government provided
Human Resources Aspects						
Staffing						
Vacant positions	√					<ul style="list-style-type: none"> Applies to government procedures
Gender				√		<ul style="list-style-type: none"> Low in number as well as decision level
HR Management						
Recruitment, HRM & HRD		√				<ul style="list-style-type: none"> Applies to government procedures Needs timely recruitment and motivating
Incentives					√	<ul style="list-style-type: none"> Needs for providing incentives for excellent performance
Staff:						
Knowledge		√				Knowledge
Skills		√				<ul style="list-style-type: none"> Needs skill development in GLOF risk reduction, real time data handling and management, glacial lake monitoring, telemetric system handling and management

	Extent of Capacity Needs					
	Good capacity	Some needs	Moderate needs	Major needs	Priority needs	Findings
Attitudes						<ul style="list-style-type: none"> Needs to enhance positive attitude in work performance

Annex: 10

Summary of Capacity Needs in Sagarmatha National Park (SNP)

	Extent of Capacity Needs					Findings
	Good capacity	Some needs	Moderate needs	Major needs	Priority needs	
Institutional aspects						
Legal Provision/ Mandate	√					<ul style="list-style-type: none"> Applies to all government ministry/Department
Policies				√		<ul style="list-style-type: none"> Needs some policies in the areas of conservation of biodiversity, Policy is needed for transparencies of NGOs working in the buffer zones
Strategies				√		<ul style="list-style-type: none"> Needs to be strengthened and improvement of strategies to minimize priorities and ensuring target
Relationships with stakeholders/ Development Partners			√			<ul style="list-style-type: none"> Needs strong co-ordinations with the stakeholders and related organization working in the buffer zone
Organizational aspects						
Structure		√				<ul style="list-style-type: none"> Need to mobilize the staffs for effective job responsibility
Systems						
Information & communication technology				√		<ul style="list-style-type: none"> Needs development of ICT skill to the staffs
Data collection			√			<ul style="list-style-type: none"> Needs more data transfer could be manual and automated by establishment of CC camera
Monitoring & Evaluation			√			<ul style="list-style-type: none"> Needs timely data collection, evaluation and monitoring
Management		√				<ul style="list-style-type: none"> Needs staff motivation, reduction in senior staff workload Needs to build management capacity at lower levels
Leadership			√			<ul style="list-style-type: none"> Higher level has clear vision and strong leadership Lower level has need to develop leadership

	Extent of Capacity Needs					
	Good capacity	Some needs	Moderate needs	Major needs	Priority needs	Findings
External Communications			√			<ul style="list-style-type: none"> Need for improve two-way communication
Internal Communications		√				
Procedures						
Budgeting		√				<ul style="list-style-type: none"> Applies to government budgetary system
Accounting		√				<ul style="list-style-type: none"> Applies to government accounting system Staff training needs, e.g. software use, technical auditing, monitoring
Reporting			√			<ul style="list-style-type: none"> Applies to government institutions calendar, procedures and templates – attention has to pay timely accomplished Needs skills development in research, data analysis and evaluation
Record keeping				√		<ul style="list-style-type: none"> Need to improve storage and retrieval systems
Culture			√			Organizational Culture is needed.
Resources						
Financial Resources			√			<ul style="list-style-type: none"> Applies to government budgetary system Significant resource constraint to meet goal, objective and targets
Infrastructure		√				<ul style="list-style-type: none"> Sufficient working space Needs to upgrade facilities
Equipment			√			<ul style="list-style-type: none"> Needs to upgrades to equipment (hardware and software) Gaps in internet connectivity
Transport		√				<ul style="list-style-type: none"> Applies to government provided facilities Needs to improve for lower level staffs
Human Resources Aspects						
Staffing						

	Extent of Capacity Needs					
	Good capacity	Some needs	Moderate needs	Major needs	Priority needs	Findings
Approved positions		√				<ul style="list-style-type: none"> Applies to government approval All staff have Job Descriptions, and there are some inconsistencies needs to improve
Vacant positions	√					<ul style="list-style-type: none"> Applies to government procedures
Gender				√		<ul style="list-style-type: none"> Women under-represented at higher grades
HR Management						
Recruitment, HRM & HRD		√				<ul style="list-style-type: none"> Applies to government procedures Needs timely recruitment and motivating
Incentives					√	<ul style="list-style-type: none"> Needs for providing incentives for excellent performance
Staff						
Knowledge		√				
Skills		√				<ul style="list-style-type: none"> Needs skill development in identifying animal voices
Attitudes			√			<ul style="list-style-type: none"> Needs to enhance positive attitude in work performance

Annex 11

List of Visited People

Department of Hydrology and Meteorology, Babarmahal, Kathmandu

Dr. Rishi Ram Sharma - Director General and National Project Director of CFGORRP
Mr. Rajendra Sharma - Senior Divisional Hydrologist and Focal Person of CFGORRP
Mr. Binod Parajuli - Hydrologist
Mr. Mikendra Bahadur Rawal - Meteorologist

Department of Water Induced Disaster Prevention, Pulchowk, Lalitpur

Mr. Rama Nanda Prasad Yadav - Director General
Mr. Vidya Sagar Mallik - Deputy Director General
Mr. Niranjana Dev Pandey - Deputy Director General
Mr. Shan Mukhesh Chandra Amatya - Senior Divisional Hydro-geologist
Mr. Khila Nath Dahal - Senior Divisional Hydro-geologist
Mr. Praeep Kumar Manadhar, Senior Divisional Engineer
Mr. Vijay Chandra Khatiwoda - Senior Divisional Engineer
Ms. Manju Sharma - Sociologist

Department of Soil Conservation and Watershed Management, Babarmahal, Kathmandu

Mr. Prem Narayan Kandel - Director General
Mr. Desh Bhatta Mallik - Senior Divisional Engineer
Mr. Arjun Kumar Thapa - Soil Conservation Officer
Mr. Deepak Bhardwaj- Engineer
Mr. Khila Nath Dahal- Under Secretary

Department of National Park and Wildlife Conservation, Babarmahal, Kathmandu

Mr. Tika Ram Adhikari - Director General
Mr. Tulsi Ram Sharma - Under Secretary, Planning Officer
Mr. Hari Bhadra Acharya - Monitoring Officer, Focal Person of CFGORRP
Ms. Prabha Shrestha – Officer

Sagarmatha National Park, Namche, Solukhumbu

Mr. Ganesh Pant – Chief Warden of SNP, Soil Conservation Officer, Namche
Mr. Laxman Paudel - Asst Conservation Officer
Mr. Laxmi Bhakta Shrestha – Major, Nepalese Army, SNP
Mr. Sonam Gyalzen Sherpa – Chairperson, Buffer Zone Management Committee, Namche
Mr. Nir Kumar Magarati – Senior Game Scout, SNP, Namche
Mr. Lamakaji Sherpa – Social Activist, Namche

PMU/CFGORRP, Babarmahal, Kathmandu

Mr. Top Bahadur Khatri – Project Director
Mr. Pravin Maskey - Senior Technical Advisor
Dr. Govinda Acharya – Technical Advisor
Ms Husna Banu Sheikh – Gender Specialist

Photograph: Visit & Interviewing, SNP, Solokhumbu

