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*“Reducing Climate Change-induced Risks and Vulnerabilities from
Glacial Lake Outburst Floods in the Punakha-Wangdi and Chamkhar
Valleys”*

INCEPTION REPORT



DEPARTMENT OF GEOLOGY AND MINES

MINISTRY OF ECONOMIC AFFAIRS

July 2008

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LIST OF ABBREVIATIONS

ACO	Austrian Coordination Office
CRM	Climate Risk Management
DCD	Development Cooperation Division
DDMC	District Disaster Management Committee
DDMT	District Disaster Management Team
DGM	Department of Geology and Mines
DoE	Department of Energy
DoR	Department of Roads
DMD	Disaster Management Division
DRM	Disaster Risk Management
EIA	Environment Impact Assessment
GEF	Global Environment Facility
GLOF	Glacial Lake Outburst Flood
GNHC	Gross National Happiness Commission
LPAC	Local Project Appraisal Committee
MoEA	Ministry of Economic Affairs
MoHCA	Ministry of Home and Cultural Affairs
NCAP	Netherlands Climate Assistance Programme
NEC	National Environment Commission
PB	Project Board
PHPA	Punatsang chhu Hyrdo Power Authority
PMU	Project Management Unit
PPD	Policy and Planning Division
RGoB	Royal Government of Bhutan
TSAT	Technical Support and Advisory Team
UNDP	United Nations Development Programme
UNDP CO	United Nations Development Programme Country Office
WWF	World Wildlife Fund

A. Project Inception Update

A.1 Overview

The DGM-UNDP/GEF Project on “Reducing Climate Change-Induced Risks and Vulnerabilities from Glacial Lake Outbursts Flood in the Punakha-Wangdi and Chamkar Valleys” was signed between UNDP CO, the Gross National Happiness Commission and the implementing agency—the Ministry of Economic Affairs on April 8, 2008. Prior to the signing of the project document, a Local Project Appraisal Committee meeting was held on March 27, 2007 to discuss on the pertinent implementation issues of the project. Subsequent to the signing of the project, the project management processed for procurement of equipments, working tools and field implements required for the engineering and safety plan and the artificial lowering of the Thorthormi Lake. As of now about 60% of the purchase has already been done and the remaining items will be procured in the 3rd and 4th Quarter of 2008. The project inception workshop was held on June 17-18, 2008 at the College of Natural Resources at Lobesa in Wangdue Phodrang district. The engineering and safety plan under Outcome 2, Output 2.2 will be implemented in 2008 and necessary arrangements for the excavation work at Thorthormi Lake will also be made. A detailed work plan for the engineering and safety plan, scheduled to start by beginning of August 2008, has been presented and approved during the inception workshop. This inception report incorporates changes and agreements made during the inception workshop and the Project Board (PB) and Technical Support and Advisory Team (TSAT) meeting and presents way forward strategies to achieve the outcomes of the full size project.

A.2 Change in the project document

The inception meeting agreed that Outcome 3: “Reduced human and material losses in vulnerable communities in the Punakha-Wangdue valley through GLOF early warning,” specifically Outputs 3.1 and 3.5 will now be taken up by the Department of Energy under the Ministry of Economic Affairs, since the Department is the main agency involved in flood warning and forecasting in the country.

Sl. No.	Original project document	Changes	Reason for Change
1	Outcome 3: Reduced human and material losses in vulnerable communities in the Punakha-Wangdi Valley through GLOF early warnings	Implementing agency and new project manager from Department of Energy	To come up with a comprehensive early warning system by combining budget from present project with budget from DoE and other sources. Moreover, DoE already has a

	Outputs: 3.1 & 3.5	(DoE)	flood warning section under them which looks after the existing manual EWS based in Lunana.
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A.3 Account of Project Progress

Thus far, the following activities related to the project have been carried out:

- The Local Project Appraisal Committee meeting was held on March 27, 2008 to address some pending issues (See Minutes, Annex F.1) before signing of the project document
- The Project document was signed on April 8, 2008 between the UNDP Country Office, the Gross National Happiness Commission and the Implementing Agency—the Ministry of Economic Affairs.
- The tendering process for procurement of field equipments, working tools and field implements began by mid April and as of date about 60% of the items have been ordered and supplied
- The project management participated in the national workshop conducted in Thimphu and a series of community awareness workshops organized in Punakha and Wangdi Valley to create general awareness to the public pertaining to the GLOF Full Size Project of the . The workshop was organized and funded by the DGM-NCAP project
- The project inception workshop was conducted on June 17-18 at the College of Natural Resources, Wangdi Phodrang (Minutes, Annex F.2)
- The Project Board and TSAT members were finalized during the inception meeting
- Terms of References for Project Management were revised and finalized (Annex F.3)
- Team member for the engineering and safety plan study were identified and terms of reference finalized (Annex F.4)

B. Stakeholder Involvement Plan

Table 1 shows key stakeholders involvement plan for preparation of the full size project and also their role in the implementation of the project

Institution	Role in PPG and FSP
Department of Geology and Mines (DGM)	<p>DGM will execute all technical aspects regarding implementation of the FSP, in close collaboration with the Disaster Management Division, MoHCA and other stakeholders. The agency was involved in contributing to all Outcomes of the PPG process, and will be involved in all FSP Outcomes. DGM will participate in the Project Board meetings and chair the meetings.</p> <ul style="list-style-type: none"> • Output 1.3: Information on climate hazards and vulnerabilities (GLOF) in Bhutan systematically captured, updated and synthesized • Output 2.1: Engineering and safety plans for mitigation works on Thorthormi lake reduce risks to workforce and downstream population • Output 2.2: Artificial lowering system of Thorthormi Lake waters implemented • Output 2.3: Water levels of Thorthormi lake and status of artificial lowering system are regularly monitored and maintained • Output 2.4: Technical knowledge and lessons in the artificial lowering of glacier lake levels captured and documented for use in future projects
Department of Energy (DoE)	<p>DoE will implement activities related to establishment of comprehensive GLOF early warning system in close collaboration with DGM, DMD and other relevant stakeholders. After the completion of the project, it will be responsible for maintenance of the EWS DoE was actively involved during PDF B phase of the project and the agency will participate in Project Board and TSAT meeting and be responsible for achieving the following outputs of the fsp.</p> <ul style="list-style-type: none"> • Output 3.1: Technical components for a GLOF early warning system in Punakha-Wangdi Valley is installed and operational • Output 3.5: Technical knowledge and lessons in the installment and operation of GLOF early warning systems captured and documented for use in future projects
Disaster Management Division (DMD, MoHCA)	<p>DMD, MoHCA, has participated in the Project Steering Committee meetings during the PPG and will provide coordination and guidance during implementation of the FSP, particularly to facilitate logistics and labor mobilization for all Outcomes. It will collaborate closely with DGM to incorporate climate change issues into the DRM framework and training materials and is also directly responsible for the delivery of project outputs under Outcome 1 “Improved national, regional, and local capacities to prevent climate change-induced GLOF disasters in the Punakha-Wangdi and Chamkhar Valleys”.</p> <ul style="list-style-type: none"> • Output 1.1: Climate-proofed DRM legislation, policy frameworks, and guidelines • Output 1.2: Capacities for climate risk planning strengthened at the district (dzongkhag) administrative levels • Output 1.4: Vulnerable communities are aware of, and prepared for, climate-related disasters • Output 3.2: Institutional arrangements in place to operate, test, and maintain the GLOF early warning system

Institution	Role in PPG and FSP
	<ul style="list-style-type: none"> • Output 3.3: Awareness of communities in the Punakha-Wangdi valley on operation of early warning system • Output 3.4: Safe GLOF evacuation areas in each vulnerable community in the Punakha-Wangdi Valley identified and locations known to community members
National Environment Commission (NEC)	NEC took the lead in designing and implementing the NAPA process in Bhutan and provided information on climate change vulnerabilities. NEC has, and will continue to, participate in the Project Board meetings and ensure policy coordination. As the agency prepares the Second National Communication to the UNFCCC, it will continue to provide input on vulnerabilities related to climate change and disasters, particularly in designing awareness and training for local staff and communities. The agency will also
Gross National Happiness Commission (GNHC)	<p>For long-term sustainable development following the project, the GNHC commission will be crucial towards integration of the hazard zonation maps into development plans for the Punakha-Wangdi Valley and Chamkhar Valley. It will also help ensure that successful approaches and outcomes of this project will contribute to Bhutan’s adaptation to climate change. GNHC has, and will continue to, participate in the PB and relevant meetings and workshops.</p> <p>For this project, GHNC will provide guidance in ensuring the resources for enhancing climate resilience complement ongoing development activities.</p>
Ministry of Finance	The MoF will participate in the PB and other relevant meetings and workshops.
Department of Roads, Ministry of Works and Human Settlement	The Department of Roads will participate in all relevant planning and dissemination workshops, the design and evaluation of the engineering plan, and will assist in identifying and fielding an engineer to supervise mitigation works at Thorthormi lake.
The <i>Dzongkhag</i> Administrations	Punakha, Wangdi, Gasa, and Bumthang Dzongkhags will form major partners for the implementation of all FSP outcomes. They will assist the project team in mobilizing labor for the mitigation works, and in organizing community awareness and preparedness workshops and trainings. Gasa dzongkhag in particular will assist the project management in arranging transportation of materials to the project site. Dzongdags (district administrator) of the three dzongkhags will be on the Project Board and attend all board meetings and other relevant project meetings.
Local communities (Punakha, Wangdi, Gasa, and Chamkhar)	Local communities in the Punakha-Wangdi Valley and Chamkhar Valley, as well as in the upstream region near the Thorthormi Lake, will be important stakeholders during the FSP implementation. Local communities will participate in the implementation of most of the FSP outcomes---especially in artificial lowering of the Thorthormi Lake.
National Committee for Disaster Management (NCDM)	Through the DMD, MoHCA, the NCDM will provide the policy directions into which climate-resilient DRM will be incorporated.
Jigme Dorji National Park (JDNP) Management	The JDNP Management will provide guidance in undertaking activities within the national park. It will also participate in assessing potential environmental impacts of the project.

Institution	Role in PPG and FSP
Department of Agriculture	As agriculture is one of the most climate-sensitive sectors, the DoA will participate in all relevant meetings and workshops.
Austrian Coordination Office (ACO)	Austria, through University of Vienna has collaborated with DGM and extensively studied glacier lake and GLOF risk analysis during the 2000-2003 period. In fact, the present mitigation project is a follow up of the recommendations made by the joint Austro-Bhutanese team. ACO has participated in stakeholder meetings during the PPG and will provide co-financing for the FSP. The agency will participate in Project Board meetings and all related workshops and meetings of the project.
World Wildlife Fund (WWF Bhutan)	WWF Bhutan will provide co-financing for the FSP and has participated in stakeholder consultations during the PPG. It will participate in Project Board meetings and all other related workshops and meetings.
International Centre for Integrated Mountain Development (ICIMOD)	ICIMOD will provide technical expertise for assessments related to GLOF risk and environmental impacts. They will also participate in activities for sharing experiences and knowledge on GLOFs and climate change.
UN Volunteers	UNV will participate in relevant meetings and, when requested, will assist in mobilizing volunteers for activities on community disaster management, awareness raising, and community capacity building.
UNDP Country Office	<p>The UNDP Bhutan office will act as overall coordinator and monitor project funds. It will help mobilize and coordinate support from other partners through a global network. UNDP will also be responsible for the sharing of lessons from the project into the Adaptive Learning Mechanism (ALM).</p> <ul style="list-style-type: none"> • Output 4.1: Project lessons captured in, and disseminated through, the Adaptation Learning Mechanism • Output 4.2: Project knowledge shared with other GLOF-prone countries
Department of Public Health, Ministry of Health (MoH)	Department of Public Health, MoH, was involved in all relevant meeting of the PPG phase and the agency will, during the mitigation work, depute a doctor and health assistance to provide basic medical services to the team
Royal Bhutan Army (RBA)	RBA will assist the project by deputing appropriate personnel to the site to maintain law and order during execution of the mitigation work
NGOs and Media: Tarayana Foundation & Royal Society for Protection of Nature (RSPN); Kuensel, Bhutan Broadcasting Service (BBS), etc	To generate greater awareness public on climate change and GLOF risk and vulnerability issues, these NGOs and media has and will be involved in all relevant meetings of the project

C. Annual Work Plan: First Year

C.1 Department of Geology and Mines

C.1.1 Engineering and Safety Plan

Stakeholder Involvement Plan: To assess the engineering and safety measures for the artificial lowering of Thorthomi Lake, through excavation of outlet channel, the following members from different organizations will conduct a detailed study during the 2008 field season.

1. Mr. Dowchu Dukpa, Project Manager, DGM
2. Mr. Karma Toeb, Team Leader: DGM
3. Mr. N.K. Giri, Civil Engineer, Department of Roads
4. Mr. Phuntsho Norbu, Engineering Geologist: DGM
5. Mr. Tashi Tshering, Geophysicist, DGM
6. Mr. Ugyen Thinley, Survey Officer, DGM
7. Dr. Tshering Tamang, District Medical Officer, Gasa Dzongkhag
8. Mr. Lobzang Gyenden, Geologist, DGM
9. Mr. Namgay Wangchuk, Blaster, DGM
10. Mr. Tika Tamang, Survey Assitant, DGM
11. Ram Chandra Sinchuri, Gasa Dzongkhag Representative

The Terms of References for multi-disciplinary team members are presented in Annex F.4. About 20 casual workers will be recruited, mostly at site, to assist the multi-disciplinary team in carrying out the Engineering and Safety Plan study.

Objectives: The multi-disciplinary team will focus on achieving the following aims and objectives:

1. Confirm the geostatic status of the moraine dam and update geotechnical assessments on the most appropriate location for the mitigation channel
2. Prepare and detailed seismic/geo-electrical/radar subsurface characterization of excavation site and confirm the presence/absence of dead ice in the moraine dam
3. Prepare a safety and evacuation plan in case of a collapse of the lake
4. Assess the economic, environmental and social impact of risk reduction measures on the project site, surrounding areas, and downstream of the project site
5. Prepare an engineering plan, including the location of the channel along the moraine dam, procedures, required equipment, etc.
6. Identification and arrangements for site camp at Lunana
7. Convene a PB meeting to 1) review the safety and engineering plans, and 2) Jointly decide on the continuation of the risk reduction measures on the basis of geostatic updates.
8. Conduct Environment Impact Assessment (EIA)

Upon completion of the work, the multi-disciplinary team will prepare a detailed report on the engineering and safety aspect of the moraine dam for excavation and make a presentation to the Project Board/TSAT and to the government, if required. The duration of the engineering and safety plan study is as stipulated below:

- Procurement of field implements and gadgets, desktop study and information collection: May-July 2008
- Journey to the site at Lunana: End of July, 2008
- Field work at the site: Mid August to Mid-October 2008
- Return to Thimphu: By Mid-October 2008
- Analysis and report writing: Till end of mid-December 2008
- Presentation of engineering and safety plan to the PB/TSAT/Government: First week of January 2008

2008 Work Plan for the Engineering and Safety Plan

Sl. No.	Activities	Time Frame								
		May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan09
1	Procurement, desktop study and preparation									
2	Journey to the site									
3	Field work at Thorthormi									
4	Return journey to Thimphu									
5	Analysis and report writing									
6	Presentation of findings to the Project Technical Committee/government									

C.1.2 Artificial Lowering of Thorthormi Lake Implemented

The following preparatory works for the implementation of the artificial lowering of Thorthormi Lake waters will be carried out during the 2008 fiscal year:

- Identify work force for the excavation work
- Procure ration and remaining materials and other necessities

- Finalize on the mode of transportation and accordingly make necessary arrangements. This include among others, arrangements of transit stores at the road head in Damji, Gasa Dzongkhag, and field store at Thanza, Lunana.
- Make emergency arrangements for field personnel involved in the mitigation work

C.1.3 Estimated Budget for First Year

Sl. No.	Activity	Amount (US\$)
1	Engineering and Safety Plan	66,500
2	Project facilitation and lessons documented	35,850
3	Improved capacities to prevent climate change induced disasters	11,250
4	Artificial lowering works implemented	233,000
TOTAL		346,600

C.2.0 Disaster Management Division

The following shows the 2008 Annual Work Plan for the DMD:

Output	Activities	Budget (\$)
1.1 Climate-proofed legislative, policy frameworks and sectoral plan for disaster/CRM	Establish national IM working groups <ul style="list-style-type: none"> • DRM standards and guidelines • Capacity building plan • Training and awareness materials • International/national consultant 	75,500
1.2 Capacities for climate risk planning strengthened at the intermediate administrative levels	Integrate climate disaster risks into local disaster management plans/ policies <ul style="list-style-type: none"> • Formation of DDMCs, DDMT and training • Development of training/awareness materials • Initiate EOCs in the three pilot Dzongkhags 	70,000
Total		145,000

C.3.0 Department of Energy

Outcome 3, outputs 3.1 and 3.5 pertaining to the installation of early warning system in the Punakha-Wangdi Valley has been handed over to the Department of Energy in order come up with a comprehensive system that will provide sufficient lead time for all the vulnerable communities including the Punatsang chhu Hydro Power Project. DoE will revise the Early Warning System concept paper, incorporate budget and work plan and submit it to the project board members for endorsement and approval by the chairman.

A new project manager from DoE will oversee the implementation of EWS installation and related activities under the project.

D. Project Management Arrangements

D.1 Project Board

The following are final members of the Project Board that will provide high level guidance and oversight to the project management:

- Dasho Sonam Tshering, Secretary, Ministry of Economic Affairs (Chairperson)
- Dorji Wangda, Director General, Department of Geology and Mines
- Deputy Resident Representative, UNDP Country Office, Thimphu
- Mr. Christian Mazal, Resident Coordinator, Austrian Coordination Office, Thimphu
- Ugyen Dophu, Director, Department of Public Health
- Dasho Dawala, Dzongdag, Punakha Dzongkhag
- Dasho Karma Weezir, Dzongdag, Gasa Dzongkhag
- Dasho Kinzang Wangdi, Dzongdag, Wangdue Dzongkhag
- Thinlay Namgyel, Chief Program Officer, DCD, GNH Commission
- Tenzin Wangmo, Program Officer, DCD, GNH Commission
- Karchung Tshering, Chief Program Officer, Ministry of Home and Cultural Affairs
- Pelden Tshering, Environment Program Officer, National Environment Commission
- Niralal Rai, Executive Engineer, Department of Roads
- Sangay Tenzin, Planning Officer, PPD, Ministry of Finance
- Karma Tenzin, WWF Bhutan
- Sonam Deki, GLOF Project Manager, Disaster Management Division
- Karma Chophel, GLOF Project Manager, Department of Energy
- Dowchu Dukpa, GLOF Project Manager, Department of Geology and Mines

D.2 Technical Support and Advisory Team

The Project will receive technical support and advice from a Technical Support and Advisory Team comprising of the following members. As decided during the inception workshop, Director General, DGM will lead the TSAT instead of the project director.

- Dorji Wangda, Director General, Department of Geology and Mines (Team Leader)
- Yeshi Dorji, Project Director, Department of Geology and Mines
- Karma Chopel, Project Manager, Department of Energy
- Gyem Dorji, Department of Public Health, Ministry of Health
- Karma Doma Tshering, Sr. Program Officer, Disaster Management Division
- Thinley Namgyel, National Environment Commission
- Niralal Rai, Executive Engineer, Department of Roads
- Karma Tshering, Representative, Puna Tsang Chhu Hydro Power Authority (PHPA)
- Kinley Tshering, Park Manager, Jigmi Dorji National Park (JDNP)
- Dowchu Dukpa, Project Manger, DGM
- Karma Rapten, UNDP Thimphu

D.3 Project Management Unit (PMU)

The Project Management Unit (PMU) shall consist of a Project Director and the Project Managers from their respective organizations:

- Mr. Yeshi Dorji, Project Director, DGM
- Mr. Dowchu Dukpa, Project Manager, DGM
- Mr. Karma Chopel, Project Manager, DoE
- Ms. Sonam Deki, Project Manager, DMD

The Project Managers will work under the direction of the Project Director from the DGM. The three project managers will be responsible for outputs to be delivered by their respective agencies, as well as the application of all UNDP administrative and financial procedures and for the use of UNDP-GEF funds. The ToRs for the Project Director and Project Managers including ToR for the new Project Manager from DoE are presented in Annex E.4.4.

E. Monitoring, Evaluation and Reporting

To ensure that project objectives are met and results achieved; tracking implementation progress; and promote feedback, learning and knowledge, the following tools and monitoring methodology will be used:

- Field trips
- Progress report through Quarterly Progress Report (QPR) and Project Implementation Review (PIR)
- Financial reports (FACE)
- Audits (Annual)

Evaluations (Mid-term and Annual)

Besides the above monitoring and evaluation plan, the project will adhere to the following meetings to provide proper guidance and oversight to the project management:

- Project Board Meetings to be held twice annually
- TSAT meeting also to be held twice in a year

- Project Managers will meet once every month

F. Annexes

F.1 Minutes of the LPAC meeting

Local Project Appraisal Committee (LPAC) Meeting

“Reducing climate change-induced risks and vulnerabilities from glacial lake outbursts in the Punakha-Wangdi and Chamkar Valleys”

Date: March 27, 2008

Venue: DGM Conference Hall

Minutes

The Local Project Appraisal Committee (LPAC) meeting for the DGM-UNDP/GEF Full Size Project (FSP) was held on March 27, 2008 at the Department of Geology and Mines (DGM) Conference Hall to discuss on issues concerning the Lunana GLOF project prior to signing of the project document between the Royal Government of Bhutan (RGoB), UNDP and Global Environment Facility (GEF) scheduled to take place within the next few weeks. The following members participated in the LPAC meeting.

1. Mr. Dorji Wangda, Director, Department of Geology and Mines
2. Mr. Toshihiro Tanaka, Deputy Resident Representative, UNDP
3. Mrs. M.Ch Weinberger, Resident Representative, ACO
4. Mr. Doley Tshering, Head, Environment, UNDP
5. Mr. Yeshi Dorji, Project Director, DGM
6. Mrs. Tenzin Wangmo, Sr. Planning Officer, GNHC
7. Mr. Thinlay Namgyel, CPO, GNHC
8. Mr. Karma Tenzin, Program Officer, WWF
9. Mrs. Sonam Lhaden Khandu, Environment Officer, NEC
10. Mr. Tshering Dorjee, F & A Manager, WWF
11. Mr. Ramesh Chhetri, Program Officer, ACO
12. Mr. Phuntsho Wangyel, Program Officer, GNHC
13. Mrs. Sonam Deki, Assistant Program Officer, DMD, MoHCA
14. Mr. Karma Chogyal, Program Associate, UNDP
15. Mrs. Karma Doma Tshering, Sr. Program Officer, DMD, MoHCA
16. Mr. Karma, Sr. Glaciologist, DGM, MoEA
17. Mr. Dowchu Dukpa, Project Manager, DGM, MoEA

The meeting started with the welcome address by Mr. Dorji Wangda, Director, Department of Geology and Mines (DGM). This was followed by remarks from Mr. Toshihiro Tanaka, Deputy Resident Representative, UNDP. Mr. Tanaka addressed the participants about the importance of the mitigation work of glacial lakes in Lunana and that the fund to carry out the work has been secured from Global Environment Facility (GEF) and co-financers Austria and World Wild Life (WWF).

This was followed by a presentation by Mr. Dowchu Dukpa, Project Manager of the Full Size Project (FSP). He presented to the participants on the outcomes, outputs, budget outlay and overall project management arrangements. The Project Manger also highlighted on the PDF B activities; the outcome of which has been used to develop the FSP project document. He mentioned that the main components of the FSP project are 1) Artificial lowering of the Thorthormi glacial lake 2) Establishment of a technical Early Warning System in the Punakha-Wangdue valley and 3) Public awareness creation which will be mainly executed by the Disaster Management Division (DMD), Ministry of Home and Cultural Affairs (MoHCA) in the two valleys of Punakha-Wangdue and Chamkhar valleys. The Project Manager then presented on the 2008 Annual Work Plan for the both DGM and DMD and he informed the members that work for engineering and safety plan at Thorthormi lake will be undertaken this year. The Project Manager, however, mentioned that work at the site has to be planned in the June-September month each year and therefore, due to limited time in the 2008 field season, DGM is planning to procure and transport the field equipments to the site and the actual excavation work at Thorthormi will be carried out in the 2009 field season.

The participants then discussed on DGM Director's suggestion of tendering the lake lowering work at Thorthormi in Lunana to national contractors. The members from the Gross National Happiness (GNH) Commission however raised concerns on the difficulties and the practicality of contracting out the work. The Deputy RR, UNDP also echoed the same concern on idea of giving the excavation work to contractors. Similarly, Mr. Doley Tshering, Head Environment, UNDP, also raised concerns on the issue of contracting out the excavation work at Thorthormi but suggested on providing attractive wages to solve the issue of labor problem. If the excavation work is to be tendered, the Resident Representative of the ACO, Mrs. Weinberger said that she is concerned that there won't be competition and feared of monopolizing the entire tender process and felt that recalculation of the entire budget may be required to confirm the feasibility of such process. Under present circumstance, she also said that the signing of the project document may have to be delayed until all the modalities are completed. In respond to Mrs. Weinberger concern, Mr. Doley Tshering, UNPD said that budget provision should not be a major concern since the co-financing from Austrian government is not included in the prodoc budget calculation and therefore he insisted on going ahead with signing of the project. Representatives from both GNHC and ACO said that if the budget is sufficient they have no problem in tendering out of the work package.

On Mrs. Weinberger query of how the lake lowering work will be carried out, Mr. Yeshe Dorji, Project Director, DGM, explained in detail how the work will be executed at the site. He also informed the floor that detailed engineering and safety plan work is important and will be carried out in the 2008 field season.

Director, DGM, explained to the participants that the main reason for exploiting the idea of contracting out the work is to speed up the work process. He mentioned that if the work is executed by DGM, due to lengthy process in procurement of field equipment and other implements, the project may not be completed within the stipulated time frame. The Donors, however, said that extension of the project time line should not be a major problem if the management can provide valid justification. On the contrary, the donors said that if project duration requires to be extended because of unforeseen problem in case of tendering out the work, the donors may not accept the request for extension.

On the issue of providing attractive incentive to the workers, the members unanimously agreed that the project may have to provide a minimum daily wages of about Nu.500. However, the members noted that special approval in this connection needs to be obtained from the concerned authority.

Mr. Karma Tenzin, WWF informed the members that WWF's contribution to the project has to be utilized by June 2008 and report be submitted by end of June 2008.

Representatives from the DMD requested the project board to include Dzongkhag representatives from Punakha and Wangdue besides Gasa Dzongkhag mainly to facilitate labor mobilization.

On the issue raised by the representatives from the GNHC regarding the project funding modality, Mr. Doley Tshering informed that the Austrian co-financing part will be routed through UNDP and a separate formal UNDP contract will be signed; in case of WWF co-financing, UNDP and WWF agreed to work out an appropriate method later.

Regarding submission of the progress reports and financial reports, the project management will submit to the UNDP through the GNHC, and UNDP will share with the co-financers.

Finally, regarding excavation work at the lake, the members agreed that DGM should work out and find out the most appropriate and feasible method including the option of tendering out the work. The meeting concluded with vote of thanks by the Director, DGM.

F.2 Minute of Inception Workshop

MINUTES

“Reducing Climate Change-induced Risks and Vulnerabilities from Glacial Lake Outburst Floods in the Punakha-Wangdi and Chamkhar Valleys”

DGM-UNDP/GEF Project Inception Workshop

Date: 17-18 June, 2008

Location: College of Natural Resources, Lobesa, Wangdue Phodrang

Introductory Remarks:

Mr. Dorji Wangda, the Director General of Department of Geology and Mines (DGM) presented the opening address by thanking the donors – UNDP/GEF, World Wildlife Fund (WWF), and the Austrian Coordination Office (ACO).

Dasho Sonam Tshering, Secretary of Ministry of Economic Affairs (MoEA) addressed the workshop by thanking the donors for funding this project. Dasho Secretary stressed his serious concern raised by the receding glaciers in northern Bhutan, both to people living downstream and major planned projects, which are the seed of economic activity, along Puntshangchu. Owing to the importance of the EWS to hydropower projects, Dasho recommended to integrate the EWS component of this project with the flood warning component of Department of Energy (DoE). The Secretary also focused on the importance of community awareness and mentioned that it depends on the communication skills to convince people at risk.

H.E. Nicholas Rosillini, Resident Representative, UNDP Bhutan, presented the threat from glacier retreat and that catastrophes like this will not only affect Bhutan, but across international boundaries in India and Bangladesh. He thanked the co-financers –ACO and WWF and reaffirmed the support to the project on behalf of UNDP.

Dasho Nado Rinchen, the Deputy Minister of National Environment Commission Secretariat (NECS) thanked DGM for the invitation. His Excellency stressed on the impacts and consequences of climate change. Bhutan will not be able to escape climate change although there wasn't any significant contribution from Bhutan to global warming and that climate change cannot be stopped although mitigation measures can be adopted. Fresh water, which are stored in glaciers, are becoming scarce, and agriculture and hydropower, which are the backbone of the economy, are very sensitive to climate change. Dasho Nado Rinchen reminded the participants about the 1994 GLOF and the importance of the two phases of Punatshangchu Project. His Excellency supported the relocating the sensor of EWS to get maximum evacuation time. The importance of community consultation and capacity development of concerned areas such as Gewogs and Dzongkhags was also mentioned. For community awareness, Dasho suggested that it might be effective to educate the communities about the risks involved rather than to pass government orders.

In delivering the vote of thanks - Mr. Chado Rinchen of DGM thanked Lyonpo Nado Rinchen, Dasho Sonam Tshering, and representatives of donor agencies – UNDP, ACO, and WWF—for their participation and support. He also thanked all the participants for their participation and support.

Mr. Dowchu Dukpa, Project Manager, presented the components of the PDF B phase and various outcome/outputs, stakeholder involvement plan, and Project Board and TSAT Terms of Reference, for the Full Size Project. The annual work plan for 2008 year was also presented.

Ms. Karma Doma Tshering, Project Manager, Disaster Management Division (DMD) made a presentation on the 2008 work plan for the Outcome 3, Output 3.3 & 3.4 of the project which will be implemented by DMD. It may be noted that the activities presented during this workshop has a slight deviation in terms of budget allocation from the activities included in the initial project document.

Mr. Yeshe Dorji, Project Director, presented the technical plan for the proposed mitigation work to lower the water level at Thorthormi Lake. Most of the technical specifications were referred from the technical study conducted by Bhutan-Austria team until 2003.

Towards the end of the workshop, Mr. Doley Tshering from UNDP Bhutan made a presentation on Monitoring & Evaluation of the project and Mr. Karma Rapten from UNDP presented on the “Regional GLOF Risk Reduction in the Himalayas” and its synergy with the third component of the present DGM-UNDP/GEF GLOF project, which will be implemented by DMD.

Key Notes from the discussions:

Stakeholders: The meeting agreed that that Ministry of Health shall be included as a stakeholder of the Project. The Project Manager (DGM) will contact the Health ministry and define its roles and responsibilities with regards to the procurement of equipment and other items required to provide field-based health services in Lunana during the project lifetime.

Emergency Evacuation Plan: Participants emphasized the necessity of an evacuation plan for workers in Lunana in case of eventual emergencies occurring in the course of mitigation works. Participants also stressed the need for insurance of workers in Lunana.

Materials Transport: The meeting demanded detailed research on individual transporting options (air, land) for construction materials into the project area. There should be at least 3 quotes for air-based transport options. Operation efficiency at high altitude and in a harsh environment were mentioned as factors impacting transport prices..

International Cooperation: It was suggested to intensify communications with similar projects in other countries, particularly Nepal, to enhance the knowledge base for decision-making in the initiation phase. It was also suggested that cooperation options with research institutions which have had a previous role in GLOF risk assessment in Bhutan, particularly the University of Vienna, are explored.

Project Board Members: It was resolved to include Dasho Dzungdags of the respective target Dzongkhags and the Ministry of Health as additional Project Board members. It was agreed that the Project Manager (DGM) will request all organizations listed in the updated Stakeholder Involvement Plan to nominate representatives for the Project Board. The meeting agreed that representatives should be at senior level, able to make decisions on behalf of their organisations. It was agreed that

the Project Board would not be involved in day-to-day management tasks of the project, but in critical milestone decisions that require joint ownership and collective responsibility.

Technical Support and Advisory Team (TSAT) Members: The meeting agreed that the Director General of DGM should chair the TSAT. Representatives from concerned Dzongkhags, Department of Energy, and Punatshangchu Hydropower Project Authority (PHPA) should be included as additional members of the TSAT.

Project Management Team: The meeting resolved that due to the stronger role of the DoE in expanding the Flooding Early Warning System, DoE will nominate a focal person responsible for implementing the Early Warning System component of the GLOF project. This focal person would act as a third Project Manager, in addition to the Project Managers from DGM and DMD. DGM will therefore be responsible for overall coordination of the Project Management and technical delivery of Outcome 2, DMD will be responsible for implementation of Outcome 1, and DoE will be responsible for implementation of Outcome 3 of the Strategic Results Framework.

Frequency of Project Meetings: It was agreed that a Project Board (PB) and Technical Support and Advisory (TSAT) meeting will be held at the earliest possible time after the inception workshop. The Project Board will meet at least twice per year. The TSAT will meet at least twice a year. Project managers (DGM, DMD, DOE) will meet at least once per month

Early Warning System: It was decided that the EWS component of the GLOF project needs to be stronger aligned with ongoing flood warning initiatives of the Department of Energy (DoE). This decision was made in view of a more comprehensive early warning system in the Punakha valley. The meeting noted that the DOE, through its existing flood warning programmes as well as the Punatsangchhu I project, will mobilize additional resources to establish a more comprehensive Early Warning System. The meeting agreed that this component of the project will therefore be implemented by Department of Energy, and a focal person from the DoE will take responsibility of the respective Project Outcome. A technical and financial proposal on how the already approved EWS setup can be extended, as well as Terms of Reference (TOR) of an additional Project Manager from DoE, will be submitted by the DoE for approval by the first Project Board meeting.

Food rations for project workers: The Project Manager (DGM) informed the meeting that although food rations for field workers in Lunana can be provided in the first year of the project (through co-financing by WWF), no funds for rations from the 2nd year onwards have been budgeted for. It was decided that the project management should prepare a cost estimate for food rations and present it to the Project Board. The possibility of re-appropriating budget from different budget lines will need to be evaluated. The meeting decided that government approval to provide such rations as incentives on top of pay and DSA should be sought, as such a provision would supersede existing government rules.

Labour Recruitment: It was suggested to conduct a health screening during labour recruitment in order to avoid unnecessary complications at the work site. It was decided that a Health Certificate, stating that the individual is fit to work in Lunana (>4000 m above sea level), should be awarded to each recruited worker.

Project Accountant: The meeting agreed that if the government is unable to provide a project accountant, the project management Team should hire accountants on contract for the project term. Project Activities and work plan: The project activities presented by the project manager from DMD and workplan for activities of DGM for 2008-2009 were approved during the inception workshop.

Key decisions:

- The Project Manager (DGM) will evaluate options for Emergency evacuation of workforce from the Lunana project area and ensure that an emergency evacuation plan is in place before mitigation works commence.
- The Project Manager (DGM) will evaluate options for workforce insurance and food rations, based on budget reallocations and sufficiency
- The Project Manager (DGM) will evaluate the costs of airlift-based options for transportation of field equipments and working tools to the site in Lunana
- The Department of Energy will be responsible to install a comprehensive Early Warning System in the project area and ensure that funds provided by the GLOF project are complemented by resources provided by the DoE to ensure a comprehensive solution.
- On the basis of the existing proposal of an Early Warning System that is already summarized in the project document, the DoE will prepare a technical and financial proposal for a redesign of the EWS, considering additional resources available within the DoE to make the EWS more comprehensive.
- In order to reflect DoE responsibility for the Early Warning System component of the project, DoE will nominate a Project Manager and prepare Terms of Reference for approval by the Project Board. These Terms of Reference will follow the format provided by the Project Document. The Project Board will ensure that all Early Warning-related Outputs listed in the Strategic Results Framework (SRF) are covered by specific responsibilities of at least one Project Manager.
- Project Board meetings will take place at least twice per year.
- TSAT meetings will take place at least twice per year.
- Project managers (DGM, DMD, DOE) will meet at least once per month
- Health screenings will be conducted for each worker before he/she is recruited to work on mitigation works in the project area.
- Dasho Dzungdags of the Gasa, Punakha and Wangdue Dzungkhags and the Ministry of Health will be included as members of the Project Board
- The Puna Tsang Chhu Hydro Power Authority (PHPA) will be included as member of the TSAT
- The AWP (2008) for both DGM and DMD were presented and approved. Annual The aggregated Annual Workplan for the first year of project implementation will be summarized as an Annex to the Project Inception Report
- The Project Manager (DGM) will invite institutions listed in the updated stakeholder involvement plan of the project to nominate senior members for the Project Board and TSAT. Initial Project Board and TSAT meetings will be scheduled at the earliest possible time, once membership of these bodies has been confirmed by the respective institutions.

Dates and issues for next meeting

- Project Board Meeting: July 23, 2008 (Morning)
- Approval of AWP for 2008
- Approval of Terms of Reference for Project Managers (DGM, DMD, DoE)
- Approval of transportation strategy, communication setup and process for labor recruitment,
- Approval of food, payment/DSA, health and insurance provisions for field workforce
- Approval of final list of Project Board members & TSAT members
- Decision on project accountant setup

- Review of Early Warning System setup in accordance with an updated proposal by the DoE
- TSAT Meeting: July 23, 2008 (Afternoon)
- Discussion of the engineering and safety plan, including recommendations for additional follow-up action by the Project Management Team
- Definition of ToR for an Engineering and Safety Plan study
- Approval of a final list of TSAT members and its ToRs

Attachments:

List of Participants-1

Meeting Agenda-2

Attachment 1: Participant List

Sl.#	Name	Designation	Agency	Email ID
1	Dasho Nado Rinchen	Deputy Minister	NEC	
2	Dasho Sonam Tshering	Secretary	MoEA	
3	Mr. Nicholas Rosillini	Resident Representative	UNDP	
4	Dorji Wangda	DG	DGM	
5	Gyembo Dorji	Program Officer	DOPH, MoH	gyemdorji2003@hotmail.com
6	Karma Doma Tshering	Sr. Program Officer	DMD, M	karmdt@mohca.gov.bt
7	Jambay Zangmo	Program Officer	GNH Commission	jgangmo@pc.gov.bt
8	Tshering Penjor	Asstt. Program Officer	GNH Commission	tshering@gnhc.gov.bt
9	Lobzang Tenzin	HRO	Gasa Dzongkhag	lozang_tenzin@hotmail.co.uk
10	N.K.Giri	Dy. Executive Engineer	DoR, Thimphu	nnkgiri@yahoo.com
11	Kin Gyeltshen	Chief Finance Officer	Dzongkha Adm	
12	Dago Tshering	Field Coordinator	RSPN	dtshering@rspnbhutan.org
13	Karma Chhophel	Chief Engineer	DoE, MoEA	kensd@druknet.bt
14	Sonam Leki	DCFO	AFD,MoEA	lesonam2007@yahoo.com
15	Sonam Tobgay		Tarayana	tobay_akautn@yahoo.com
16	Jigme Choki	Dz. Env.O	Punakha Dzongkhag	jimiechoki@gmail.com
17	Pema Wangda	BO	Punakha Dzongkhag	pemawada@yahoo.com
18	Gernot Laganda	Regional technical Advisor	UNDP	gernot.laganda@undp.org
19	Christian Mazal	Res. Coord. ACO	ACO	thimphup@ada.gv.at
20	Ramesh Chhetri	Prog. Officer	ACO	thimphu@ada.gv.at
22	Yeshey Penjor	Sr. Eng. Officer	NEC	ypenjor@nec.gov.bt
23	Yeshi Dorji	Specialist	DGM	
24	Karma	Sr. Geologist	DGM	
25	Dowchu Dukpa	Sr. Geologist	DGM	
26	Tashi Tshering	Sr. Geologist	DGM	
27	Chado Rinchen	Sr. Survey Officer	DGM	
28	Wangchu Bida	Executive Assistant	DGM	
29	Neten Wangmo	Adm.Assistant	DGM	
30	Karma Tshering	AEE	PHPA	
31	Gorab Dorji	AEE	PHPA	
32	Karma Raptan	PSO	UNDP	karma.raptan@undp.org
33	Doley Tshering		UNDP	

Attachment 2: Workshop Agenda

Agenda for the GLOF project Inception Workshop

Venue: College of Natural Resources

Date: 17-18 June 2008

16 June 2008

All participants arrive and check in into CNR Guest House / YT Hotel

Dinner will be served at YT Guest House from 1900-2000

17 June 2008

- | | | |
|-------------|-------------|---|
| 1 | 0830 – 0850 | Registration of participants |
| 2 | 0855 | Arrival of Chief Guest |
| 0900 – 1005 | | Opening ceremony |
| 3 | 0900 – 0915 | Marchang ceremony |
| 4 | 0915 – 0925 | Welcome address by Mr. Director General, DGM |
| 5 | 0925 – 0935 | Address by Dasho Sonam Tshering, Secretary, MoEA |
| 6 | 0935 – 0945 | Address by RR, UNDP |
| 7 | 0945 – 0955 | Address by Dasho Nado Rinchen, Deputy Minister National Environment Commission (Chief Guest) |
| 8 | 0955 – 1005 | Vote of thanks by Mr. Chado Rinchen, Head, HQ Support Section, DGM |
| | 1005 – 1035 | Tea break and photo session |
| 9 | 1040 - 1120 | Project Overview by Mr. Dawchu Dukpa, Project Manager, DGM <ul style="list-style-type: none">• Project goals, objectives, budgets• Project log-frame – goal, objectives, outcomes, outputs• Project Organogram, stakeholder involvement plan, etc.• Project board, technical committee• Detailed project AWP Year 1• Project issues and update |
| 10 | 1120 - 1150 | Presentation by Mrs. Karma D. Tshering, DMD Project Manager |
| 11 | 1150 – 1300 | Discussion & decision |
| | 1300 – 1400 | Lunch |
| 12 | 1400 – 1430 | Thorthormi Lake mitigation measures by Mr Yeshi Dorji, PD |
| 13 | 1430 – 1500 | Discussion |
| 14 | 1500 – 1520 | Project reporting and other requirements by Doley Tshering <ul style="list-style-type: none">• Quarterly progress reports, annual reports (PIR)• Financial reporting (FACE reporting)• Lessons documentation, project monitoring and evaluation |
| 15 | 1520 – 1530 | Discussion |
| | 1530 – 1545 | Tea Break |
| 16 | 1545 – 1600 | Presentation on the Regional GLOF project and updates (Karma Rapten, UNDP) |
| 17 | 1600 – 1630 | Discussion |
| | 1900 – 2100 | Closing Dinner and Socials |

18 June 2008

- | | | |
|----|-------------|---|
| | 0800 – 0845 | Breakfast |
| 18 | 0900 - 1200 | Field trip (picnic lunch at Samdingkha) |
- All participants leave after lunch

F.3 Terms of Reference: Project Management

F.3.1 Project Director

The Project Director will be responsible for overseeing project implementation and ensuring that the project goal, objectives, and outputs are achieved. Specific responsibilities include the following:

- Ensure that RGOB inputs to the project are forthcoming in a timely and effective manner
- Supervise consultants and monitor and assess their outputs. Technical endorsement from the Project Director will be essential for release of consulting payments.
- Supervise and provide guidance to the Project Managers in project implementation.

Qualifications

1. Familiar with climate change and adaptation issues in Bhutan and the main actors and stakeholders in this field
2. Proven experience in the implementation of projects regarding glaciers, glacial lakes, and disaster risk reduction
3. Proven ability to lead multi-disciplinary technical teams
4. Excellent working knowledge of spoken and written English
5. Willingness to travel as appropriate

F.3.2 Project Manager (DGM)

The Project Manager from DGM will play a key role in project execution. The Project Manager reports to the Project Director, will receive guidance from the TSAT and PB, and is responsible for the day-to-day management, coordination, and supervision of the overall project implementation. The Project Manager will be appointed by the executing agency and will be in charge and responsible for the following:

- Coordinate project implementation, monitor work progress, and ensure timely delivery of Outputs 1.3, 2.1, 2.2, 2.3, and 2.4
- Liaise with Project Manager, DMD, to ensure project implementation, monitor work progress, and ensure timely deliver of Outputs 1.1, 1.2, 1.4, 3.2, 3.3, and 3.4
- Liaise with Project Manager, DoE, to ensure project implementation, monitor work progress, and ensure timely deliver of Outputs 3.1 and 3.5
- Liaise with relevant stakeholders in Thimphu, Gasa, Punakha, Wangdi, and Bumthang related to activities for the Outputs under DGM's responsibility
- Prepare a detailed work plan for the project at the outset of implementation, in coordination with the Project Manager, DMD & DoE, and revise at least annually
- Organize and conduct stakeholder meetings, technical trainings, and others as necessary
- Liaise with experts to provide technical input on early warning, GLOF mitigation, disaster preparedness, and climate change for the development of guidelines, training materials, public awareness materials, and others as necessary

- Assist in the identification, selection and recruitment of consultants and other experts for the Outputs under DGM responsibility
- Supervise, coordinate, and facilitate the work of all national and international consultants retained for the different activities related to the Outputs listed above
- Participate in PB meetings and follow up on the outcomes of such meetings and report on progress related to the Outputs under DGM's responsibility
- Control expenditures and assure adequate management of resources for the overall project
- Prepare technical specifications for equipment required for the project and manage procurement for Outputs under DGM's responsibility
- Identify relevant, on-going activities by other government and non-government agencies, and establish linkages
- Build partnerships with international/regional institutions and national organizations
- Prepare technical progress reports and other monitoring reports as described in the M&E plan for the overall project, with inputs from the Project Manager, DMD & DoE. Reports should contain assessments of progress in implementing activities, including reasons for delays, if any, and recommendations on necessary improvements

Qualifications

Understanding of climate change, adaptation, GLOFs, and disaster management issues in Bhutan and the main actors and stakeholders in this field

1. Proven experience with the implementation of development projects, particularly in the field of disaster risk reduction and water management
2. Proven ability to manage, monitor, and troubleshoot comparable projects
3. Excellent working knowledge of spoken and written English
4. Willingness to travel as appropriate

F.3.3 Project Manager (DMD)

The Project Manager from DMD will play a key role in project execution. The Project Manager is responsible for the day-to-day management, coordination, and supervision of the project implementation for select Outputs as detailed below. The Project Manager, DMD, will be appointed by the executing agency. S/he will receive guidance from the Project Director, TSAT, and PB, and will be in charge and responsible for the following:

- Coordinate project implementation, monitor work progress, and ensure timely delivery of Outputs 1.1, 1.2, 1.4, 3.2, 3.3, and 3.4
- Liaise with relevant stakeholders in Thimphu, Gasa, Punakha, Wangdi, and Bumthang related to activities for the Outputs under DMD's responsibility
- Prepare a detailed work plan for the Outputs above at the outset of implementation, in coordination with the Project Manager, DGM, and revise at least annually
- Liaise with the Project Manager, DoE, to incorporate technical input on early warning, GLOF mitigation, disaster preparedness, and climate change for the development of guidelines, training materials, public awareness materials, and others as necessary
- Assist in the identification, selection and recruitment of consultants and other experts for the Outputs above
- Supervise, coordinate and facilitate the work of all national and international consultants retained for the different activities related to the Outputs listed above

- Participate in PB meetings and follow up on the outcomes of such meetings and report on progress related to the Outputs above
- Control expenditures and assure adequate management of resources for the Outputs above
- Identify relevant, on-going activities by other government and non-government agencies, and establish linkages
- Build partnerships with international/regional institutions and national organizations
- Provide input to the Project Manager, DGM, for technical progress reports and other monitoring reports as described in the M&E plan for the overall project. Reports should contain assessments of progress in implementing activities, including reasons for delays, if any, and recommendations on necessary improvements

Qualifications

1. Familiar with climate change, adaptation, and GLOF issues in Bhutan
2. Understanding of disaster management and capacity building needs and methodologies appropriate for stakeholders in Bhutan
3. Familiar with the main actors and stakeholders in this field
4. Proven experience with the implementation of development projects, particularly in the field of disaster risk reduction
5. Proven ability to manage, monitor, and troubleshoot comparable projects
6. Excellent working knowledge of spoken and written English
7. Willingness to travel as appropriate

F.3.4 Project Manager (DoE)

The Project Manager from DOE will play a key role in project execution. The Project Manager is responsible for the day-to-day management, coordination, and supervision of the project implementation for select Outputs as detailed below. S/he will receive guidance from the Project Director, TSAT, and PB, and will be in charge and responsible for the following:

- Coordinate project implementation, monitor work progress, and ensure timely delivery of Outputs 3.1 and 3.5
- Liaise with relevant stakeholders in Thimphu, Punakha, and Wangdi related to activities for the Outputs under DoE's responsibility
- Prepare a detailed work plan for the Outputs above at the outset of implementation, in coordination with the Project Manager, DGM, and revise at least annually
- Assist in the identification, selection and recruitment of consultants and other experts for the Outputs above
- Supervise, coordinate and facilitate the work of all national and international consultants retained for the different activities related to the Outputs listed above
- Participate in PB meetings and follow up on the outcomes of such meetings and report on progress related to the Outputs above
- Control expenditures and assure adequate management of resources for the Outputs above
- Identify relevant, on-going activities by other government and non-government agencies, and establish linkages
- Build partnerships with international/regional institutions and national organizations
- Provide input to the Project Manager, DGM, for technical progress reports and other monitoring reports as described in the M&E plan for the overall project. Reports should

contain assessments of progress in implementing activities, including reasons for delays, if any, and recommendations on necessary improvements

Qualifications

1. Familiar with climate change, adaptation, and GLOF issues in Bhutan
2. Understanding of disaster management and capacity building needs and methodologies appropriate for stakeholders in Bhutan
3. Familiar with the main actors and stakeholders in this field
4. Proven experience with the implementation of development projects, particularly in the field of disaster risk reduction
5. Proven ability to manage, monitor, and troubleshoot comparable projects
6. Excellent working knowledge of spoken and written English
7. Willingness to travel as appropriate

F.4 Terms of Reference: Multi-disciplinary team

F.4.1 Team Leader

The team leader will be leading the multi-disciplinary for the execution of the engineering and safety plan and mitigation work. S/he shall carry out the following activities:

First Year (2008)

- Coordinate all the activities pertaining to the field work
- Supervise all the works at site
- Carry out site work plan
- Carry out selection of site for labour camp, stores and base camp
- Over see site Administration
- Monitor labour deployment
- Be part of the pay committee that will be formed by the management
- Compile and submit over all report to the project management by end of December 2008

2009-2012

- Continue all above mentioned responsibilities
- Provide decisions on any changes required at the work site on technical matters in consultation with the technical team and inform the Project management
- Submit fortnightly progress report to the project management.
- Ensure the safety measures spelt out in the technical report and recommendations are implemented
- Maintain all records on non technical activities
- Submit report on work progress, challenges and issues by mid-December every year to the Project Management

F.4.2 Civil Engineer

The civil engineer will prepare the engineering and safety plan for the excavation of the Thorthormi Lake outlet channel. S/he shall be responsible for accomplishing the following tasks:

First Year (2008)

- Review studies carried out by DGM-Austrian team pertaining to mitigation of Thorthormi lake
- Study the various options suitable for mitigation works.
- Select site for the construction of the channel in consultation with engineering geologist, Geophysicists, glaciologist.
- Design of the open channel with details on the bottom width, top width and the side slopes to maintain stability of the channel.
- Provide the engineering safety measures for executing the mitigation works.
- Work out the year-wise out put.
- Report submission to the Team Leader by mid-December 2008.

2009- 2012

- Supervise the construction work at site.

- Indent for required tools and manpower to the team leader.
- Record daily progress and submit to the team leader for onward submission to the project management.
- Provide daily cross sections
- Carry out updating of the design in consultation with the Engineering Geologist and the Team Leader.
- Submit yearly report on the spillway construction to the Team Leader by December every year till the completion of the project.

F.4.3 Medical Doctor

The medical doctor will coordinate with the team members and shall carry out the following medical related services at the project site:

First Year (2008)

- Provide basic medical services to the team
- Indent the basic medical requirements for more than 300 people working at Lunana for four months and submit to the project management through the team leader by mid-December 2008

2009-2012

- Arrange medical facilities in line with the indent prepared in 2008 in consultation with project management.
- Conduct health screening for the workers prior to recruitment
- Provide basic medical services
- Submit yearly medical report to the team leader by December every year till the completion of the project.

F.4.4 Representative from Gasa Dzongkhag, Ministry of Home and Cultural Affairs

The representative from Gasa Dzongkhag, MoHCA will coordinate with the team and the project management in providing the following assistance:

2008-2012

- Recruitment of labourers
- Transportation
- Any other logistic arrangements as and when required by the Team Leader

F.4.5 Engineering Geologist

The engineering geologist will play a key role in the assessment of moraine dam stability and determine the best location for outlet channel excavation. The following are primary duties of the engineering geologist during the engineering and safety plan as well as during the mitigation phase:

First Year (2008)

- Detailed investigation on the end moraine and the left lateral moraine to
 1. determine the engineering properties of the material.

2. assess the stability of the barrier.
 3. map weak zones, seepages, abandoned channels.
 4. assess the stability of the barrier between Thorthormi and Raphstreng.
 5. elevation difference between the present outlet and the old channel.
- Prepare site work plan and submit to Team leader for necessary coordination.
 - Indent labour and tools requirement to the Team Leader.
 - Assess the most critical barrier for spillway construction.
 - Submit report to the Team Leader by mid-December 2008.

2009-2012

- Provide engineering Geological inputs for safe and stable spillway.
- Actively participate in decision making forums at site pertaining to the construction works.
- Assess the stability of the channel and record different geological settings during the construction.
- Monitor the release of water from the reservoir during the construction.
- Record any changes in the geotechnical parameters during the construction.
- Submit report on geotechnical issues to the Team Leader by December yearly till the completion of the project.

F.4.6 Survey Officer

The survey officer will be responsible for topographic survey of the site and s/he will also work in coordination with the geophysicist, engineering geologist and the civil engineer for laying of profiles. The main roles of the survey officer will be as shown below:

First Year (2008)

- Collect available existing information before proceeding to the field
- Carry out topographical survey of the Thorthormi area in coordination with the team leader and technical team
- Prepare cross-sections as per the requirement of the civil engineer and engineering geologist
- Collect data for geophysical profiles as per the requirement of the Geophysicist
- Prepare map and submit report to the team leader by mid-November 2008
- Set up the necessary bench mark for future reference
- Prepare a stability map of the site using GIS techniques in coordination with the engineering geologist, team leader and civil engineer

2009-2012

- Collect necessary information as per instruction of the team leader, civil engineer and engineering geologist
- Submit report to the team leader weekly on the progress of the cross-sections of the channel

F.4.7 Geophysicist

The geophysicist will conduct geophysical methods such as electrical resistivity and seismic refraction to confirm the presence/absence of dead ice in the subsurface of the moraine dam and thickness of the morainic material above the ice core, especially at the excavation point. The following are main responsibilities of the geophysicist:

First Year (2008)

- Make necessary preparations such as testing equipments and check list of items before proceeding to the field work
- Carry out geophysical survey (refraction seismic and resistivity) in coordination with the technical team
- Coordinate with the blaster and be responsible while using explosives for seismic survey
- Prepare report and submit to the team leader by Mid-December 2008

F.4.8 Geologist

The geologist will play vital role in collection of geological information of the site and s/he shall also assist and carry out other assignments as per team leader's instruction. The following are main roles of the geologist:

2008-2012

- Assist the team leader in over all project activities including transportation arrangements and other necessary preparations before proceeding to the field
- Collect geological information and carry out other assignments as per team leader's instruction
- Prepare report and submit to the team leader by mid-December 2008

F.4.9 Store In-Charge, Head Quarter

The Department of Geology and Mines has a head quarter store incharge who looks after all store related activities of department. It has been agreed that the HQ store incharge will also look after the project store and be responsible for the following:

2008-2012

- Inspect and receive goods as per supply order
- Maintain stock entry of all the procurements made under the project
- Issue items based on requisition form approved by the project management and keep proper record
- Submit inventory list to the project management by mid-December every year
- Be responsible for overall management of the store

F.4.10 Store In-Charge, Site

A site store incharge will be appointed during the mitigation phase by the project management in consultation with the team leader. S/he shall be responsible for the works related to stores at the site:

- Inspect and receive goods at the site as per the list from the Head Quarter Store Incharge
- Maintain stock entry of all the items at the site
- Issue items based on approval from the team leader
- Submit store record to the team leader at beginning and at the end of field work every year
- Be responsible for overall management of the store at the site

F.4.11 Blaster (for Seismic Investigation)

Since our geophysicist is not trained in handling explosive, a trained blaster from DGM will be assist the geophysicist in conducting the seismic survey and be responsible for the following activities related to the explosive handling:

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- Be responsible for handling and transportation of explosives to the site
- If required, obtain all necessary approval and formalities for using explosives in coordination with the geophysicist
- Ensure safety measures are emplaced while handling explosives
- Assist the geophysicist in preparation of seismic survey and other works as and when required by the geophysicist
- Coordinate and inform the team leader prior to activities involving blasting at the site