



**PROJECT DEVELOPMENT FACILITY
REQUEST FOR PDF B APPROVAL**

AGENCY'S PROJECT ID: 3722
GEFSEC PROJECT ID:
COUNTRY: Bhutan
PROJECT TITLE: Reduce climate change-induced risks and vulnerabilities from glacial lake outbursts in the Punakha-Wangdi and Chamkhar Valleys
GEF AGENCY: UNDP
OTHER EXECUTING AGENCY (IES): Department of Geology and Mines (DGM) of the Ministry of Trade and Industry, Bhutan
DURATION: 6 months
GEF FOCAL AREA: Climate Change
GEF OPERATIONAL PROGRAM:
GEF STRATEGIC PRIORITY: Least Developed Country Fund (LDCF)
ESTIMATED STARTING DATE: December 2006
Estimated End Date: May 2007

| FINANCING PLAN (US\$) | |
|---|------------------|
| GEF ALLOCATION | |
| Project | 3,455,050 |
| Project Co-financing | 3,496,224 |
| PDF A* | |
| PDF B** | 180,000 |
| PDF C | |
| <i>Sub-Total GEF PDF</i> | 180,000 |
| PDF Co-Financing (details provided in Part II, Section E – Budget) | |
| GEF Agency | 180,000 |
| National Contribution | 30,000 |
| Others | 220,000 |
| <i>Sub-Total PDF Co-financing:</i> | 250,000 |
| <i>Total PDF Project Financing:</i> | 430,000 |

* Indicate approval date of PDF A

** If supplemental, indicate amount and date of originally approved PDF

RECORD OF ENDORSEMENT ON BEHALF OF THE GOVERNMENT :

Mr. Sonam Wangchuk
Director General and GEF OFP, Dept., of Aid and Debt Management, Ministry of Finance, Royal Government of Bhutan.

July 7, 2006

This proposal has been prepared in accordance with GEF policies and procedures and meets the standards of the GEF Project Review Criteria for approval.

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Annex: Acronyms

| | |
|--------|--|
| BCPR | Bureau of Crisis Prevention and Recovery |
| CBDRM | Community-Based Disaster Risk Management |
| COP | Conference of Parties |
| CRED | Centre for Research on the Epidemiology of Disasters |
| DGM | Department of Geology and Mines |
| DLG | Department of Local Governance |
| DRM | Disaster Risk Management |
| EWS | Early Warning System |
| FSP | Full-Size Project |
| GEF | Global Environment Facility |
| GLOF | Glacial Lake Outburst Flood |
| GIS | Geographic Information System |
| ICIMOD | International Center for Integrated Mountain Development |
| LDC | Least Developed Country |
| LDCF | Least Developed Country Fund |
| MoHCA | Ministry of Home and Cultural Affairs |
| NAPA | National Adaptation Programme of Action |
| NCAP | The Netherlands Climate Assistance Programme |
| PDF | Project Development Fund |
| RGoB | Royal Government of Bhutan |
| UNDP | United Nations Development Programme |
| UNFCCC | United Nations Framework Convention on Climate Change |
| WCDR | World Conference on Disaster Reduction |

PART I - PROJECT CONCEPT

A - SUMMARY

1. In May 2002, the GEF Council approved the operational guidelines for funding the preparation of National Adaptation Programmes of Action (NAPA). In addition to supporting National Communications to the UNFCCC, the NAPA is designed to assist Least Developed Countries (LDCs) to build capacity for addressing urgent and immediate adaptation needs. Proposed NAPA activities focus on those actions whose further delay could increase vulnerability, or lead to increased economic, social and environmental costs at a later stage¹.
2. This project has emerged from the recently concluded NAPA process in Bhutan. The methodology used to develop the NAPA was a widely consultative process involving stakeholders at the national and regional levels. Senior and mid-level professionals representing a wide range of stakeholders – agriculture, forestry, livestock, environment, roads, health, geology and mines, finance, planning and home affairs – participated in numerous workshops and training sessions held to develop NAPA project priorities and profiles. A NAPA task force, with representation from five key sectors, was created from amongst the stakeholders. This multidisciplinary NAPA task force deliberated at each step of the NAPA formulation process starting with inception training workshops and familiarisation of the process to national and regional consultations and, finally, to prioritisation or ranking of project options for developing project profiles.
3. Regional consultations were held at Phuntsholing, Lobeysa, Bumthang and Trashigang, covering all 20 *dzongkhags* (districts). At these consultations, a group of cross-sector representatives from each *dzongkhag* (including local community leaders, namely *Gups* or *geog* heads and *Chimis* or people's representatives) attended and deliberated on the range of anticipated climate change vulnerabilities and adaptation options presented by the task force members.
4. Bhutan experiences a number of natural hazards annually, including climate-induced disasters such as landslides and floods, which result in extensive damage. Climate change is likely to further exacerbate some of the natural hazards to which Bhutan is prone and lead to significant additional impacts (either in terms of severity or frequency) on the country's development pathway. A majority of Bhutan's population and infrastructure development is concentrated in large river valleys. The economy is highly dependent on hydropower resources, with revenue from hydropower export to India constituting 45% of the country's revenue². A major, climate-induced natural disaster could cause great human and economic devastation.
5. Of the natural hazards to which Bhutan is prone, none is more significant than that of climate change impacts on glaciers. Bhutan's entire northern upper land has glacier/snow-fed lakes in the mountaintops. Rising mean temperature, attributed by the scientific community to climate change, is the main cause of glacial retreat. Recent studies suggest the rate of glacial retreat in the Himalayas is as high as 30 to 60 metres per decade³. The melting of glaciers is leading to the volumes of water in downstream glacial lakes increasing at an alarmingly rapid rate. The concern is that when the current holding capacity of the lakes reaches a critical threshold, loose glacial debris that act as dams or

¹ Note on GEF, Support for NAPAs, May 8, 2002, GEF/C.24/Inf.7

² Bhutan NAPA Document, Final Draft Copy, August 2005

³ D. Cyranoski, The Long-range Forecast, *Nature*, vol. 438, November 2005

barriers could fail and lead to flash floods that result in severe adverse impacts on downstream communities.

6. An Inventory of Glaciers, Glacial Lakes and Glacial Lake Outburst Floods (GLOFs) in Bhutan, prepared by a team of Bhutanese and foreign experts in 2001⁴, identified 677 glaciers and 2,674 glacial lakes. The study also revealed a total of 24 glacial lakes posing potentially high risk for GLOFs. Eight of these 24 lakes are located in the Pho Chhu Sub Basin and three are located in the Chamkhar Chhu Sub Basin.
7. A team of experts from Bhutan's Department of Geology and Mines (DGM) and the Institute of Geology of the University of Vienna carried out detailed field assessments in the headwaters of the Pho Chhu Sub Basin. They found a serious and immediate threat of GLOF from the Thorthormi and Raphstreng lakes⁵. Several interconnected supraglacial lakes are observed near the terminus of the Thorthormi glacier. Due to rapid melting of the glacier, these lakes are expanding into one large proglacial lake. The worst-case scenario projects the collapse of the wall separating the Thorthormi and the Raphstreng Lakes as early as 2010. This could result in a massive GLOF with a flow of over 53 million cubic meters of water. This is more than twice the volume of the 1994 GLOF event that caused huge devastation downstream.
8. These two Sub Basins – Pho Chhu and Chamkar Chhu – represent the two most GLOF-vulnerable areas in the country at the present time and pose a major threat to life and infrastructure in downstream communities in the Punakha-Wangdi and Chamkhar valleys respectively. A sizable concentration of the Bhutanese population lives in these two valleys. The Pho Chhu flows into Puna Tshang Chhu, the country's longest river, along which there are emerging townships, important historical structures, major hydropower projects, a sizable percentage of the country's agricultural farmland and public infrastructural projects. The Chamkhar valley is an important emerging urban, tourist and economic hub.
9. The Pho Chhu Sub Basin was seriously impacted by GLOFs in 1957, 1960 and 1994. The GLOF in 1994 was especially devastating to the Punakha-Wangdi valley. There are virtually no written records of the 1957 and 1960 GLOFs. The 1994 GLOF damaged more than 1,700 acres of agriculture and pasture land, washed away five mills and 16 yaks, destroyed six tons of food grains, washed away houses, caused critical infrastructure damage and killed 22 people.
10. Taking into consideration all the different dimensions of climate vulnerability, the NAPA process in Bhutan recommended a disaster management strategy as their top priority, followed by lowering of the waters of the Thorthormi Lake to mitigate the immediate threat posed by the Thorthormi and Raphstreng Lakes as the second priority.
11. GEF funding is requested for developing a Full-Size Project (FSP) to respond directly to the priorities identified during the NAPA process. The UN Country Team will take the lead on integrating Disaster Risk Management (DRM) strategies into Bhutan's planning process⁶ while the GEF Least Developed Country Fund (LDCF) funding will focus on complementing the DRM integration with the artificial lowering of the Thorthormi Lake waters, vulnerability assessments and an Early Warning System. The LDCF will fund the top (unfunded) priority identified in the NAPA process.

⁴ The inventory was prepared under the aegis of the International Center for Integrated Mountain Development (ICIMOD) and in cooperation with the United Nations Environment Programme Regional Resource Center for Asia and the Pacific, 2001.

⁵ Glacial Lakes and Their Outburst Flood Assessment in the Bhutan Himalaya, 2002

⁶ UN Strategy Policy Brief: Strengthening Disaster Risk Management Capacities in Bhutan

12. The entire DRM integration project will concentrate on the two most vulnerable areas, Punakha-Wangdi Valley and the Chamkhar Valley, with a strong mandate to replicate the DRM framework through the rest of the country.
13. The goal of the FSP is to “enhance adaptive capacity to climate change–induced disaster impacts in Bhutan”. As a contribution to the achievement of this goal, the project objective is to “reduce climate change-induced risks and vulnerabilities from glacial lake outbursts in the Punakha-Wangdi and Chamkhar Valleys”.
14. In order to fulfil the objective, the project will focus on the following outcomes:
 - a. DRM capacities in the Punakha-Wangdi and Chamkhar Valleys strengthened;
 - b. Artificial lowering of Thorthormi Lake waters implemented;
 - c. An Early Warning System for the Punakha-Wangdi Valley installed.
15. The PDF-B phase of the project will implement a number of activities. These include creating a GLOF hazard zonation and mapping vulnerability assessment for the Chamkhar Valley and lower Punakha-Wangdi Valley areas, an assessment of the most effective Early Warning Systems for GLOF preparedness as well as preparation of the FSP Executive Summary document and the UNDP Project document for submission to GEFSEC for approval.

B - COUNTRY OWNERSHIP

B.1. Country Eligibility

16. Bhutan, one of the 48 LDCs, is a Party to the United Nations Framework Convention on Climate Change (UNFCCC), having ratified it on August 25, 1995.

B.2. Country Drivenness

17. In 2005, the National Environment Commission Secretariat undertook a series of stakeholder consultation and prioritisation exercises to formulate the NAPA to respond to climate change threats. The proposed project has emanated from the NAPA process.
18. The proposed project relates well to the Initial National Communication to the UNFCCC prepared in 2000. The National Communication highlights GLOFs as a major threat due to climate change and recommends improved information on natural disaster risks and enhanced capability to predict GLOFs and increase preparedness.
19. In the context of the country's overall national development goals and objectives, the proposed project will contribute to the socio-economic development and environmental sustainability objectives envisioned in Bhutan 2020, a vision document to maximise Gross National Happiness – a distinctive Bhutanese philosophy which guides the development process in the country.
20. The Ninth Five Year Plan (July 2002-June 2007) features “building an inventory of geological, engineering geology and geo-hazard maps” and “mitigating natural disasters resulting from natural hazards” among the key objectives for the mineral resources and geotechnical services sector. The project will contribute to these sectoral objectives.

C – PROGRAM AND POLICY CONFORMITY

C.1. Program Designation and Conformity

21. The proposed project conforms to the LDCF criteria for GEF climate adaptation projects. The LDCF, initiated at the COP-8, was created with the objective of funding NAPAs for identifying urgent and immediate adaptation needs in LDCs.
22. At the 9th session of the COP, further guidance was provided for the operation of the LDCF. It called for the fund to support the implementation of NAPAs as soon as possible after their completion. The decision specifically promoted the integration of adaptation measures in national development and poverty reduction strategies, plans or policies, with a view to increasing resilience to the adverse effects of climate change⁷. The LDCF calls for funding of the top-priority projects identified in the NAPA process. The FSP that will be developed in Bhutan targets the top (unfunded) priority identified in the NAPA process.
23. The biggest impact of climate change being observed in Bhutan is accelerated retreat of glaciers resulting in formation of supraglacial lakes that may ultimately result in GLOF disaster events. Recognising the need for systematising the DRM system in the country, since late 2004, the Royal Government of Bhutan has, with the support of the UNDP, started to formalise such a system. In January 2005, a multi-stakeholder consultation on

⁷ COP 9, Guidance on Implementation of NAPAs, recalling decision 6/CP.9.

disaster issues was organised for the first time. Presently, the Royal Government of Bhutan, with the support of UNDP, has been developing a national framework for strengthening the DRM system in the country⁸.

C.2. Project Design

24. Climatic seasonal variations are becoming more pronounced in Bhutan. Studies show greater variability in rainfall and temperature over the past decade. Reliable hydro-meteorological data exists for a period of 10-12 years, allowing for an analysis of climate fluctuations from 1990-2003. Temperatures for 1998-2002 were above the 1990-2003 mean value. On average, air temperatures in the Himalayas are 1°C higher now than in the 1970s, rising by 0.06°C per year⁹. Bhutan gets its rain from the Indian summer monsoon cycle. The period from 1990-2003 has seen high rainfall in the years 1998, 2000 and 2002, while Bhutan was hit by a drought in 2001, further stressing the need for planning for larger climatic variability in the future¹⁰. With increasing seasonal precipitation variability, the threats of monsoonal rain flooding and rain triggered landslides have increased. Bhutan experienced massive flooding and landslide disasters in 2000, 2003 and 2004¹¹. Vulnerability to climatic risks and natural disasters is growing rapidly in Bhutan.
25. Scientists tracking the impact of climate change on Himalayan glaciers have observed glaciers retreating at an alarming rate over the past couple of decades¹². The glaciers in Bhutan are receding at a rate of almost 30 to 60 meters per decade. The melting ice from these receding glaciers is increasing the volume of water in glacial lakes, pushing the hazard risk for GLOFs to critical levels.
26. Detailed assessments of the hazard potential of GLOFs have identified the Thorthormi and Raphstreng glaciers and their lakes to have a high probability of a worst-case scenario, with a GLOF originating in the Thorthormi area by 2010.
27. The World Conference on Disaster Reduction (WCDR), held in January 2005 in Kobe, Hyogo, Japan, adopted a “Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters”. It underscored the need for, and identified ways of, building the resilience of nations and communities to disasters¹³. Following the WCDR, the Royal Government of Bhutan, with the support of UNDP, has developed the National Disaster Risk Management Framework for strengthening the DRM system in the country¹⁴.
28. The NAPA process, taking all climate change priorities and current initiatives into consideration, initially made a list of 55 projects. These were narrowed down to 20 and then, using the agreed criteria that best suited Bhutan’s unique conditions, the NAPA

⁸ UN Strategy Policy Brief: Strengthening Disaster Risk Management Capacities in Bhutan.

⁹ Shrestha A.B. *et.al.*, Maximum temperature trends in the Himalayas and its vicinity, *Journal of Climate*, Vol.12, 2775-2787, 1999.

¹⁰ Dewan Abdul Quadir, Md. *et.al.*, Climatic Characteristics of Temperature and Precipitation of Bhutan, SAARC Meteorological Research Center, Dhaka, Bangladesh.

¹¹ Centre for Research on the Epidemiology of Disasters (CREED) Em -Dat database for Natural Disasters.

¹² WWF, (2005). An Overview of Glaciers, Glacier Retreat, and Subsequent Impacts In Nepal, India and China, WWF Nepal Synthesis Paper.

¹³ UN ISDR, Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters, Preamble 1.1, January 2005.

¹⁴ UN Strategy Policy Brief: Strengthening Disaster Risk Management Capacities in Bhutan.

team came up with the following nine prioritised proposed projects that address the country's climate change vulnerability and aim to increase their adaptive capacity¹⁵:

- Disaster Risk Management Strategy;
- Artificial Lowering of Thorthormi Glacial Lake;
- Weather Forecasting System to serve Farmers and Agriculture;
- Landslide Management and Flood Prevention (Pilot Schemes in Critical Areas);
- Flood Protection of Downstream Industrial and Agricultural Area;
- Rainwater Harvesting;
- GLOF Hazard Zoning (Pilot Scheme – Chamkhar valley);
- Installation of Early Warning System in Punakha-Wangdi valley;
- Promote Community-based Forest Fire Management and Prevention.

29. The NAPA process identified Disaster Risk Management Strategy as the top priority project and the lowering of the waters of Thorthormi Lake as the second-highest priority project for climate change adaptation in Bhutan.
30. The UNDP Bureau of Crisis Prevention and Recovery (BCPR) is developing a DRM system for Bhutan that will begin to address a comprehensive DRM strategy. The proposed FSP will specifically focus on climate-induced disasters for the DRM programme. It will focus on lowering of the waters of the Thorthormi Lake and an Early Warning System for the Punakha-Wangdi Valley by fulfilling the second priority for climate change adaptation in Bhutan.
31. Taking into consideration these immediate and long-term climate change-induced disaster risks, the proposed project is being designed as an integrated DRM programme in the two most vulnerable areas, the Punakha-Wangdi and Chamkhar Valleys. The integrated DRM programme, along with the two main priorities identified in the NAPA process, also encompass several components of the different prioritised projects from the NAPA process, including the hazard zonation project for the Chamkhar and the lower Punakha-Wangdi Valleys and an Early Warning System for the Punakha-Wangdi Valley.
32. Without a comprehensive DRM in place, the impacts of a GLOF event could be very severe. The current Early Warning System in place relies on a basic manual system of personnel equipped with wireless phones keeping a watch at specific locations along the main rivers. In case of a flood, the person upstream sounds an alarm through the phone system.
33. The biggest problem of the current Early Warning System is that it could prove ineffective if downstream stations remain unattended at the time of a flood. As a result, communities and the government downstream could be caught unawares, causing huge damage to life and property. The current Early Warning System will need to be overhauled to have a functioning system in place that is technically sound to trigger an alarm at all times and one that is equipped to have a strong social response mechanism once the alarm has been sounded.
34. Hazard zoning and vulnerability mapping will identify multiple hazard risks to communities in these two valleys. GLOFs, as the main climate change-induced hazard risk, will be integrated into the planning and development process of the two valley areas of Punakha-Wangdi and Chamkhar.
35. The Royal Government of Bhutan recently developed the National Disaster Risk Management Framework. The Department of Local Governance within the Ministry of

¹⁵ Executive Summary, National Adaptation Programme of Action, Bhutan, August 2005, Final Draft.

Home and Cultural Affairs is nodal agency for coordinating disaster preparedness and response operations in the country. Other ministries and departments at the national level deal with different issues relevant to disaster risk management as a part of their regular functioning. Despite the progress made so far, there is a need to step up disaster risk reduction and preparedness as climate change impacts increase and communities become more vulnerable to potential disaster risks.

36. Recognising the need to systematise DRM and integrate it into the development and planning strategy for the country, the FSP aims to develop a framework for strengthening disaster risk reduction and preparedness for climate change-induced disasters in the two most vulnerable areas of Bhutan, the Punakha-Wangdi and the Chamkhar Valleys. The integrated DRM approach will help develop institutional, legislative and policy frameworks and capacity for the national, intermediate (*Dzongkhags*) and local (*Geogs*) levels, develop technical capabilities for better preparedness and response mechanisms, initiate community-based DRM programmes and integrate DRM linkages with other development sectors.
37. The FSP will focus on the following components: (a) capacity building for climate change-induced DRM at the national, intermediate and local levels amongst various stakeholders, (b) artificial lowering of waters from the Thorthormi Lake, and (c) installation and operationalisation of an effective Early Warning System in the Punakha-Wangdi Valley, in order to create an integrated DRM programme in the Punakha-Wangdi and Chamkhar Valleys.
38. The goal of the FSP is to “enhance adaptive capacity to climate change–induced disaster impacts in Bhutan”. As a contribution to the achievement of this goal, the project objective is to “reduce climate change-induced risks and vulnerabilities from glacial lake outbursts in the Punakha-Wangdi and Chamkhar Valleys”.
39. In order to fulfil the objective, the project will focus on the following three outcomes:
 - Capacities for DRM, for climate change-induced disasters, in the Punakha-Wangdi and Chamkhar Valleys strengthened;
 - Artificial lowering of Thorthormi Lake waters implemented;
 - An Early Warning System for the Punakha-Wangdi Valley installed.
40. **Outcome 1: Capacities for DRM, for climate change-induced disasters, in the Punakha-Wangdi and Chamkhar Valleys strengthened :**
41. UNDP-BCPR, in compliance with the UN Strategy for Disaster Risk Management and the Hyogo Framework for Action to build resilience against disaster risk, will support the strengthening of DRM capacity at various levels of government and amongst all stakeholders. Following the WCDR in January 2005, the Royal Government of Bhutan, with support of the UNDP, began developing a national framework for DRM. The next stage will involve development of institutional structures and policy frameworks to support a comprehensive DRM system. The DRM initiative will ensure that baseline needs with respect to DRM are addressed. The estimated baseline cost is US\$600,000. The Government, bilaterals and other UN agencies will contribute towards this baseline cost.
42. In the interest of establishing an integrated approach to DRM, it is necessary to identify and incorporate disaster risk, climate change and development planning needs within a coherent framework. Overcoming institutional barriers (structural, managerial, information, financial) is required to facilitate the integration of experience, information and knowledge of development, climate change and DRM expertise. Long-term

sustainability will require local capacity in climate change sensitive DRM as well as information to be developed. Synthesised information and capacities on hazards, vulnerabilities and risks need to be developed and vulnerable communities trained in community-based DRM. The latter will include the creation of “Safe Areas” and disaster simulation exercises. Therefore, ensuring climate change concerns are reflected in DRM in the Punakha-Wangdi and Chamkhar Valley areas is an additional cost to the current baseline. The estimate of the additional cost, for which GEF funding is requested, is US\$600,000.

43. The outputs from this outcome are:
- 1.1 Developed institutional, legislative and policy frameworks for climate-resilient DRM;
 - 1.2 Built capacities at intermediate and local levels for climate-resilient DRM;
 - 1.3 Synthesised information and capacities on climate hazards, vulnerabilities and risks;
 - 1.4 Vulnerable communities trained in community-based, climate-resilient DRM;
 - 1.5 Created “Safe Areas” and disaster simulation exercises in face of climate change.

44. Outcome 2: Artificial lowering of Thorthormi Lake waters implemented:

Baseline without GEF support

45. Identified as the top (unfunded) priority need for adaptation under the NAPA process, the Thorthormi Lake waters will be artificially lowered. Currently, baseline activities to address the risks imposed by climate-induced rising water levels in the Thorthormi Lake are limited. At present, the Bhutanese government is unable, on its own, to bear the total cost of reducing the threat of flooding from rising water levels. The baseline costs incurred have focused on studies on glacial lakes and potential threats along with detailed planning of stability analysis and alternatives for lowering of lake waters. The Government, together with bilaterals and other UN agencies, have made a commitment of US\$2,756,224 towards other baseline development activities.

GEF Alternative Scenario

46. In order to address the climate change-induced pressure brought to bear on the population in the region (in terms of increased risk of flooding), the lowering of the lake waters is an additional cost. It is a cost that is directly a result of adapting to a climate change-induced threat. Without this additional expenditure complementing baseline development costs, there is a high risk of the stability of the Thorthormi Lake being compromised and causing a major GLOF disaster by 2010. The additional cost of this outcome, for which GEF Funding is requested, is approximately US\$1,934,850.
47. The outputs from this outcome are:
- 2.1 Water diversion and outlet channels built and functioning;
 - 2.2 Lowered water levels of Thorthormi Lake;
 - 2.3 Local staff trained to monitor and maintain artificial lowering system;
 - 2.4 Documented knowledge and experience in artificial lowering of lake waters to use in future projects.

48. Outcome 3: Early Warning System for the Punakha-Wangdi Valley installed:

Baseline without GEF support

49. Currently, there has been limited progress towards the establishment of hazard/vulnerability zones. In part, this has been due to insufficient information. This has somewhat been addressed through a hazard zonation and vulnerability mapping exercise conducted on the upper Punakha-Wangdi Valley in 2002. Beyond that, little else has taken place. The baseline cost of establishing hazard/vulnerability zones, to be met by Government, bilaterals and other UN agency contributions, is estimated at US\$140,000.

GEF Alternative Scenario

50. Serving both immediate and long-term needs for climate change-induced DRM, a modernised Early Warning System will be installed and operationalised as soon as possible. The Early Warning System will have the dual capability of being technically sound to trigger an alarm at all times, as well as being equipped to have a strong social response mechanism once the alarm has been raised. The Early Warning System will tie into the DRM strategy under guidance of Department of Local Governance of the Ministry of Home and Cultural Affairs.
51. The PDF-B phase of this project will contribute towards the formulation of a hazard zonation map of the lower Punakha-Wangdi Valley. Together with the existing hazard zonation map for the upper Punakha-Wangdi Valley, these maps will guide the selection, installation and operationalising of the new Early Warning System that is proposed through this project. The physical installation and piloting of the Early Warning System in the entire Punakha-Wangdi Valley, together with the monitoring and evaluation of the system, constitutes an additional cost to adapting to climate change. The GEF contribution that is requested towards the additional cost of establishing an Early Warning System is approximately US\$920,000.
52. Expected outputs from this outcome are:
 - 3.1 Installed Early Warning System in the Punakha-Wangdi Valley;
 - 3.2 Staff trained to operate and maintain Early Warning System;
 - 3.3 Awareness campaign amongst valley communities on working of Early Warning System;
 - 3.4 Documented evaluation and performance of system for replication.

Baseline and Additional Costs

53. GEF funding will complement current baseline funding and co-financing mobilised from the Government, bilateral and multilateral donors in supporting activities required to deliver the GEF Alternative. Baseline costs directly related to addressing the threat of GLOF are approximately US\$3,496,220. Government and other co-financing sources (bilaterals, UNDP) are likely to commit resources towards the baseline costs. The amount of GEF funding requested through this project is guided by additional cost reasoning as specified in GEF/C.24/12. Based on this guidance, the additional cost of adaptation to the imminent threat posed by climate change-induced glacial retreat is approximately US\$3,455,050. LDCF funding is requested to meet these additional costs of adapting to the climate change threat of GLOF.

C.3. Sustainability (including financial sustainability)

54. Sustainability is an integral part of the project design. The sustainability of the project's results will mainly depend on the effectiveness of stakeholder involvement; the appropriateness of the implementation of the models whilst using international best practice; adequate technical, legal and institutional capacity and expertise at the national level; and long-term political and financial commitment of decision-makers.
55. The project has strong government support at both central and local levels. Various stakeholders from the government and civil society were involved in the NAPA process and some of those agencies are keen on carrying forward the implementation of the top priorities identified in the NAPA process.

56. The long-term viability and sustainability of the project will depend greatly on institutional sustainability. This will be achieved through capacity building at all levels, following the principle of developing a DRM programme and not a mere project. The capacity-building components of the FSP, that will be developed, will empower stakeholders at all levels, from local communities to regional authorities to national government agencies, to deal with climate change impacts and enhance the adaptive capacities of the Bhutanese people beyond the time limitations of the project.
57. Project risks are limited since the project has strong Government commitment. The main risk is that the project will end up becoming a pilot demonstration without any future expansion. However, this risk will be minimised by developing an integrated DRM mechanism, with a specific focus on GLOFs, in the Punakha-Wangdi and Chamkhar Valleys. The underlying rationale is that successful approaches and lessons learnt will be easily applicable to other areas in Bhutan.
58. The entire FSP will be designed according to vulnerabilities of climate change-induced risks for community losses and economic and infrastructure losses. The implementation of the developed FSP will ensure building of community resilience and financial sustainability for Bhutan.
59. Additional human and financial resource requirements to sustain the activities initiated through the integrated DRM programme will be integrated into Bhutan's national human resource plan and budget for the Tenth Five Year Plan (July 2007-June 2012). These resources will help sustain and expand the DRM programme into other GLOF and climatic disaster vulnerable areas throughout the country.

C.4. Replicability

60. Each of the main outcomes for the FSP have replicability components built into the outputs.
61. The capacity built for an integrated DRM in the Punakha-Wangi and the Chamkhar Valleys will be used to develop a national DRM system over time. Application of institutional, legislative and policy frameworks within the two valleys will allow for an evaluation and learning process for creation of national strategies. Similarly, capacity built at the intermediate and local levels amongst various stakeholders in these two valleys will allow for rapid replication of the DRM programme into other districts of Bhutan.
62. The experience and lessons learnt from the artificial lowering of the Thorthormi Lake waters will prove invaluable in the years to come. This by no means is the last lake to pose GLOF threats. As climate change becomes more pronounced, Bhutan will be exposed to greater GLOF threats. Capacity built at the national level through this project will help Bhutan deal with GLOF problems by effectively adapting to this particular hazard risk.
63. The Early Warning System will be installed as a pilot for the Punakha-Wangdi Valley. Careful monitoring of performance, efficiency, cost-effectiveness and robustness will prove useful in developing a nation-wide Early Warning System in the future. Built capacity amongst communities for Early Warning System awareness, preparedness, response and developing of safe areas will be replicable for other areas of the country. The Early Warning System that will be installed for warning against GLOF risks, will, in time, be upgraded to encapsulate multiple hazards. The learning captured at the district and local level will provide a strong feedback into strengthening community-based DRM

approaches in Bhutan and other communities across the developing world, especially in mountainous regions.

64. The hazard zonation activity that will be carried out during the PDF-B process for the Chamkhar Valley is already being replicated from the process that was undertaken for the Punakha-Wangdi Valley a few years ago. Building national capacity to undertake hazard and vulnerability zoning activities will allow for replication of similar risk identification strategies in other river valleys of Bhutan.
65. The project proposes to enhance the current state of knowledge on planning and implementing projects for artificially lowering waters from glacial lakes in order to reduce the hazard risks for GLOFs. This knowledge will be extremely useful for better adapting to climate change induced glacier retreat and GLOF threats not only in Bhutan, but the entire Himalayan mountain region as well as other similar terrains. This project will add to the Adaptation Learning Mechanism initiative developed by UNDP-GEF aiming to integrate adaptation best practices and improved learning amongst different countries and regions.

C.5. Stakeholder Involvement

64. The Department of Geology and Mines, under the Ministry of Trade and Industry, will execute all technical aspects regarding implementation of the FSP, in close collaboration with the Department of Local Governance, under the Ministry of Home and Cultural Affairs. This is the nodal agency for coordinating disaster management activities at the National, *Dzongkhag* and *Geog* level and will facilitate in logistics and labour mobilisation.
65. The stakeholders in the process will be:
 - The Department of Local Governance, under the Ministry of Home and Cultural Affairs, is the nodal agency for coordinating disaster management activities at the National, *Dzongkhag* and *Geog* level. The Department of Local Governance will participate in the Project Steering Committee meetings and provide coordination and guidance during implementation of PDF phase and the FSP.
 - National Environment Commission – The Commission took the lead in designing and implementing the NAPA process in Bhutan. The Commission oversees and guides environmental management within overall national development. The Commission will participate in the Project Steering Committee meetings and ensure policy coordination. The Commission is also the national focal agency for the UNFCCC and the lead agency for preparation of national communication.
 - Planning Commission – The Planning Commission will be crucial towards integration of the hazard zonation maps into development plans for the Punakha - Wangdi and Chamkhar valleys.
 - The *Dzongkhag* Administrations – All the relevant district-level administration offices will work closely with the Department of Geology and Mines and the Department of Local Governance in all of the districts where the project activities will be implemented.
 - Department of Aid and Debt Management – The Department is responsible for mobilising and monitoring external funds for development projects.

- Local communities – Local communities in the Punakha-Wangdi and Chamkhar Valleys, as well as in the upstream region near the Thorthormi Lake, will be important stakeholders during the FSP design and implementation.
- The World Food Programme will provide food for one year (2007) through “Food for Work” to people participating in lowering lake waters (output 2.1).
- UNDP Country Office – the UNDP Bhutan Office will act as overall coordinator and monitor project funds.

D- Financing

D.1. Financing Plan

66. The financing instrument will be the LDCF for GEF funding. The proposed project cost is US\$6,951,274, out of which US\$3,455,050 is proposed from LDCF. Co-financing amounting to US\$3,496,224 is secured from the Royal Government of Bhutan, the UN System in Bhutan and other bilateral donors.

| Output | Baseline cost estimate (US\$) | | | Additional Cost Estimates | Total |
|--|-------------------------------|------------|----------------|---------------------------|------------------|
| | Royal Gov't of Bhutan | Bilaterals | UN System | GEF request | |
| Related to Outcome 1 | | | | | |
| 1.1 Developed institutional and policy frameworks for climate-resilient DRM | 50,000 | | 100,000 | 150,000 | 300,000 |
| 1.2 Built capacities at intermediate and local levels for climate-resilient DRM | 50,000 | | 100,000 | 150,000 | 300,000 |
| 1.3 Synthesized information and capacities on climate hazards, vulnerabilities and risks | | | 100,000 | 100,000 | 200,000 |
| 1.4 Vulnerable communities trained in community-based, climate-resilient DRM | | | 150,000 | 150,000 | 300,000 |
| 1.5 Created “Safe Areas” and disaster simulation exercises in face of climate change | | | 50,000 | 50,000 | 100,000 |
| <i>Sub-total</i> | <i>100,000</i> | <i>0</i> | <i>500,000</i> | <i>600,000</i> | <i>1,200,000</i> |
| Related to Outcome 2 | | | | | |
| 2.1 Conducted feasibility study for lowering of water level of Thorthormi Lake | | 1,100,000 | | | 1,100,000 |
| 2.2 Lowered water level of Thorthormi Lake | 500,000 | | 26,224 | 1,584,900 | 2,111,124 |

| | | | | | |
|---|----------------|------------------|----------------|------------------|------------------|
| 2.3 Staff trained on artificial lowering techniques & related natural hazards | 100,000 | 1,000,000 | | 319,950 | 1,419,950 |
| 2.4 Documented knowledge and experience in artificial lowering of lake waters to use in future projects | 20,000 | | | 20,000 | 40,000 |
| 2.5 Project Evaluation | 10,000 | | | 10,000 | 20,000 |
| Sub-total | 630,000 | 2,100,000 | 26,224 | 1,934,850 | 4,691,074 |
| Related to Outcome 3 | | | | | |
| 3.1 Installed Early Warning System in the Punakha-Wangdi valley | 40,000 | | | 566,750 | 606,750 |
| 3.2 Staff trained on disaster and risk and also to operate and maintain Early Warning System | 40,000 | | | 320,120 | 360,120 |
| 3.3 Awareness campaign amongst valley communities on working of Early Warning System | 20,000 | | | 10,000 | 30,000 |
| 3.4 Documented evaluation and performance of system for replication | 20,000 | | | 3,330 | 23,330 |
| 3.5 Project Evaluation | 20,000 | | | 20,000 | 40,000 |
| Sub-total | 140,000 | 0 | 0 | 920,200 | 1,060,200 |
| Total | 870,000 | 2,100,000 | 526,224 | 3,455,050 | 6,951,274 |

D.2. Co-Financing Plan

67. The co-financing will come from the Royal Government of Bhutan (in kind) for all three outcomes. The UN System in Bhutan will co-finance the DRM strategy outcome.

| CO-FINANCING SOURCES | | | | |
|---|------------------|------------------------|------------------|-----------|
| Name of co-financier (source) | Classification | Type | Amount (US\$) | Status |
| UN Agencies (UNDP & World Food Programme) | Inter-Govt. Org. | Cash and food for work | 526,224 | Committed |
| Royal Government of Bhutan | Government | In kind | 870,000 | Committed |
| Austria | Bilaterals | In kind | 1,200,000 | Secured |
| Japan | Bilaterals | In kind | 900,000 | Secured |
| Sub-Total Co-financing | | | 3,496,224 | |

D.3. PDF-B Financing Plan

68. The PDF-B activities will be financed by the GEF, with co-financing provided by the Royal Government of Bhutan (in kind) and the Netherlands Climate Assistance Programme (NCAP) (in cash).

| PDF-B FINANCING SOURCES | | | | |
|--|----------------|---------|----------------|-----------|
| Source of funds | Classification | Type | Amount (US\$) | Status |
| GEF/LDCF | Trust fund | Cash | 180,000 | |
| Royal Government of Bhutan | Government | In kind | 30,000 | Committed |
| Netherlands Climate Assistance Programme | | Cash | 220,000 | Committed |
| Sub-Total Co-financing | | | 430,000 | |

E- INSTITUTIONAL COORDINATION AND SUPPORT

E.1. Core Commitments and Linkages

69. The project is in line with the UNDP Bhutan's Country Programme and contributes to one of its key goals – "Crisis prevention and recovery". Within this goal, an outcome to be secured is "disaster risk reduction integrated into development planning", and this project will constitute a major contribution towards this outcome. The recently completed (November 2005) UN Common Country Assessment highlights Bhutan's vulnerability to climate change and the need to build national capacity to address this issue. The project will also contribute to achieving the Millennium Development Goals by reducing vulnerability of the poor and ensuring environmental sustainability.
70. Finally, the project will take the NAPA process a step further by translating the NAPA project concepts into ground reality and developing the capacity of the Royal Government of Bhutan and local communities to adapt to the vulnerabilities related to climate change.

E.2. CONSULTATION, COORDINATION AND COLLABORATION BETWEEN AND AMONG IMPLEMENTING AGENCIES, EXECUTING AGENCIES, AND THE GEF SECRETARIAT.

71. Bhutan's National Disaster Risk Management Framework document (recently published, and available through the UNDP Bhutan CO website www.undp.org.bt) and the previous version of the GLOF proposal has been shared with Dr. Surendra Shrestha, Regional Director, UNEP ROAP based in Bangkok. UNEP have indicated an interest to collaborate with UNDP on the early warning component of this project and assessment. The collaboration is being strengthened through the recently launched UN Development Assistance Framework (UNDAF) and UN Country Team Programme formulation process. During the preparatory phase, linkages with UNEP and other interested parties will be further discussed and where relevant, a partnership established.

E.3. IMPLEMENTATION/EXECUTION ARRANGEMENTS.

72. The project will be nationally executed. The Department of Geology and Mines (DGM) under the Ministry of Trade and Industry will be the principal executing agency for the PDF - B phase of this project. The DGM is made up of the Geological Survey of Bhutan and the Mining Division. The DGM's activities include geological mapping, mineral exploration, and geotechnical services such as geologic hazard and risk assessments. Since the 1994 GLOF, the Department is actively involved in the monitoring of glaciers and glacial lakes.

73. The DGM will be mainly responsible for delivering outcome 1, 2 and 3 of the PDF -B. For Outcome 1 (Compiled collection of baseline studies that analyze the threat of climate change and variability on glacial lakes in Bhutan), DGM will take the lead but close cooperation will be sought from the National Environment Commission. For Outcome 2 (Hazard Zonation and Vulnerability Mapping for the Chamkhar Valley and lower Punakha-Wangdi Valley implemented), DGM will deliver this outcome in close collaboration with Punakha and Chamkhar District Administration and the local communities. For Outcome 4 (Implementation Plan for the FSP) and Outcome 5 (FSP Executive Summary document and UNDP Project Document), UNDP Bhutan will take the lead and deliver these two outcomes in close consultation with GEF OFP, Department of Local Governance (national focal agency for disaster management), National Environment Commission (national focal agency for climate change), the Executing Agency of this project (DGM), and the donors providing the co-financing.

74. A Project Steering Committee (PSC)¹⁶ will be created in order to advise the Project Manager, Department of Geology and Mines (Executing Agency) and UNDP during project implementation. The PSC includes: Department of Aid and Debt Management (Ministry of Finance), Department of Local Governance, National Environment Commission, Planning Commission, Department of Geology and Mines, WFP and UNDP.

F. - MONITORING AND REPORTING

F.1. Project Inception Phase

75. A Project Inception Workshop will be conducted with the full project team, relevant government counterparts, co-financing partners, the UNDP-CO and representation from the UNDP-GEF Regional Coordinating Unit, as well as UNDP-GEF (HQs) as appropriate.

76. A fundamental objective of this Inception Workshop will be to assist the project team to understand and take ownership of the project's goals and objectives, as well as finalize preparation of the project's first annual work plan on the basis of the project's logframe matrix. This will include reviewing the logframe (indicators, means of verification, assumptions), imparting additional detail as needed, and on the basis of this exercise finalize the Annual Work Plan (AWP) with precise and measurable performance indicators, and in a manner consistent with the expected outcomes for the project.

77. Additionally, the purpose and objective of the Inception Workshop (IW) will be to: (i) introduce project staff with the UNDP-GEF *expanded team* which will support the project during its implementation, namely the CO and responsible Regional Coordinating Unit staff; (ii) detail the roles, support services and complementary responsibilities of UNDP-CO and RCU staff vis à vis the project team; (iii) provide a detailed overview of UNDP-GEF

¹⁶ In Annex II C of your PDFB doc, please use Project Steering Committee instead of Project Advisory Committee – as this is the term used in Bhutan.

reporting and monitoring and evaluation (M&E) requirements, with particular emphasis on the Annual Project Implementation Reviews (PIRs) and related documentation, the Annual Project Report (APR), Tripartite Review Meetings, as well as mid-term and final evaluations. Equally, the IW will provide an opportunity to inform the project team on UNDP project related budgetary planning, budget reviews, and mandatory budget rephasings.

78. The IW will also provide an opportunity for all parties to understand their roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff and decision-making structures will be discussed again, as needed, in order to clarify for all, each party's responsibilities during the project's implementation phase.

F.2. Monitoring responsibilities and events

79. A detailed schedule of project reviews meetings will be developed by the project management, in consultation with project implementation partners and stakeholder representatives and incorporated in the Project Inception Report. Such a schedule will include: (i) tentative time frames for Tripartite Reviews, Steering Committee Meetings, (or relevant advisory and/or coordination mechanisms) and (ii) project related Monitoring and Evaluation activities.

80. *Day to day monitoring of implementation progress* will be the responsibility of the Project Director based on the project's Annual Work Plan and its indicators. The Project Director will inform the UNDP-CO of any delays or difficulties faced during implementation so that the appropriate support or corrective measures can be adopted in a timely and remedial fashion.

81. The Project Director and the Project GEF Technical Advisor will fine-tune the progress and performance/impact indicators of the project in consultation with the full project team at the Inception Workshop with support from UNDP-CO and assisted by the UNDP-GEF Regional Coordinating Unit.. Specific targets for the first year implementation progress indicators together with their means of verification will be developed at this Workshop. These will be used to assess whether implementation is proceeding at the intended pace and in the right direction and will form part of the Annual Work Plan. The local implementing agencies will also take part in the Inception Workshop in which a common vision of overall project goals will be established. Targets and indicators for subsequent years would be defined annually as part of the internal evaluation and planning processes undertaken by the project team.

82. It is important to develop impact indicators related to adaptation to climate change. Impact indicators for this project will be developed during PDF B phase. Past and ongoing efforts of other organizations such as the STAP on the formulation of impact indicators will be taken into consideration..

83. *Periodic monitoring of implementation progress* will be undertaken by the UNDP-CO through quarterly meetings with the project proponent, or more frequently as deemed necessary. This will allow parties to take stock and to troubleshoot any problems pertaining to the project in a timely fashion to ensure smooth implementation of project activities.

84. UNDP Country Office and UNDP-GEF RCU as appropriate, will conduct yearly visit to project field sites, or more often based on an agreed upon scheduled to be detailed in the project's Inception Report / Annual Work Plan to assess first hand project progress. Any other member of the Project Steering Committee can also accompany, as decided by the PSC. A Field Visit Report will be prepared by the UNDP Country Office and circulated no less than one month after the visit to the project team, all PSC members, and UNDP-GEF.

85. Annual Monitoring will occur through the **Tripartite Review (TPR)**. This is the highest policy-level meeting of the parties directly involved in the implementation of a project. The project will be subject to Tripartite Review (TPR) at least once every year. The first such meeting will be held within the first twelve months of the start of full implementation. The project proponent will prepare an Annual Project Report (APR) and submit it to UNDP-CO and the UNDP-GEF regional office at least two weeks prior to the TPR for review and comments.

86. The APR will be used as one of the basic documents for discussions in the TPR meeting. The project proponent will present the APR to the TPR, highlighting policy issues and recommendations for the decision of the TPR participants. The project proponent also informs the participants of any agreement reached by stakeholders during the APR preparation on how to resolve operational issues. Separate reviews of each project component may also be conducted if necessary.

Terminal Tripartite Review (TTR)

87. The terminal tripartite review is held in the last month of project operations. The project proponent is responsible for preparing the Terminal Report and submitting it to UNDP-CO and GEF's Regional Coordinating Unit. It shall be prepared in draft at least two months in advance of the TTR in order to allow review, and will serve as the basis for discussions in the TTR. The terminal tripartite review considers the implementation of the project as a whole, paying particular attention to whether the project has achieved its stated objectives and contributed to the broader environmental objective. It decides whether any actions are still necessary, particularly in relation to sustainability of project results, and acts as a vehicle through which lessons learnt can be captured to feed into other projects under implementation of formulation.

88. The TPR has the authority to suspend disbursement if project performance benchmarks are not met. Benchmarks will be developed at the Inception Workshop, based on delivery rates, and qualitative assessments of achievements of outputs.

F.3. Project Monitoring Reporting

89. The Project Director in conjunction with the UNDP-GEF extended team will be responsible for the preparation and submission of the following reports that form part of the monitoring process. Items (a) through (f) are mandatory and strictly related to monitoring, while (g) through (h) have a broader function and the frequency and nature is project specific to be defined throughout implementation.

(a) *Inception Report (IR)*

90. A Project Inception Report will be prepared immediately following the Inception Workshop. It will include a detailed First Year Annual Work Plan divided in quarterly time-frames detailing the activities and progress indicators that will guide implementation during the first year of the project. This Work Plan would include the dates of specific field visits, support missions from the UNDP-CO or the Regional Coordinating Unit (RCU) or consultants, as well as time-frames for meetings of the project's decision making structures. The Report will also include the detailed project budget for the first full year of implementation, prepared on the basis of the Annual Work Plan, and including any monitoring and evaluation requirements to effectively measure project performance during the targeted 12 months time-frame.

91. The Inception Report will include a more detailed narrative on the institutional roles, responsibilities, coordinating actions and feedback mechanisms of project related partners. In addition, a section will be included on progress to date on project establishment and start-up activities and an update of any changed external conditions that may effect project implementation.

92. When finalized the report will be circulated to project counterparts who will be given a period of one calendar month in which to respond with comments or queries. Prior to this circulation of the IR, the UNDP Country Office and UNDP-GEF's Regional Coordinating Unit will review the document.

(b) Annual Project Report (APR)

93. The APR is a UNDP requirement and part of UNDP's Country Office central oversight, monitoring and project management. It is a self-assessment report by project management to the CO and provides input to the country office reporting process and the ROAR, as well as forming a key input to the Tripartite Project Review. An APR will be prepared on an annual basis prior to the Tripartite Project Review, to reflect progress achieved in meeting the project's Annual Work Plan and assess performance of the project in contributing to intended outcomes through outputs and partnership work.

94. The format of the APR is flexible but should include the following:

- § An analysis of project performance over the reporting period, including outputs produced and, where possible, information on the status of the outcome
- § The constraints experienced in the progress towards results and the reasons for these
- § The three (at most) major constraints to achievement of results
- § AWP, CAE and other expenditure reports (ERP generated)
- § Lessons learned
- § Clear recommendations for future orientation in addressing key problems in lack of progress

(c) Project Implementation Review (PIR)

95. The PIR is an annual monitoring process mandated by the GEF. It has become an essential management and monitoring tool for project managers and offers the main vehicle for extracting lessons from ongoing projects. Once the project has been under implementation for a year, a Project Implementation Report must be completed by the CO together with the project. The PIR can be prepared any time during the year (July-June) and ideally prior to the TPR. The PIR should then be discussed in the TPR so that the result would be a PIR that has been agreed upon by the project, the executing agency, UNDP CO and the concerned RC.

96. The individual PIRs are collected, reviewed and analysed by the RCs prior to sending them to the focal area clusters at the UNDP/GEF headquarters. The focal area clusters supported by the UNDP/GEF M&E Unit analyse the PIRs by focal area, theme and region for common issues/results and lessons. The TAs and PTAs play a key role in this consolidating analysis.

97. The focal area PIRs are then discussed in the GEF Interagency Focal Area Task Forces in or around November each year and consolidated reports by focal area are collated by the GEF Independent M&E Unit based on the Task Force findings.

98. The GEF M&E Unit provides the scope and content of the PIR. In light of the similarities of both APR and PIR, UNDP/GEF has prepared a harmonized format for reference.

(d) *Quarterly Progress Reports*

99. Short reports outlining main updates in project progress will be provided quarterly to the local UNDP Country Office and the UNDP-GEF regional office by the project team. See format attached.

(e) *Periodic Thematic Reports*

100. As and when called for by UNDP, UNDP-GEF or the Implementing Partner, the project team will prepare Specific Thematic Reports, focusing on specific issues or areas of activity. The request for a Thematic Report will be provided to the project team in written form by UNDP and will clearly state the issue or activities that need to be reported on. These reports can be used as a form of lessons learnt exercise, specific oversight in key areas, or as troubleshooting exercises to evaluate and overcome obstacles and difficulties encountered. UNDP is requested to minimize its requests for Thematic Reports, and when such are necessary will allow reasonable timeframes for their preparation by the project team.

(f) *Project Terminal Report*

101. During the last three months of the project the project team will prepare the Project Terminal Report. This comprehensive report will summarize all activities, achievements and outputs of the Project, lessons learnt, objectives met, or not achieved, structures and systems implemented, etc. and will be the definitive statement of the Project's activities during its lifetime. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the Project's activities.

(g) *Technical Reports* (project specific- optional)

102. Technical Reports are detailed documents covering specific areas of analysis or scientific specializations within the overall project. As part of the Inception Report, the project team will prepare a draft Reports List, detailing the technical reports that are expected to be prepared on key areas of activity during the course of the Project, and tentative due dates. Where necessary this Reports List will be revised and updated, and included in subsequent APRs. Technical Reports may also be prepared by external consultants and should be comprehensive, specialized analyses of clearly defined areas of research within the framework of the project and its sites. These technical reports will represent, as appropriate, the project's substantive contribution to specific areas, and will be used in efforts to disseminate relevant information and best practices at local, national and international levels.

(h) *Project Publications* (project specific- optional)

103. Project Publications will form a key method of crystallizing and disseminating the results and achievements of the Project. These publications may be scientific or informational texts on the activities and achievements of the Project, in the form of journal articles, multimedia publications, etc. These publications can be based on Technical Reports, depending upon the relevance, scientific worth, etc. of these Reports, or may be summaries or compilations of a series of Technical Reports and other research. The project team will determine if any of the Technical Reports merit formal publication, and will also (in consultation with UNDP Country Office, the government and other relevant stakeholder groups) plan and produce these Publications in a consistent and recognizable format. Project

resources will need to be defined and allocated for these activities as appropriate and in a manner commensurate with the project's budget.

2. INDEPENDENT EVALUATION

104. The project will be subjected to at least two independent external evaluations as follows:-

(i) *Mid-term Evaluation*

105. An independent Mid-Term Evaluation will be undertaken at the end of the second year of implementation. The Mid-Term Evaluation will determine progress being made towards the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, terms of reference and timing of the mid-term evaluation will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF.

(ii) *Final Evaluation*

106. An independent Final Evaluation will take place three months prior to the terminal tripartite review meeting, and will focus on the same issues as the mid-term evaluation. The final evaluation will also look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental goals. The Final Evaluation should also provide recommendations for follow-up activities. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF.

AUDIT CLAUSE

107. The Government will provide the Resident Representative with certified periodic financial statements, and with an annual audit of the financial statements relating to the status of UNDP (including GEF) funds according to the established procedures set out in the Programming and Finance manuals. The Audit will be conducted by the legally recognized auditor of the Government, or by a commercial auditor engaged by the Government.

PART II - PROJECT DEVELOPMENT PREPARATION

A – DESCRIPTION OF PROPOSED PDF ACTIVITIES

108. The Punakha-Wangdi Valley and the Chamkhar Valley are home to a large proportion of the Bhutanese population. The valleys also have growing urban centers, significant hydropower-generating dam projects, tourism hubs, historically significant sites and large agricultural land farms. A GLOF could prove devastating to the two valleys.

109. A hazard zonation of the upper Punakha Valley was conducted by the Bhutanese Department of Mines and Geology in collaboration with the University of Austria, Department of Geology in 2002. A similar hazard zonation plan is necessary for the Chamkhar valley and the lower Punakha-Wangdi Valley.

110. An Early Warning System for the Punakha-Wangdi Valley is both an immediate and a long-term need for GLOF disaster risk reduction. The Early Warning System will be operationalised during the FSP, but a detailed assessment of the most appropriate Early Warning System for the said area and GLOF hazard warning is necessary.

111. The GEF PDF-B project will be designed in order to complete the hazard zonation and assess the most effective Early Warning Systems for GLOF preparedness in order to prepare the baseline for an integrated DRM programme against climate change-induced risks in the Punakha-Wangdi and the Chamkhar Valleys. The PDF-B project work will lead to the development of a FSP Executive Summary and UNDP Project Document for submission to the GEF.

112. The objective for the PDF-B project is “Hazard Zonation and Early Warning System Assessment for GLOF vulnerable areas of Punakha-Wangdi and Chamkhar Valley areas”.

113. In order to fulfill the objective, the project will focus on the following outcomes:
- Compiled collection of baseline studies that analyse the threat of climate change and variability on glacial lakes in Bhutan;
 - Hazard Zonation and Vulnerability Mapping for the Chamkhar Valley and lower Punakha-Wangdi Valley implemented;
 - Assessment of most suitable Early Warning System for GLOF threat in Punakha-Wangdi Valley completed;
 - Implementation Plan for the FSP;
 - FSP Executive Summary document and UNDP Project Document .

B – PDF BLOCK B OUTPUTS

114. The PDF-B outcomes contribute to the development of a FSP Brief and a UNDP Project Document including implementation plan. For each of the PDF-B outcomes outlined above, the following outputs are expected to be completed during the PDF-B phase of the project:

115. Outputs related to Outcome 1: Compiled collection of baseline studies that analyse the threat of climate change and variability on glacial lakes in Bhutan:

- § Creation of a database listing all available study and project reports on climate change-induced GLOF risks carried out by the Royal Bhutanese Government individually and with bilateral support;

- § Identification of existing gaps in climate vulnerability studies and project feasibility studies related to GLOF hazard risks.
115. Following is an overview of the activities that will be carried out to achieve the aforesaid outputs:
- § The Department of Geology and Mines, in collaboration with the National Environment Commission, will create a database of all existing studies and completed projects focusing on climate change and variability impacts on Bhutan including DRM projects and studies. These will be used as baseline information for the designing of a comprehensive FSP. The database will also help identify any existing gaps in studies that will need to be conducted in order to develop the FSP, especially focusing on GLOF hazard risks.
116. Outputs related to Outcome 2: Hazard zonation and vulnerability mapping for the Chamkhar Valley and Punakha-Wangdi Valley implemented:
- § Community vulnerability assessed through field surveys, including data collection and community consultations, conducted in Chamkhar Valley and lower Punakha-Wangdi Valley;
- § Staff trained in GLOF hazard risk issues;
- § Remote sensing and Geographic Information System (GIS) data and graphic materials of Chamkhar valley and lower Punakha-Wangdi Valley areas produced and maintained;
- § Direct field observation data and remote sensing data analysed and GLOF hazard zonation and vulnerability maps produced for Chamkhar Valley and lower Punakha-Wangdi Valley.
117. Following is an overview of the activities that will be carried out to achieve the aforesaid outputs:
- § The Department of Geology and Mines field survey team will collect data on topography, slope stability, geology, hydro-geology, socio-economy, and land use and cover in the Chamkhar valley and lower Punakha-Wangdi Valley areas. This will entail six months of field work in each of the project sites that will be undertaken simultaneously in both valley areas.
- § The project will train two Department of Geology and Mines staff for three months each in remote-sensing and GIS application at a regional/ international institute. In addition, the project will enable Department of Geology and Mines staff to participate in regional/international scientific seminars and workshops related to GLOF and natural disasters and provide study tours to staff from Department of Geology and Mines and partner institutions to gain insights and understanding of GLOF hazard assessment and impact mitigation activities in other countries.
- § For remote sensing and GIS application, the Department of Geology and Mines will procure satellite images, ERDAS/GEOMETICA/ENVI remote-sensing software and ARCGIS software. Using these software, the project will collate field and remote sensing data and establish a GLOF information system within the Department of Geology and Mines.
- § Based on field and remote sensing data, the project will produce a set of maps providing information on topography, slope stability, geology, hydro-geology, socio-economy, and land use and cover in the Chamkhar Valley and lower Punakha-Wangdi Valley areas. Collective analysis of the various maps will be undertaken to produce GLOF hazard zonation maps.
118. The institutional strengthening of the Department of Geology and Mines will entail procurement of field and office equipment such as Global Positioning System (GPS),

Total Station survey equipment, computers, laser locators, and portable generator. These equipment are essential for the field surveys.

119. The GLOF hazard zonation maps will also be presented to the Policy and Planning Divisions of other line ministries such as Ministry of Agriculture, Trade and Industries, Works and Human Settlement, Information and Communication, etc, as well as the Department of Local Governance, in the Ministry of Home and Cultural Affairs, which is responsible for coordinating all DRM activities in the country.

120. Outputs related to Outcome 3: Assessment of most suitable Early Warning System for GLOF threat in Punakha-Wangdi Valley completed:

- § Comparative assessment of Early Warning Systems in operation in other countries with Bhutan-like geophysical conditions (e.g., Nepal, Switzerland);
- § GLOF-related hazards and risks in Punakha-Wangdi Valley areas assessed.

121. Following is an overview of the activities that will be carried out to achieve the aforesaid outputs:

- § A team led by the Director of the Department of Geology and Mines will carry out assessments of an integrated Early Warning System, focusing on technological capabilities, economic installation and maintenance feasibilities and overall best fit for the Punakha-Wangdi Valley, considering GLOF-related hazard risks and social vulnerabilities existing in the area. The Early Warning System assessment will be completed in three months and a report will be presented by the Department of Geology and Mines to partner institutions.
- § GLOF-related hazards and risks will be assessed to determine location of automatic sensors, alarms and personnel stations in the valley. The planning for the entire Early Warning System will be completed before installation during the FSP.

122. Outputs related to Outcome 4: Implementation plan for the FSP:

- § Undertake stakeholder consultations and make all stakeholders clear of their role and responsibilities during FSP implementation;
- § Institutional arrangement for FSP implementation at the national, intermediate (*Dzongkhags*) and local (*Geog*) level, especially in the Punakha-Wangdi Valley.

123. Following is an overview of the activities that will be carried out to achieve the aforesaid outputs:

- § The Department of Geology and Mines, in collaboration with the Department of Local Governance, will conduct a mapping of all stakeholders and institutional arrangements necessary for implementation of the FSP at the national, intermediate and local levels.
- § The stakeholder mapping will ensure that all stakeholders will be included in the design and implementation process of the FSP. The institutional arrangements for implementation of the FSP will determine the lead and collaborative government agencies, their responsibilities and capacities during the implementation of the FSP. The institutional arrangements will also help in identifying gaps in order to strengthen key agencies that will be responsible for carrying out the FSP activities.

124. Outputs related to Outcome 5: FSP Executive Summary document and the UNDP Project Document:

- § FSP document developed for submission to the GEF Secretariat;
- § UNDP Project Document developed.

125. Following is an overview of the activities that will be carried out to achieve the aforesaid outputs:

- § The main implementing agency will be responsible for developing an FSP clearly outlining the scope of the FSP along with the goal, objective and outcomes of the project, the relevant stakeholders, the sustainability and replicability of the project and the financial mechanism for project funding.
- § A UNDP Project Document will be prepared with a strong emphasis on evaluation of the outcomes of the project.

C – JUSTIFICATION

126. The design of an effective adaptation intervention requires substantial preparatory work to define accurately the project scope and system boundary, as described in the proposed PDF-B activities. This includes a systematic analysis of the project baseline and existing adaptive capacities, definition of specific priorities to be addressed by this project, and specification of key parameters for “on the ground” interventions. Extensive stakeholder participation and consultation is essential during this process in order to ensure linkages with national priorities. PDF-B funding from the GEF is requested to ensure a thorough analysis of the current adaptation scenario, leading to a project strategy designed to achieve maximum impact.

127. Active preparation of hazard risk and community vulnerability zoning maps during the PDF-B will be useful for implementation of a comprehensive DRM for the Punakha - Wangdi and Chamkhar Valley areas. The DRM system will be able to focus on the most vulnerable communities, as well as the areas with highest hazard risk through an installed Early Warning System and community-based DRM training for communities and local government officials.

D – TIMETABLE

128. Project Timetable: November 2006 – April 2007 (6 months)

| Outcome | Output | Implementing Partner | Q 1 | Q 2 |
|-----------|---|----------------------|-----|-----|
| Outcome 1 | 1.1 Creation of a database listing all available study and project reports on climate change-induced GLOF risks carried out by the Royal Bhutanese Government individually and with bilateral support | DGM, NEC | X | |
| | 1.2 Identification of existing gaps in climate vulnerability studies and project feasibility studies related to GLOF hazard risks | DGM, NEC | X | |
| Outcome 2 | 2.1 Community vulnerability assessed through field surveys conducted in Chamkhar Valley and lower Punakha-Wangdi Valley areas | DGM | X | |
| | 2.2 Staff trained in GLOF hazard risk issues | DGM | X | |
| | 2.3 Remote sensing and Geographic Information System (GIS) data and graphic materials of Chamkhar Valley and lower Punakha-Wangdi Valley areas produced and maintained | DGM | X | X |
| | 2.4 Direct field observation data and remote sensing data analysed and GLOF hazard zonation and vulnerability maps produced for Chamkhar Valley and lower Punakha-Wangdi Valley areas | DGM | | X |

| Outcome | Output | Implementing Partner | Q 1 | Q 2 |
|-----------|--|----------------------|-----|-----|
| Outcome 3 | 3.1 Comparative assessment of Early Warning Systems in operation in other countries with Bhutan-like geophysical conditions (e.g. Nepal and Switzerland); | DGM, DLG | X | |
| | 3.2 GLOF-related hazards and risks in Punakha-Wangdi Valley areas assessed | DGM, DLG | X | |
| Outcome 4 | 4.1 Institutional arrangements for FSP implementation at the national, intermediate (<i>Dzongkhags</i>) and local (<i>Geog</i>) level, especially in the Punakha-Wangdi Valley | DGM, NEC, DLG | X | X |
| Outcome 5 | 5.1 FSP Executive Summary developed for submission to the GEF Secretariat | DGM, UNDP | | X |
| | 5.2 UNDP Project Document developed | UNDP | | X |

E - BUDGET

| Output | GEF request | Co-financing | | Total |
|---|-------------|--------------|---------|---------|
| | | RGoB | NCAP | |
| Related to Outcome 1 | | | | |
| 1.1 Creation of a database listing all available study and project reports on climate change-induced GLOF risks carried out by the Royal Bhutanese Government individually and with bilateral support | | 6,000 | | 6,000 |
| 1.2 Identification of existing gaps in climate vulnerability studies and project feasibility studies related to GLOF hazard risks | | 4,000 | | 4,000 |
| Related to Outcome 2 | | | | |
| 2.1 Community vulnerability assessed through field surveys conducted in Chamkhar Valley and lower Punakha-Wangdi Valley areas | 20,574 | 10,000 | 40,000 | 70,574 |
| 2.2 Staff trained in GLOF hazard risk issues | 21,980 | | 70,000 | 91980 |
| 2.3 Remote sensing and Geographic Information System (GIS) data and graphic materials of Chamkhar Valley and lower Punakha-Wangdi Valley areas produced and maintained | 77,112 | 0 | 100,000 | 177,112 |
| 2.4 Direct field observation data and remote sensing data analysed and GLOF hazard zonation and vulnerability maps produced for Chamkhar Valley and lower Punakha-Wangdi Valley areas | 6,667 | 8,000 | 10,000 | 24,667 |
| 2.5 Workshops & result dissemination | 6,667 | | | 6,667 |
| Related to Outcome 3 | | | | |
| 3.1 Comparative assessment of Early Warning Systems in operation in other countries with Bhutan-like geophysical conditions (e.g. Nepal and Switzerland); | 17,000 | 0 | | 17,000 |
| 3.2 GLOF-related hazards and risks in Punakha-Wangdi Valley areas assessed | 10,000 | | | 10,000 |

| Output | GEF request | Co-financing | | Total |
|--|----------------|---------------|----------------|----------------|
| | | RGoB | NCAP | |
| Related to Outcome 4 | | | | |
| 4.1 Institutional arrangements for FSP implementation at the national, intermediate (<i>Dzongkhags</i>) and local (<i>Geog</i>) level, especially in the Punakha-Wangdi Valley | 5,000 | 2,000 | | 7,000 |
| Related to Outcome 5 | | | | |
| 5.1 FSP developed for submission to GEF Secretariat | 15,000 | | | 15,000 |
| 5.2 UNDP Project Document developed | | | | |
| Total | 180,000 | 30,000 | 220,000 | 430,000 |

| CO-FINANCING SOURCES | | | | |
|--|----------------|---------|----------------|-----------|
| Name of co-financier (source) | Classification | Type | Amount (US\$) | Status |
| Royal Government of Bhutan | Government | In kind | 30,000 | committed |
| Netherlands Climate Assistance Programme | | Cash | 220,000 | committed |
| Sub-Total Co-financing | | | 250,000 | |

ANNEX I: LETTER OF ENDORSEMENT



དངུལ་རྩིས་ལྷན་ཁག།

གྲོགས་རམ་དང་རྒྱིན་འགུལ་འཛིན་སྐྱོང་ལས་ཁུངས།

**DEPARTMENT OF AID & DEBT MANAGEMENT
MINISTRY OF FINANCE
ROYAL GOVERNMENT OF BHUTAN**

DADM/GEF-OPP/ 058

July 7, 2006

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The Resident Representative a.i
United Nations Development Programme
Thimphu.

Subject: Endorsement of PDF-B – Reduce climate change induced risks and vulnerabilities from Glacier lake outbursts Flood in the Punakha-Wandgi and Chamkhar valleys

Sir,

This is to inform you that the captioned project proposal is endorsed by the Royal Government of Bhutan and the GEF Operational Focal Point in Bhutan. In addition, by this same letter, we would like to confirm the commitment of the government amounting to USD 30,000 in kind reflected in the project document.

We would therefore appreciate if the enclosed project proposal is kindly submitted to the GEF financing.

Thank you for your continued support.

Yours sincerely,

(Sonam Wangchuk)
Director General

Copy to:

1. The Deputy Minister, NEC, Thimphu for kind information.
1. The Director, Department of Geology and Mines, MTI, Thimphu.

ANNEX II: TERMS OF REFERENCE FOR PROJECT STAFF

ANNEX II-A: TOR FOR PROJECT MANAGER

Background

Relevant information on the project background, objectives, activities, and expected outputs of the project are provided in the project document, which can be referred to for more detailed information. The project document is to be considered an integral part of these Terms of References.

Overall duties

The project manager (PM) is responsible for the day-to-day management, coordination and supervision of the implementation of the PDF B activities during the 6 months programmed for the PDF B phase. The PDF B activities are listed in Part II of the project concept. In summary the activities are structured around four outcomes: (1) identification of pilot sites and adaptation measures; (2) adaptive capacity needs assessment; (3) development of resource mobilization and partnership strategies; and (4) development of a full project brief. The PM will be appointed by the executing agency and will be in charge and responsible for the following:

- Prepare a detailed work plan for the project¹⁷ at the outset of the PDF B implementation;
- Assist in the identification, selection and recruitment of national consultants and other experts;
- Supervise, coordinate and facilitate the work of all national and international consultants retained for the different activities;
- Keep the PAC fully informed of the progress of the PDF B implementation;
- Participate in the PAC meetings and carry out a follow up on the outcomes of such meetings;
- Control expenditures and assure an adequate management of resources provided for the project;
- Design a resource mobilization strategy;
- Identify relevant, on-going activities by NGOs, CBOs, and other agencies, and establish linkage;
- Build partnerships with donors through consultations;
- Build partnerships with regional institutions;
- Organize a donor round table to finalize co-financing modalities;

Co-ordinate the preparation of a Full Size Project Brief according to the Global Environment Facility (GEF) guidelines and the preparation of a Project Document according to the United Nations Development Programme (UNDP) guidelines. This includes incorporating comments received from various stakeholders on the drafts of the Brief and Project Document. Project Brief Requirements include:

- a description and prioritisation of all the key barriers to the implementation of adaptation measures and a strategy and a proposed set of measures to remove and/or reduce these barriers;
- a financing plan for the project, including assistance in securing co-financing commitments;

¹⁷ Please note that if not stated otherwise the term “project” refers to the PDF B project phase.

- a plan for the involvement of all the key stakeholders, including the framework for continuing the communication with the potential national, bilateral and/or multilateral financial organizations;
- an agreed upon institutional set-up and implementation arrangements for the full-size project as well as a draft work plan, including time and activity schedule.

Outputs

The final output of the PDF-B phase for which the PM is responsible will be a project brief and project document including the following:

- Adaptation measures to be piloted and plan for implementation decided
- Assessment of capacity needs at the systematic, institutional, individual levels conducted
- Resource mobilization strategy formulated
- Proceedings and other documentation of workshops and seminars produced
- Monitoring and Evaluation framework developed
- Project execution and implementation arrangements agreed

Qualifications

At minimum the following qualifications apply for the position of PM:

- Familiar with climate change and adaptation issues in Bhutan and the main actors and stakeholders in this field;
- Familiar and experienced with the design and planning of development projects, particularly in the field of disaster risk reduction and water management ;
- Proven ability to implement and manage project activities at a comparable level to the ones included under the PDF B phase;
- Preferably some knowledge on GEF procedures and processes, including GEF requirements for submitting a full-scale programme;
- Excellent working knowledge of spoken and written English;
- Willingness to travel as appropriate;

A minimum of 10 years professional working experience relevant in the context of this project (climate change, adaptation, disaster risk reduction and water management, sustainable development, environment).

Timing and Modalities

Services of the PM are required over a project period of 6 months. Within the 6 month period approx. 120 working days is required. Estimated starting date is November 15, 2006.

The PM will perform his/her duties from the home office through e-mail, telephone and fax correspondence combined with short, focused missions.

The PM will report to UNDP RCU and consult very closely with the UNDP country office in Bhutan and the UNDP HQ Technical Advisor on adaptation.

ANNEX II-B: TOR FOR CONSULTANTS

Background

Relevant information on the project background, objectives, activities, and expected outputs of the project are provided in the project document, which can be referred to for more detailed information. The project document is to be considered an integral part of these Terms of References.

Overall duties

The consultant is responsible for carrying out a specific set of activities, which contribute to the design of the overall project. The consultant works under the supervision and guidance of the PM and in close consultation with UNDP Country Office to implement the PDF B activities. The activities for which the consultant is responsible include:

- Validate pilot sites with local communities and other stakeholders through national workshops;
- Carry out barrier analysis for piloting the adaptations;
- Appraise capacity needs for applying risk management techniques, and use of climate information, including seasonal forecast and monitoring information and products;
- Assess effectiveness of early warning systems in place, focusing on institutional capacity needs at local, national, and regional levels which includes identification of traditional communication systems;
- Assess pathways of information delivery from producers to users of climate information along the chain of regional, national and local institutions
- Identify capacity needs and gaps in the communication chain along regional, national and local users and producers of climate information including integration of farmer knowledge into climate forecasting systems;
- Identify capacity for implementing adaptation measures in relation to climate information systems at local, national and regional scales, indigenous knowledge, drought mitigation practices, and other land management practices
- Assess capacity gaps for adequate policy support particularly with regard to mainstreaming into sector policies;
- Provide inputs to the drafting of the project brief and project document.

Timing and Modalities

The Consultant will work under the guidance of the PM and report directly to the PM. The Consultant will be contracted by the project for a period of 6 months and a total of 90 working days. Starting date is December, 2006.

The consultant will perform his/her duties from the home office through e-mail, telephone and fax correspondence combined with short, focused in-country missions.

ANNEX II-C: TOR FOR PROJECT STEERING COMMITTEE (PAC)

A Project Steering Committee (PAC) will be created in order to advise the Project Manager the Executing Agency and UNDP during project implementation.

Duties

The responsibilities of the PSC include the following:

- Provide strategic advice to the PM and the EA on the overall direction of the project;
- Offer technical and political expertise to the PM for successful implementation of the PDF B activities;
- Act as a platform for sharing information on the project and disseminate information to interested networks and institutions

Frequency of meetings

The PSC will meet 2 times over the 6 months period of the PDF B phase. The first meeting will be approx. 1 month after project start and the second meeting towards the end of the 6 months period. The location of the meetings will be in Bhutan. If useful the PSC might extend its existence into the implementation phase of the full size project.

Members

At minimum, representatives of the following organizations will take seat in the PSC:

- UNDP Regional Office Bangkok (the GEF-Implementing Agency)
- UNDP Bhutan CO
- The Project Manager
- Government Representatives
- Relevant local and regional institutions involved in disaster risk mitigation and early warning systems related to flood control.