



PROJECT IDENTIFICATION FORM (PIF) ¹

PROJECT TYPE: Full-sized Project

TYPE OF TRUST FUND: LDCF

PART I: PROJECT IDENTIFICATION

Project Title:	Community Based Flood and Glacial Lake Outburst Risk Reduction		
Country(ies):	Nepal	GEF Project ID: ²	4551
GEF Agency(ies):	UNDP (select) (select)	GEF Agency Project ID:	4657
Other Executing Partner(s):		Submission Date:	2011-06-17
GEF Focal Area (s):	Climate Change	Project Duration(Months)	36
Name of parent program (if applicable): ➤ For SFM/REDD+ <input type="checkbox"/>	LDCF	Agency Fee (\$):	630,000

A. FOCAL AREA STRATEGY FRAMEWORK³:

Focal Area Objectives	Expected FA Outcomes	Expected FA Outputs	Indicative Financing from relevant TF (GEF/LDCF/SCCF) (\$)	Indicative Cofinancing (\$)
CCA-1 (select)	Outcome 1.2: Reduced vulnerability to climate change in development sectors	Output 1.2.1: Vulnerable physical, natural and social assets strengthened in response to climate change impacts, including variability	5,750,000	17,250,000
(select) (select)				
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(select) (select)				
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(select) (select)				
(select) (select)				
(select) (select)	Others			
Project management cost ⁴			550,000	1,650,000
Total project costs			6,300,000	18,900,000

¹ It is very important to consult the PIF preparation guidelines when completing this template.

² Project ID number will be assigned by GEFSEC.

³ Refer to the reference attached on the Focal Area Results Framework when filling up the table in item A.

⁴ GEF will finance management cost that is solely linked to GEF financing of the project.

B. PROJECT FRAMEWORK

Project Objective: Reduce human and material losses from Glacier Lake Outburst Flooding (GLOF) in Solukhumbu district and catastrophic flooding events in the Terai and Churia Range					
Project Component	Grant Type (TA/IN V)	Expected Outcomes	Expected Outputs	Indicative Financing from relevant TF (GEF/LDCF/SCCF) (\$)	Indicative Cofinancing (\$)
Glacier Lake Outburst Flood (GLOF) risk reduction in the High Mountains	TA	1. Human and material losses from Glacial Lake Outburst Flood (GLOF) events reduced	<p>1.1. Artificial lowering of the lake level in at least 1 hazardous glacier lake (such as Imja, Tsho Rolpa) through controlled drainage</p> <p>1.2. Strengthened connectivity of GLOF monitoring and early warning systems in at least 1 GLOF-prone district (such as Solokhumbu or Dolakha)</p> <p>1.3. All vulnerable communities in at least 1 GLOF-prone district (such as Solukhumbu or Dolakha) are trained in flood preparedness and GLOF risk mitigation</p>	3,500,000	3,900,000
Community-based Flood Risk Management in the Terai/Churia Range	TA	2. Human and material losses from recurrent flooding events in 4 flood-prone districts of the Terai and Churia range reduced	<p>2.1. Stabilization of hazard-prone slopes and river banks in selected communities through bio-dykes and gabion embankments</p> <p>2.2. Flood-proofing of communal water supply and storage facilities in selected communities</p>	2,250,000	13,350,000

			2.3.Strengthening structural integrity of drainage systems in selected communities		
			2.4. Flood preparedness training for district and VDC representatives, NGOs and CBOs in 4 flood-prone districts		
	(select)				
	(select)				
	(select)				
	(select)				
	(select)				
	(select)				
	(select)				
	(select)				
Project management Cost ⁵				550,000	1,650,000
Total project costs				6,300,000	18,900,000

C. INDICATIVE CO-FINANCING FOR THE PROJECT BY SOURCE AND BY NAME IF AVAILABLE, (\$)

Sources of Cofinancing	Name of Cofinancier	Type of Cofinancing	Amount (\$)
GEF Agency	UNDP through - Comprehensive Disaster Risk Management Programme (CDRMP) (5,235,000) - Regional Climate Risk Reduction Project (RCRRP) in the Himalayas (200,000) - Global Climate Risk Management Technical Assistance Support Programme (CRM-TASP) (525,000)	Grant	5,960,000
GEF Agency	UNDP (through core resources)	Grant	400,000
Other Multilateral Agency (ies)	World Bank - (Strategic Programme for Climate Resilience)	Unknown at this stage	2,000,000
Bilateral Aid Agency (ies)	DFID (LAPA initiative) and new climate change adaptation programmes (currently under discussion)	Unknown at this stage	3,500,000
Others	IFRC (DRR flagship Programme)	Unknown at this stage	4,250,000

⁵ Same as footnote #3.

National Government	Contributions by national and local government partners (tbd)	Unknown at this stage	2,790,000
(select)		(select)	
(select)		(select)	
(select)		(select)	
(select)		(select)	
Total Cofinancing			18,900,000

D. GEF/LDCF/SCCF RESOURCES REQUESTED BY AGENCY, FOCAL AREA AND COUNTRY¹

GEF Agency	Type of Trust Fund	Focal area	Country name/Global	Project amount (a)	Agency Fee (b)²	Total c=a+b
UNDP	LDCF	Climate Change	Nepal	6,300,000	630,000	6,930,000
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
Total Grant Resources				6,300,000	630,000	6,930,000

¹ In case of a single focal area, single country, single GEF Agency project, and single trust fund project, no need to provide information for this table

² Please indicate fees related to this project.

PART II: PROJECT JUSTIFICATION

A. DESCRIPTION OF THE CONSISTENCY OF THE PROJECT WITH:

A.1.1 THE GEF FOCAL AREA STRATEGIES:

N/A, as this PIF is for submission to the LDCF

A.1.2. FOR PROJECTS FUNDED FROM LDCF/SCCF: THE LDCF/SCCF ELIGIBILITY CRITERIA AND PRIORITIES:

This PIF was formulated in compliance with LDCF guidelines and aligned with the updated Results-Based Management Framework for the LDCF and SCCF (GEF/LDCF.SCCF.9/Inf.4 from October 20, 2010). Consistent with the Conference of Parties (COP-9), the project will implement **priority interventions from the Nepal NAPA** (corresponding to objectives outlined in NAPA profile 3 'Community-based Disaster Management for Facilitating climate Adaptation' and NAPA profile 4 'GLOF Monitoring and Disaster Risk Reduction'). Along these lines, this project satisfies criteria outlined in UNFCCC Decision 7/CP.7 and GEF/C.28/18. With regards to the LDCF Results Framework, the PIF is aligned with Objective CCA-1 (Reducing Vulnerability: Reduce vulnerability to the adverse impacts of climate change, including variability, at local, national, regional and global level) and compliant with Outcome 1.2 (Reduced vulnerability to climate change in development Sectors). Output 1.2.1 of the LDCF Results Framework (Vulnerable physical, natural and social assets strengthened in response to climate change impacts, including variability) correspond with the main impact indicators of the proposed project.

Through alignment with the key disaster management projects and programs currently under definition and implementation in Nepal, this project will improve the adaptive value of ongoing government, bilateral and multilateral investments in priority vulnerable communities which are most affected by climate-related extreme events. The project will use LDCF resources to finance additional costs of achieving sustainable development imposed by the impacts of climate change. It is exclusively country-driven and will integrate climate change risk considerations into disaster preparedness and risk management systems. In line with paragraph 12 d) of LDCF guidelines, the project will put emphasis on

- Development of early warning systems against climate-related extreme events;
- Monitoring of conditions for, and development of, programs to respond to flooding and glacial lake outburst flooding (GLOF); and
- Raised awareness and understanding of local communities about the necessity and benefits of preparedness for climate hazards.

These priorities are aligned with the expected interventions articulated in the LDCF programming paper and decision 5/CP.9.

A.2. NATIONAL STRATEGIES AND PLANS OR REPORTS AND ASSESSMENTS UNDER RELEVANT CONVENTIONS, IF APPLICABLE, I.E. NAPAS, NAPS, NBSAPS, NATIONAL COMMUNICATIONS, TNAS, NIPS, PRSPS, NPFE, ETC.:

Nepal is one of the most disaster affected countries in the world. The country is exposed to multiple hazards, most prominently floods, landslides, windstorms, hailstorms, earthquakes, forest fires, glacial lake outburst floods (GLOFs) and avalanches. Reports from Nepal's Ministry of Home Affairs (MoHA) show that over the course of the past 10 years, more than 4000 people have died from climate-induced disasters, which have resulted in accumulated economic losses of US\$ 5.34 billion⁶. UNDP's case study on Nepal titled "Economic and Financial Decision-Making in Disaster Risk Reduction" (MoHA, 2010)

⁶ Ministry of Home Affairs, Disaster Preparedness Network, Documentation Centre, 2010

reflects how Nepal will face greater variability in precipitation patterns, with reduced rainfall in winter months and higher rainfall over fewer days during the monsoon, as a consequence of global warming. In a rapidly changing climate, the MoHA concluded that every year, more than 1 million people in Nepal will be vulnerable to climate-induced disasters such as floods, landslides and drought. Partly as a result of these findings, the Government of Nepal has become acutely conscious of the country's vulnerability to climate-induced hazards and integrated priority actions for climate-induced disaster risk management into a number of national policy processes.

Nepal's **National Adaptation Programme of Action (NAPA)**, which was endorsed by the Government of Nepal on 28 September 2010 and represents the country's most recent effort to assess and prioritize immediate climate change risks, concludes that climate-induced disasters are expected to increase with the effects of global warming. Following a similar line of argument as Nepal's **Initial National Communications to the UNFCCC** (2004), the NAPA document highlights that the confluence between low degrees of human and economic development, complex topography and a high dependence on climate-sensitive natural resources has resulted in substantive human and economic losses from climate-related events over the past 10 years. According to the NAPA, "Observations of the effects of increased climatic variability in some parts of Nepal show increasing erratic and intense rains. This climatic trend combined with fragile topography, deforestation and eroded soils are leading to landslides and flash flooding hazards. It is projected that rainfall intensity will increase across many areas of Nepal with climate change. Vulnerable communities will have to increase adaptive capacity to cope with climatic hazards. These hazards also affect the availability of water resources particularly for household use. Water supplies need to be managed so they are climate proofed."

Following these findings, the NAPA identifies 2 priority actions (termed combined profiles) in which UNDP was found to have comparative advantage through its range of existing baseline projects and investments in Disaster Risk Reduction (see Section C of this PIF). Consequently, UNDP was requested by the Government of Nepal to address these priority actions in a combined PIF: In Profile 3, which is addressed by Outcome 2 of this PIF, the NAPA sets out the components considered necessary to address community-based disaster risk reduction and the climate-proofing of communal water sources for disaster-prone communities. Profile 4 of the NAPA, which corresponds with Component 1 of the proposed PIF, focuses on actions required to reduce risks from imminent Glacial Lake Outburst Flooding (GLOF) in high risk areas.

Nepal's NAPA process is embedded within the country's development objectives, which are in turn guided by an overriding poverty reduction agenda. The **Tenth Five-Year Plan/Poverty Reduction Strategy Paper (2002-2007)** and the **interim Three-Year Plans (2007-2010 and 2010-2012)** are aimed at achieving 'a remarkable and sustained reduction in the poverty level in Nepal', which is only possible if development gains are not undermined by climate-related disasters. The Tenth Plan has prioritized disaster management and establishes clear linkages to the **National Strategy for Disaster Risk Management (2009)**. The long term vision of this strategy is to establish disaster resilient communities which are able to bounce back from climate-related shocks and stresses. The strategy aims to mainstream Disaster Risk Reduction into development through sector-based planning, using the principles of the **Hyogo Framework of Action**. Following the logic of the Tenth Plan, the Eleventh Plan continues to establish objectives of human security and promotes protection of livelihood assets from natural disasters through sustainable, environment-friendly and result oriented development. It demands strengthened 'no regrets' disaster management practices which are efficient, effective and able to reduce vulnerability in a changing climate.

The Government of Nepal (GoN) has recently issued the **Three Year Plan (TYP) Approach Paper (2010/11-2013/14)** which has the objectives of promoting green development, making development activities climate-friendly, mitigating the negative impacts of climate change and promoting adaptation. The key expected outcomes of the TYP are to prepare and implement a national framework on climate change adaptation and mitigation, disaster risk reduction, poverty reduction and poverty environment initiatives. With a view on implementing these strategies, the TYP identifies – guided by coordination,

through the Ministry of Environment (MoE) – different sector agencies which will take the lead on certain aspects of NAPA follow-up implementation. In line with this rationale, NAPA priority 3 (‘Community-based Disaster Management for Facilitating climate Adaptation’) and NAPA priority 4 (‘GLOF Monitoring and Disaster Risk Reduction’), which provide the mandate for this PIF, are expected to be addressed through a cooperation between the Ministry of Home Affairs, the Ministry of Environment, the Department of Water Induced Disasters and Prevention (Ministry of Irrigation), the Department of Hydrology and Meteorology (Ministry of Environment), the Ministry of Agriculture, the Ministry of Local Development, and the United Nations Development Programme (UNDP).

B. PROJECT OVERVIEW:

B.1. DESCRIBE THE BASELINE PROJECT AND THE PROBLEM THAT IT SEEKS TO ADDRESS:

- Description of Climate-Related Problem:

Located in geologically young and unstable rugged terrains in the Himalayas, Nepal’s natural environment and ecosystems are diverse and vulnerable. These ecosystems are increasingly threatened by a rapidly growing population that is putting pressure on its fragile natural resource base including land, water, and forest resources. With resource-dependent human settlements relying heavily on these ecosystems for their livelihoods, the deterioration of the environmental and natural resource base has contributed to chronic rural poverty and migration to urban areas, and heavy out migration to India and other countries. Uncontrolled urbanization and spreading infrastructure has contributed to reduced agricultural land, increasing congestion, and environmental degradation associated with the poorly managed disposal of solid and industrial wastes and other forms of pollution.

On top of this vulnerable development baseline comes the **increased intensity and frequency of extreme weather events** which can in part be attributed to anthropogenic climate change (IPCC, 2007). Analysis of temperature trends in Nepal since 1962 shows significant variations between years, but a progressive increase in maximum temperatures is evident in line with global and regional records. From 1977 to 1994, the mean annual temperature is estimated to have increased by 0.06°C annually, and is projected to increase by another 1.2°C by 2030, 1.7°C by 2050, and 3.0°C by 2100 (MoE, 2010). The current impacts of climate change in Nepal materialize in water shortages in the dry season, due to glacial retreat; accumulation of large bodies of water on glaciers or behind thinning moraine dams which increase threats from glacial lake outburst floods (GLOFs); and increasingly erratic rainfall during the monsoon season (shorter, more intense bursts of rain that alternate with longer dry periods) which pose the threat of increased landslides, erosion and reduced groundwater reserves due to excessive surface runoff. These impacts have serious implications particularly with regards to hydropower development, water resources management, and agriculture. The impacts are felt mostly by the poor who live on a subsistence basis.

The transect appraisal exercises undertaken by members of the NAPA Thematic Working Groups (TWG) and the literature review undertaken by the NAPA TWG on ‘Climate Induced Disasters’ reveal a growing trend from human and material losses through climate-induced disasters. More than 4000 people have died in the last ten years due to climate induced disasters which have caused economic losses of \$5.34 billion USD. Every year, more than one million people in Nepal are prone to human and material losses from climate induced disasters such as floods, landslides, and droughts (Ministry of Home Affairs, Disaster Preparedness Network Documentation Centre, 2009).

Fig.1: Time trend of people affected by flooding in the Terai and Churia range

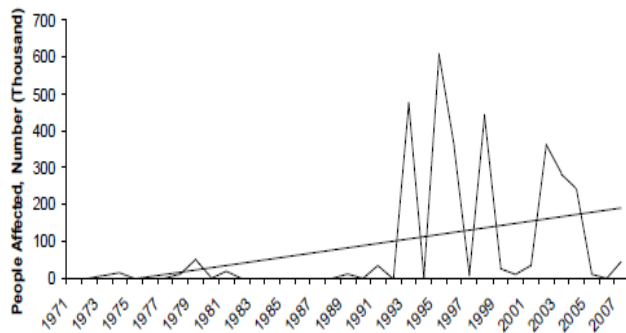
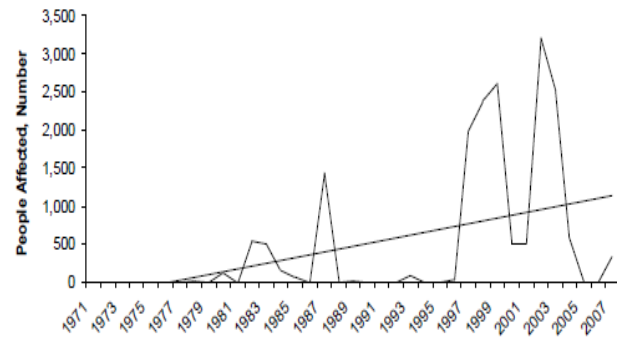


Fig.2: Time trend of people affected by flooding in the High Mountains (includes GLOF events)



Among these threats, flooding has become an increasingly serious concern. There has been a marked increase in the **severity and uncertainty of flooding events in the Terai and Churia range, and growing threats from Glacier-Lake Outburst Floods (GLOFs) in the high mountains.**

With regards to **GLOF threats**, various studies suggest that the warming trend in the Himalaya region has been greater than the global average (ICIMOD, 2007). The most severe threat of this effect is related to the rapid melting of glaciers. As these glaciers retreat, glacial lakes start to form and rapidly fill up behind natural moraine or ice dams at the bottom or on top of these glaciers. The ice or sediment bodies that contain the lakes can breach suddenly, leading to a discharge of huge volumes of water and debris. These are termed Glacial Lake Outburst Floods (GLOFs) and have the potential to release millions of cubic meters of water and debris, with peak flows as high as 15,000 cubic meters per second. During a GLOF, the V-shaped canyons of a normally small mountain stream can suddenly develop into an extremely turbulent and fast-moving torrent, some 50 meters deep. On a floodplain, inundation becomes somewhat slower, spreading as much as 10 kilometers wide. Both scenarios present horrific threats to lives, livelihoods, infrastructure and economic assets for the exposed population. Mountain communities living in the proximity of glacial lakes and glacier fed rivers are particularly at risk, as they live in remote and marginalized areas and depend heavily on fragile ecosystems for their livelihoods.

A recent study by ICIMOD (“Formation of Glacial Lakes in the Hindu-Kush Himalayas and GLOF Risk Assessment”, 2010) reveals that 20 glacial lakes in Nepal are potentially dangerous. The NAPA process has defined 6 of these as the most ‘critical’, i.e. at immediate risk of bursting (MoE, 2010). It is important to note that UNDP is currently supporting the implementation of large-scale GLOF risk reduction projects in Bhutan and Pakistan, which have resulted in a wealth of field-based experience in the respective engineering works needed. As such, UNDP is well positioned to draw on and mobilize know-how and experience on GLOF risk management from its network of Country Offices in the region and it is hoped that this project will be add to knowledge on reducing risk of GLOF globally.

In the **Terai and Churia range**, the hazards of flooding, river course shifting, erosion, landslides, drought, degradation of water quality as well as vector and water borne diseases contribute to an extensive and diverse climate risk profile. The Terai is an almost flat land covered with thick deposit of alternating sand and gravel developing shallow and deep aquifers which store large amounts of groundwater. The area is heavily cultivated and serves as the major food grain production area in Nepal. About 48% of Nepal’s total population are residing in the Terai. Lying to the north of the Terai, the tectonic unit Siwaliks (Churia) forms the newest mountain belt in the Himalayan region. Mountain building processes are still going on, and the landscape is extremely dynamic in terms of climate-induced hazards. The Churia hills are Nepal’s first monsoon barriers, and serve as a water recharge area for the Terai. The hills are composed of easily erodeable sedimentary rocks that have developed steep slopes at several locations. Since the zone is overlying the most active fault, known as Himalayan Frontal Thrust, of the Himalayan region, the zone is also seismically active and earthquake prone. Earthquakes, even of

small magnitude, produce cracks on rocks which go on enlarging during each seismic event. This makes rocks susceptible to landslides and debris flow during the rainy seasons. Major climate change risks of the zone include debris flows, landslides and soil erosion which ultimately deposit sediments on the cultivated land in the Terai. Rivers originated in this zone are seasonal, and the area suffers from intense human encroachment. In this highly dynamic ecological zone, water-induced hazards such as flooding, erosion, landslides, drought and water-borne diseases have been shown to collectively affect marginalized, indigenous and poor people's livelihoods, increase food insecurity and impact on the health of both humans and livestock.

- *Description of Baseline Projects addressing the Climate-related Problem:*

In response to the above challenges, UNDP Nepal has developed an integrated Disaster Risk Reduction (DRR) Programme which provides the main baseline initiative for the proposed project. This programme in Nepal is rooted in a number of discrete financial and technical contributions to the assessment and reduction of climate-related threats in 13 districts (Bara, Nawalparasi, Dolakha, Sindhupalchok, Banke, Sunsari, Sarlahi, Surkhet, Sindhuli, Chitawan, Makawanpur, Tanahu and Syangja). The proposed project will benefit from these initiatives both directly (e.g. through the provision of hazard and vulnerability data in target districts, complementary investment in flood risk reduction and preparedness measures, and mobilization of communal workforce) as well as indirectly (e.g. through providing partnerships with NGOs and CBOs at the local level and enabling well established consultative planning processes to provide input to the project design). In parallel, these initiatives will ensure systematic feedback of field-based experiences to the national policy level. This, in turn, will enable capacity development of national disaster management authorities about no-regrets climate risk management planning, and facilitate evidence-based review of existing climate risk management strategies and plans.

The following projects contribute to UNDP's baseline DRR programme:

- **Comprehensive Disaster Risk Management Programme (CDRMP)**
Financial scope: 15 million USD, of which 5 million USD are funded by UNDP

The CRDMP has been assigned to UNDP through an inter-agency initiative, the Nepal Risk Reduction Consortium. The programme aims to strengthen the institutional and legislative aspects of Disaster Risk Management (DRM) in Nepal, by building the capacities of Ministry of Home Affairs, other ministries, and local governments on climate risk management, community-based disaster risk management, and emergency preparedness and response. The CDRMP focuses on institutional and capacity development for disaster management in the following districts:

- *Mountain Region:* Dolakha, Sindhupalchok, Solukhumbu, Sankhuwasabha;
- *Hilly Region:* Dadeldhura, Rukum, Achham, Syangja, Kaski, Lamjung, Bhaktapur, Kathmandu, Lalitpur, Makawanpur, Baglung, Arghakhachi, Sindhuli;
- *Terai Region:* Kailali, Banke, Nawalparasi, Bara, Saptari, Sunsari, Jhapa, Mahottari.

The CDRMP focuses on the provision of institutional and capacity support, which includes the training of Climate Change and disaster risk management focal points in target districts, the delivery of community based risk reduction trainings, and the establishment of Emergency Operations Centers at the district and central level. A particular strength of the CDRMP lies in the broad array of institutional partnerships it can mobilize to support an effective and coordinated GLOF and flood risk management effort under the proposed project. CDRMP has established effective working relationships with technical focal persons in the Department of Hydrology and Meteorology (DHM), the Ministry of Home Affairs (MoHA), the Ministry of Local Development (MOLD), the Department of Water Induced Disasters and Prevention (DWIDP) under the Ministry of Irrigation, and the Department of Soil Conservation and Watershed Management (DSCWM) under the Ministry of Forests and Soil Conservation. Apart from government partners, CDRMP's partnerships include research institutions and NGOs such as Kathmandu University, Tribhuvan University, the Government Staff College, the National Academy of Science and¹⁰

Technology, ICIMOD, and a number of local NGOs and CBOs which have already been involved in hazard and risk assessments, small mitigation measures, and capacity building of communities and local government bodies in various districts. As a flagship project for Disaster Management in Nepal, the CDRMP is well placed to mobilize resources from various funds to address any co-financing gaps that may be identified in the project preparation phase.

With a view on GLOF risk reduction, CDRMP's engagement in Dolakha and Solukhumbu (where Tsho Rolpa and Imja Lake are located) will provide complementary investment to address institutional and training aspects of a comprehensive Early Warning and risk communication system downstream of hazardous glacier lakes. In the Terai/Churia range, the CDRMP will play a similar role in 2 out of the 4 selected target districts (Jhapa and Mahottari). Through CDRMP-funded Emergency Operations Centres (EOCs), the proposed LDCF project will be able to connect local efforts in flood early warning and preparedness with a network of district and central-level institutions which can effectively process and relay flood risk and early warning information to hazard-prone sites. This connectivity is essential for Output 1.2 and 2.4 of the proposed PIF.

- **Regional Climate Risk Reduction Project in the Himalayas (RCRRP) – Nepal Component**

Financial scope: USD 200,000

The RCRRP is supported by the European Commission's Humanitarian Aid office (ECHO) and implemented by the United Nations Development Programme's (UNDP) Bureau for Crisis Prevention and Recovery (BCPR). The aim of the project is to develop and implement comprehensive risk management strategies to address climate-induced hydro-meteorological hazards in the Himalayan region. In the process, feasible measures to reduce the risks faced by mountain communities and to mitigate impacts of hydro-meteorological/climatic hazards are being identified and implemented at community and local administration level. The RCRRP is supporting capacity development for disaster risk reduction through the following actions: Delivering community-based disaster risk management training for communities and government agencies, conducting hazard vulnerability and risk assessments, preparing feasibility studies for low cost early warning systems, delivering school-based training in disaster risk reduction, developing school manuals for disaster risk reduction, and supporting the preparation of community disaster preparedness and response plans.

While its limited financial scope is restricting the outreach of the RCRRP, the project has responded to the rising GLOF threat from Tsho Rolpa through establishing a community-based, low tech Early Warning system (EWS) in 3 downstream communities. The initiative is an important starting point for GLOF risk reduction, but of insufficient scale to incorporate other communities downstream of Tsho Rolpa (such as Beding, Syalu, Suri Dovan, Bhorle, Singati, Nagdhaha, Khimti, and others as far as 100 kilometers down the projected GLOF impact zone). The proposed LDCF project will build on the experiences from the RCRRP and expand the range of communities in all high risk areas downstream of Tsho Rolpa. It will benefit from a range of GLOF hazard maps that were developed with RCRRP financing, and utilize the community based disaster risk management training kits that the RCRRP has developed and adopted.

- **Regional GLOF Risk Reduction Project (RGLOFRRP) - Nepal Component**

Financial scope: USD 295.000

This project was designed to address the problem of Glacial Lake Outbursts Floods (GLOF) in the Himalayan region and enable comparative analysis of GLOF threats and risk mitigation efforts in Nepal, Bhutan, India and Pakistan. This comparative analysis found that a coordinated approach combining structural with sociological and community based methods is necessary to prepare vulnerable communities against the threat of GLOFs and glacier melts in the targeted sub-region. The project has provided a community-based risk assessment of GLOF risk from Imja Lake and Tsho Rolpa, which is the focus of Component 1 under the proposed PIF and will be a key starting point for more comprehensive stakeholder discussions about the prioritisation of target sites, the selection of an appropriate bundle of

risk reduction actions (including controlled drainage, early warning and community-based preparedness training), and the exchange of concrete technical experience from other GLOF projects in the region.

- **Climate Risk Management Technical Assistance Support Project (CRM-TASP)**

Financial scope: USD 525,000

The CRM-TASP project analyzes risks to development that are associated with climate variability and change, and prioritizes measures that will assist countries in better managing those risks in both the short and longer terms. It advocates managing risks at all time scales (weather, climate, extremes, changing climate) and integrates the analysis of climate-related risks with analysis of the institutional, decision and policy landscape; consensus-based identification and prioritization of risk management actions (in alignment with the NAPA); development of decision-support tools; and the mainstreaming of climate risk management into local and national development processes.

In the context of the proposed LDCF project, the CRM-TASP project provides connectivity with a Regional Multi-Hazard Early Warning System (RIMES), which is coordinated by the Asian Disaster Preparedness Center in Bangkok. RIMES provides flood and storm early warning information to a number of Asian Countries, which can then be transmitted from Hydromet Departments (such as DHM) to regional and local partners. This connectivity is essential when establishing flood risk management systems and early warning protocols in the Terai/Churia Range. The PPG phase will analyze how such connectivity could be optimized with a view of providing timely and accurate early warning information to local inhabitants in the target districts. In addition, the CRM-TASP project has developed a number of training modules on climate risk management which can potentially be adopted, thereby reducing duplication of efforts and investments.

B. 2. INCREMENTAL /ADDITIONAL COST REASONING: DESCRIBE THE INCREMENTAL (GEF TRUST FUND) OR ADDITIONAL (LDCF/SCCF) ACTIVITIES REQUESTED FOR GEF/LDCF/SCCF FINANCING AND THE ASSOCIATED GLOBAL ENVIRONMENTAL BENEFITS (GEF TRUST FUND) OR ASSOCIATED ADAPTATION BENEFITS (LDCF/SCCF) TO BE DELIVERED BY THE PROJECT:

In alignment with priority adaptation strategies identified by the Nepal NAPA, the proposed project will aim to:

- Reduce human and material losses from Glacier Lake Outburst Floods in the High Mountains;
- Reduce human and material losses from unpredictable flooding events in the Terai and Churia range

Definition of target areas for the proposed project will be finalized over the course of the project preparation phase, based on data from existing risk and vulnerability assessments and analysis from national and regional scientific sources. At the time of PIF submission, stakeholder discussions have provided coherent, vulnerability-based arguments for the following possible sites:

- GLOF risk reduction: Imja Lake (Solukhumbu), Tsho Rolpa (Dolakha District)
- Community-based flood risk management in the Central and Eastern Terai and Churia Range: Mahottari (Central Terai), Jhapa (Eastern Terai), Sarlahi (Central Terai), Ilam (Eastern Terai/Churia).

Component 1: Glacier Lake Outburst Flood (GLOF) Risk Reduction

Baseline:

The risk of an outburst flood from **Imja Lake in Solukhumbu** and **Tsho Rolpa, Dolakha** district is very high in comparison to other glacial lakes in Nepal (ICIMOD, 2010). Over the course of the project preparation phase, both sites will be validated and reviewed taking into consideration field level

studies, feedback from expert institutions (such as ICIMOD) and the cost of required GLOF mitigation actions. Based on this validation, one site will be proposed for risk reduction using LDCF resources, while an active effort will be made at mobilizing additional bilateral financing to include the second site into the project as well.

The baseline situation for Imja Lake (Solukhumbu District) is as follows:

Studies conducted by ICIMOD and other institutions have reported that Imja Lake is posing a high risk to several villages downstream. This lake, situated in the Khumbu Region, is the headwater of the Imja River which is fed by the Imja Glacier. Imja Lake did not exist in the early 1960s and it started growing rapidly thereafter attaining an area of 0.3 km² in 1975. Growth of the lake has been quite rapid and it covered an area of 0.56 km² in 1983, 0.63 km² in 1989 and 0.77 km² in 2000. According to the most recent field survey, the lake has attained the area of 0.83 km² (Yamada 2003). The rate of expansion of the lake is such that it may increasingly have a significant negative impact on settlements, livelihoods, infrastructure and socio-economic development downstream. It is estimated that a total area of 1010 hectares up to 101.2 kilometer downstream of Imja Glacial Lake is exposed to GLOF risk. 56% (567.00 ha) of flood inundation is projected to occur along the river course itself; the remaining 44% of flooding will affect agricultural land, forest, grass, and bush land. Among these, about 88 ha of agricultural land, 207 ha of forest, 24 ha of bush land, 54 ha of grass land, and about 36 ha of barren land are exposed to the GLOF risk (ICIMOD, 2011). In addition, mountains are important assets for the tourism industry. They take up an estimated share of 15-20% of the global tourism market, generating between 100 and 140 billion US\$ per year (ICIMOD, 2011) and the significance of Imja Lake which is connected to the Mount Everest region is one of the world's most sought after adventure destination. In 2009, 2,693 summiteers climbed Mount Everest (Nepal Tourism Board, 2009) and more than 20,000 tourists visited Mount Everest region and the impact of GLOF to the downstream infrastructure catering to the intangible tourism benefits can be manifold.

Moreover, the rate of retreat of the Imja Glacier is among the highest noticed in the Himalayan region at a staggering 74 meters per annum. These factors combined make the Imja Lake possibly one the most high risk glacial lake in the entire Himalaya-Hindu Kush range.

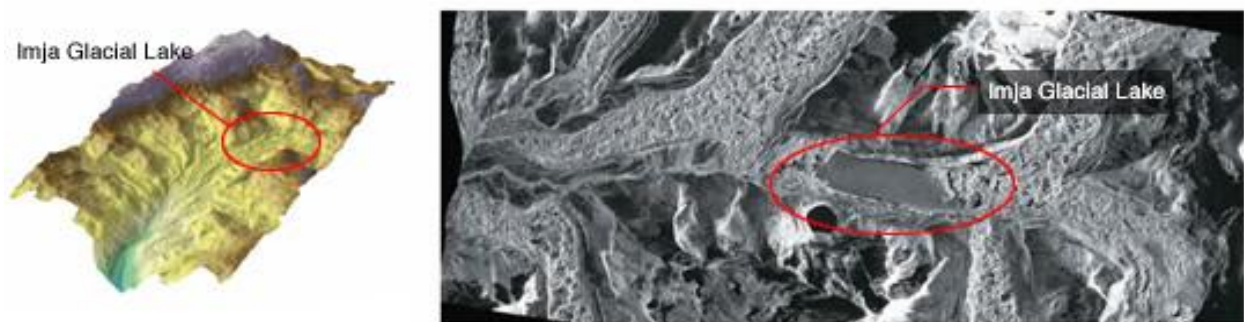


Fig.3: Digital elevation model and Topographic interpretation of the area surrounding Imja Glacial Lake Image (Infoterra, 2008)

A number of initiatives, including the UNDP/DIPECHO-funded Regional GLOF Risk Reduction project, have analyzed the threat from Imja Lake and highlighted the urgent necessity to undertake structural measures to prevent a catastrophic outburst flood. In 2007, a team from the Asian Institute of Technology (AIT) extended WiFi (wireless LAN) from the Namche village to Imja Lake, which is more than 27 km away, and linked up a Field Server to capture images and meteorological data. This data was transferred real-time to a server located in Japan (<http://fsds.dc.affrc.go.jp/data4/Himalayan/>). Since then, ICIMOD is strongly engaged in the monitoring of Imja Lake, both through direct observation, remote sensing and the SERVIR project.

An ICIMOD risk assessment report has estimated lead time, discharge rate and possible impacts at various strategic locations in downstream villages of Imja lake. Projected flood arrival time and discharge rates in various locations downstream from Imja Lake are as follows:

Place	Time (min)	Discharge (m ³ /s)
Imja Lake outlet	0	5,461
Dhusum (Chukung)	8.8	5,242
Dinboche	13.90	5,094
Orso	18.8	4,932
Panboche	21.30	4,800
Laria Dovan	34.8	3,223
Bengkar	38.8	2,447
Ghat	46.4	2,355
Nakchung	55	2,166

Tab.1: Projected flood arrival time and discharge rates from an Imja GLOF event

Settlements vulnerable to a GLOF event from Imja Lake:

Name	Description
Dhusum (Chukung)	Whole village within flood zone
Dinboche	Part of agricultural land and a few houses within flood zone. Almost all agricultural land in northeastern part and half in southern part in highly vulnerable zone
Churo	Agricultural land in highly vulnerable zone.
Orso, Lhowa, Sano Ghumela, Nakchung, Panboche	Agricultural land along riverbank in highly vulnerable zone.
Syomare	Agricultural land and some houses in highly vulnerable zone.
Milingo	Edge of agricultural land along riverbank in highly vulnerable zone.
Deboche	Some houses on edge of cliff along riverbank in highly vulnerable zone.
Jorsalle, Chhumo, Ngombuteng, Chhermading	Some houses and agricultural land along riverbank in highly vulnerable zone.
Bengkar	Some houses, trails and agricultural land along riverbank in highly vulnerable zone.
Rangding	Houses & agricultural land in flood zone and highly vulnerable zone.
Phakding	Agricultural land along riverbank in flood zone and highly vulnerable zone.
Chhuthawa	Some agricultural land along riverbank in flood zone.
Ghat	Some agricultural land & trails along riverbank in highly vulnerable zone.

Tab.2: Hazard-prone locations and livelihood assets in valleys downstream of Imja Lake (UNDP, 2010)

At present, although a number of assessments have highlighted the imminent risk of a catastrophic GLOF event from Imja Lake, no dedicated GLOF risk reduction project has been undertaken. The government is involved in the planning of structural mitigation measures and takes an active interest in monitoring the lake level. Without LDCF support, as global warming progresses to increase the water body of Imja Lake, the risk of a catastrophic outburst flood will increase and the above-mentioned villages, agricultural assets and tourism assets will remain at very high risk of catastrophic losses.

The baseline situation for Tsho Rolpa Lake (Dolakha district) is as follows:

Tsho Rolpa, the largest glacial lake in Nepal is located in the Rolwaling Valley, approximately 30 km Southwest of Mount Everest. It has formed over the last forty years as the Trakarding glacier had melted and retreated. The lake, which is at an elevation of 4580 m, is approximately 3 km long, 0.5 km wide and up to 130 m deep. According to ICIMOD, Tsho Rolpa is one of the most vulnerable lakes to a Glacial Lake Outburst Flood (GLOF) event in the Himalaya region.

The chance of the natural moraine dam that holds the water back breaking is high. If the dam is breached, the resulting flood event would release of approximately 80 million cubic metres of water which would cause serious damage for more than 100 km downstream, threatening as many as 6000 lives, the₁₄

construction site for a 60 MW hydroelectric project, and other infrastructure. The damage would have a serious macroeconomic impact on the economy of Nepal. The current risk of moraine dam failure is considered to be increasing rapidly: A Moraine Dammed Lake Breach could be triggered according to MacDonald and Langridge-Monopolis (1984) by either breaches formed by erosion of dam material or by breaches formed by sudden removal of a portion of the dam material (like due to earthquake, geo-technical failure, etc.). Both of these issues are considered a threat to Tsho Rolpa.

ICIMOD has carried out GLOF modeling of Tsho Rolpa glacial lake and their downstream impact assessment as a part of a Sida Funded Program "*Too Much Water, Too Little Water*" and World Bank funded GLOF Risk Assessment Project. Table 3 demonstrates the estimated land cover types that are likely to be exposed due to a 20 meter dam breach of Tsho Rolpa Glacial Lake (ICIMOD, unpublished).

Land Cover Types	Area (in Ha.)	Percent
Agriculture Land	169.83	20.38
Forest	68.62	8.24
Bush	37.44	4.49
Grass	4.24	0.51
Barren Land	38.06	4.57
River Course	514.95	61.81
Total	833.15	100.00

*Source: Topographic Map, DoS, 1996

Tab. 3. Land cover types that could be affected by GLOF event at Tsho Rolpa

Table 4 details the socioeconomic vulnerability of communities, property and livelihoods which would be immediately affected by a GLOF event at Tsho Rolpa. Table 5 outlines possible economic impacts.

Glacial lakes	Tsho Rolpa	
Flood Scenario	Modeled flood	Maximum
No of households living inside flood-prone area	142	331
No of households having property inside flood-prone area	280	835
Total	422	1166
No of people living inside flood-prone area	680	1604
No of people having property inside flood-prone area	1305	3579
Total	1985	5183
No of 'pakki' houses	85	200
No of 'kacchi' houses	60	130
Total	145	330
Area of 'khet' land (ropani)	478	2227
Area of 'bari' land (ropani)	48	314
Total	526	2541

Tab. 4: Summary of lives and property exposed to GLOF risk from Tsho rolpa (Source: ICIMOD (2011) Glacial lakes and glacial lake outburst floods in Nepal. Kathmandu: ICIMOD

Glacial lakes	Tsho Rolpa	
Flood scenario	Modeled flood	Maximum 35m
Real estate	1,411	6,524
Agricultural sector	117	330
Public infrastructure	319	1,928
Revenue	0	0
Total	1,847	8,781

Tab. 5: Summary of monetary value of elements exposed to a potential GLOF risk (USD '000) (ICIMOD 2011)

Recognizing the high level of threat, the Tsho Rolpa Mitigation and Early Warning Programme was the first glacial lake outburst flood operation to include civil engineering structures in the entire Himalaya-Hindukush region. It has installed siphons over part of the terminal moraine of Tsho Rolpa in May 1995. The project was undertaken in cooperation with the Netherlands-Nepal Friendship Association. Although the test siphons were installed successfully, the induced outflow was far below the requirements to ensure that the lake level could be reduced by the targeted 3 metres. In a second phase, which was supported by a contribution of \$2.9 million from the Dutch Government, an open channel was cut through the moraine dam and a 4 meter deep artificial spillway succeeded in lowering the lake level by 3 metres. The spillway construction was completed by the Tsho Rolpa GLOF Risk Reduction Project of the Department of Hydrology and Meteorology in June 2000. An establishment of 15 kW hydropower plant has been established in the outlets of the lake and this is serving to fulfill the energy requirements in the offices in the outlet.

A first Early Warning System (EWS) installed at Tsho Rolpa and the villages of the Tamakoshi valley in May 1998 was intended to warn people living in downstream areas in the case of a GLOF event, and consisted of a GLOF sensing and warning system. The sensors should detect the occurrence of a GLOF and transmit relevant information to the transmitter station thus setting in motion the warning process. Even though several GLOF warning stations exist, as well as a GLOF sensing station which can theoretically transmit and receive signals from a Meteor Burst master station installed in Western Nepal, the EWS is not able to provide adequate warning (especially if two or more successive stations fail). At the present point in time, there is no reliable means to monitor the moraine dam to determine where and when it might fail/has failed. In its present state, the existing EWS at Tsho Rolpa is considered a failure due to the system being too technologically advanced and beyond the technical capacity of the local people to handle repair and maintenance.

Adaptation Alternative:

LDCF resources will be used to finance a controlled, artificial drainage project at Imja Lake or Tsho Rolpa, pending a participatory and comprehensive prioritization over the course of the PPG phase. Following the models from Lake Thorthomi in Bhutan (which is also financed by the LDCF), the level of water in the glacial lake will be reduced by opening a channel which may be regulated by a sluice gate. Reducing the level of a glacial lake in a remote, high altitude area that is distant from various supply and transportation routes is extremely labor-intensive. As most of the work of lowering the lake will entail manual excavation by a large workforce, materials such as spades, pickaxes, shovels, crowbars, etc. need to be procured and appropriate precautions with regards to workforce health and safety need to be undertaken (safety and evacuation plans; nutritional rations; protective clothing; health screening and insurance; emergency equipment). While some of this equipment will be provided by other projects and existing government teams, LDCF funds will be crucial in funding the cash-for-work and health/safety arrangements required. Lessons from UNDP-supported GLOF projects in Bhutan and Pakistan will serve to ensure cost efficiency in the design of this project (to be undertaken during the PPG phase). Modalities of joint procurement will be explored. While LDCF financing under Outcome 1 is not sufficient to finance an Early Warning system, the project will establish alignment with investments undertaken by other projects (especially the CDRMP, the RCRRP and the World Bank-funded SPCR) and mobilize cofinancing for an early warning system which can operate in all villages downstream of the targeted glacial lake. Remote sensing and GIS data will be linked up with this system, and existing hazard zonation maps will be used to design this Early Warning system. The SPCR has confirmed active interest in such a co-financing partnership; Further consultations are planned for the PPG phase under the leadership of the Government.

Component 2: Community-based Flood Risk Management

Baseline:

In the Terai and Churia range, rainfall during the monsoon season is caused by the influence of both the south-east and south-west Monsoon. The time from June to September is characterized by intense rainfall amounting to 80% of the total rain registered per year. During the monsoon, rivers originating from the Mahabharat range cause great damage in floodplains of the Terai region. Riverine floods from the major perennial rivers generally rise slowly in the southern Terai plains; inundations of large areas are due to overflowing river banks resulting in extensive damage to life and properties. Flash floods, which occur with little or no warning, are characterized by a minimal time lapse between the start of the flood and peak discharge. These floods are extremely dangerous because of the suddenness and speed with which they occur. They are triggered by extreme rainfall, glacial lake outbursts, or the failure of dams – whether man-made or caused by landslides, debris, ice, or snow. Water flow in the rivers in the Churia range in southern Nepal is characterised by a sharp rise of flood water followed by a rapid recession, often causing high flow velocities, resulting in damaged crops, property, lives, and livelihoods. Damming of a river by a landslide is a potentially dangerous situation. Such a blockage of the river flow is more common in narrow valleys where the slopes are steep on both sides of the river. Landslide dams will eventually collapse, causing heavy downstream flooding resulting in loss of life and property.

To address climate-induced flooding, landslide and erosion threats in the Churia and Terai region, UNDP has undertaken a number of concrete disaster risk reduction efforts in various districts. Based on UNDP's analysis integrated into the NAPA document and the Des Inventar Report (NSET, 2010), 10 districts have been identified as most vulnerable in terms of floods, landslides and overall climate induced risk. This provides a suitable starting point for the prioritisation of target districts for the proposed initiative (at the present point in time, the districts of Sarlahi, Mahottari, Jhapa and Ilam have been proposed for further analysis during the PPG phase). Additional works are envisaged under UNDP's CDRMP initiative in the Jhapa, Mahhattori districts of East Nepal. Through cooperation with ActionAid, UNDP has financed embankment protection; construction of culverts; raising of handpumps; construction of emergency shelters; installation of gabion boulder blocks along riverbeds to prevent erosion; installation of community Based Early Warning Systems; and the design of Emergency Plans of Action. These efforts have been complemented by integrated watershed management approaches for flood risk reduction in the Pasaha Khola Watershed of Bara District, and Kerunge Khola Watershed in Nawalparasi District in collaboration with the Department of Soil Conservation and Watershed Management (DSCWM) and the Department of Water Induced Disaster Prevention (DWIDP). In addition, a UNDP-FAO supported project- "Enhancing Capacities for Climate Change Adaptation and Disaster Risk Management for Sustainable Livelihoods in Agriculture Sector" is assisting the Ministry of Agriculture and Cooperatives (MoAC) in testing and operationalising the process of shifting from a reactive emergency response intervention approach towards a pro-active natural hazard risk prevention/preparedness oriented approach in the agricultural sector. The project has demonstrated climate change adaptation practices in two selected pilot districts (Banke and Surkhet) to address climate variability on crops and increase awareness by local communities about evolving climate risks. These efforts do not only provide insights into the factors that underpin the vulnerabilities of rural livelihoods, but also a range of complementary experiences to draw on with regards to what has worked in assessing, communicating and responding to climate risks in flood-prone agricultural areas.

Adaptation Alternative:

LDCF resources will be used to address and establish community based actions in connection to flood risk management by focusing mainly the marginalized community including women. The initiative will identify flooding, landslide and erosion-related vulnerabilities in 4 districts of the Terai/Churia area and address evident investment gaps in flood risk management that have been identified by UNDP and other development partners. The tentative selection of four target districts (**Sarlahi, Mahottari, Jhapa and Ilam**) is based on the vulnerability index created during the NAPA process, the Nepal Hazard Risk₁₇

Assessment (GoN/WB/ADB/ADPC/NGI/CECI), Nepal’s disaster database (based on Des Inventar), and on synergies with existing DRR baseline work that has created successful partnerships with local development planners and community-based organizations, and opportunities to leverage complementary financing to achieve a larger impact. LDCF financing will thereby address critical investment gaps that have not yet been addressed by any other project. The proposed districts will be revalidated and reviewed during the PPG phase, building of additional field level assessments and additional stakeholder consultations. Based on this revalidation, the most vulnerable districts in the Terai/Churia range will be included as target areas in the programme document.

Corresponding to NAPA priority profile 3, which has emphasized the necessity to ‘climate-proof’ water-supply from climate-related hazards, LDCF funds will be used to address the lack of drinking water during flood events which is a critical problem for many villages. It has been found that a minor correction in the design and installation of communal wells and handpumps can ensure the availability of safe drinking water during flooding events, avoid freshwater contamination and avoid damages to critical infrastructure in times of disaster. A side benefit of this measure is that the elevation of handpumps and the protection of the well sites will result in reduced instances of water borne diseases. In addition, LDCF resources will be used to establish low-tech flood- and rain-gauges, and enable investments in embankment protection and flood control in flood- and slide-prone areas. The suite of LDCF investment actions will include the following community-based climate risk management measures:

- Flood-proofing of handpumps:



- Flood gauges:



- Gabion spur construction:



- ‘Safe Exit’ drainage culverts:



- Embankment protection:



B.3. DESCRIBE THE SOCIOECONOMIC BENEFITS TO BE DELIVERED BY THE PROJECT AT THE NATIONAL AND LOCAL LEVELS, INCLUDING CONSIDERATION OF GENDER DIMENSIONS, AND HOW THESE WILL SUPPORT THE ACHIEVEMENT OF GLOBAL ENVIRONMENT BENEFITS(GEF TRUST FUND) OR ADAPTATION BENEFITS (LDCF/SCCF). AS A BACKGROUND INFORMATION, READ [MAINSTREAMING GENDER AT THE GEF.](#):

At a local level, LDCF funding will reduce the vulnerability of communities in 4 districts of the Terai and Churia region to flooding hazards and reduce human and economic losses from catastrophic flooding events. In the High Mountains, LDCF resources will protect livelihoods and critical communal infrastructure downstream of Imja lake/Tsho Rolpa from a glacial lake outburst flood (see Tab.2, 4,5). By focusing on investments which protect critical, shared community infrastructure from climate-related shocks and extreme events, LDCF financing will directly reduce potential for conflict, ensure equal access of community members to the benefits of adaptation-related investments, and counter existing trends of relocation. As vulnerability to climate change is not only exacerbated by inequalities in exposure and sensitivity to climate-related hazards, but also by inequalities in access to resources, capabilities and opportunities, the project will ensure that disadvantaged community groups will not be rendered more vulnerable to the impact of natural disasters (Neumayer & Plümper,2007). In addition, the project will address the lack of awareness in communities about the impacts of climate change and enable access of risk and early warning information by disadvantaged and marginalized groups. As women are traditionally more vulnerable to the effects of disasters, and at the same time instrumental in achieving disaster preparedness of livelihoods, the project will make a special effort to address gender-disaggregated flooding impacts and mobilize women as multipliers for flood risk preparedness.

At the national level, LDCF funding will enable the government of Nepal to address important investment gaps in community-based climate risk reduction. Many of these gaps have been highlighted in a number of previous assessments by development partners but never been followed up due to a lack of adaptation financing. These investments will address a number of factors which have contributed to Nepal’s growing vulnerability. Of the total households in the country, nearly 78% are agricultural households which are poorly diversified and largely dependent on variable monsoons. Access to safe drinking water, health care and sanitation is below South Asian standards and with a population growth rate of 2.25% annually over the last decade, a growing rate of poverty is projected. Lack of clean drinking water, poor sanitation, hygiene and malnutrition are among the main reasons for public health problems in the target areas. Out of 400 deaths in a recent diarrhoeal outbreak in Western and Far Western districts, one- third of the

reported dead were women and children from marginalized groups (Source: Oxfam GB, 2010.) These groups are more vulnerable than the rest of the population due to already existing economic and cultural disparities in livelihood resilience. With such a potent mix of baseline vulnerability factors, climate-related disasters are expected to set back development gains, undermine the livelihood resilience of rural populations (especially women and marginalized communities) and increase migration to sprawling urban centers.

With regards to socio-economic benefits, it is worth highlighting that this project will draw on UNDP's experience in gender-sensitive adaptation planning. The UNDP (2008c) Resource Guide on Gender and Climate Change and the Gender Mainstreaming Learning Manual (UNDP, 2000) present principal conceptual and methodological advances on gender relations in the context of climate change. The respective guidelines will be used to integrate gender perspectives into the programming of climate change adaptation activities, and ensure that gender-disaggregated vulnerability data are considered when planning the investments under this project.

B.4 INDICATE RISKS, INCLUDING CLIMATE CHANGE RISKS THAT MIGHT PREVENT THE PROJECT OBJECTIVES FROM BEING ACHIEVED, AND IF POSSIBLE, PROPOSE MEASURES THAT ADDRESS THESE RISKS TO BE FURTHER DEVELOPED DURING THE PROJECT DESIGN:

The proposed project is based on strong government support and can draw on important pilot experiences that have been derived from 5 UNDP-supported disaster risk reduction projects in the target districts. This reduces strategic and organisational risks to the project. At this point, the main risks for the project can be summarized as follows:

	Risk	Level of Risk	Mitigating Action
1	Too many different/divergent stakeholder interests in target sites may prevent efficient consensual decision-making	L	Identification of the appropriate government agencies, implementing partners and project implementation arrangements prior to project inception
2	Costs of water retention structures and climate proofing water supplies prohibit sufficiently wide- scale construction and installation.	H	Assessment of possibilities to cost-share installations with public and/or community funds; Assessment of co-financing opportunities with SPCR, DFID, EC, DANIDA, JICA and other development partners in target sites
3	Lack of community involvement in some project sites	M	Assessment of available community workforce and cash-for work-modalities in target sites prior to project inception
4	The timing of co-financing investments is out of sync with LDCF disbursements	L	Securing firm commitments of responsible agencies during the project design stage and ensuring joint investment planning
5	Political instability and discontinuity at national level and in project sites	M	Defining project implementation arrangements which enable efficient project implementation in unstable political conditions
6	Risks to workforce health and security in remote, high altitude project areas	M	Appropriate budgeting and resourcing of engineering and safety plans; ensuring availability of safety equipment and insurance mechanisms for project workforce; delineation of contingency plans and medical safeguards

B.5. IDENTIFY KEY STAKEHOLDERS INVOLVED IN THE PROJECT INCLUDING THE PRIVATE SECTOR, CIVIL SOCIETY ORGANIZATIONS, LOCAL AND INDIGENOUS COMMUNITIES, AND THEIR RESPECTIVE ROLES, AS APPLICABLE:

The key stakeholders for the proposed project are found as below. However, the implementation arrangements and implementation agency will be assessed during the PPG phase, after a more detailed capacity assessment and a well founded analysis. Ministry of Environment/Climate Change Management Division will remain the coordinating agency of this project.

Key Stakeholders	Roles
Ministry of Home Affairs (MoHA)	The Ministry of Home Affairs (MoHA) will be an implementing agency for the proposed project. Since MoHA has the mandate to work on disaster risk and preparedness activities under GON, the work will be closely linked under their jurisdiction. MoHA will have an executive role as a member to the Project Executive Board.
Ministry of Environment (MOE) <ul style="list-style-type: none"> • Climate Change Division • Department of Hydrology and Meteorology (DHM) 	The Ministry of Environment (MoE) will ensure alignment of the proposed project with Nepal’s NAPA follow-up programme. MOE hosts a newly established Climate Change Management Division under the mandate of the Government of Nepal and MoE is the Secretariat to the Climate Change Council chaired by the Hon. Prime Minister to Nepal. MoE has a coordinating role for NAPA follow-up programming. The Department of Hydrology and Meteorology (DHM) of the Ministry of Environment will be one of the implementing agencies for this project. DHM has the mandate and responsibility to work on GLOF EWS and climate data collection/analysis. DHM will have a technical and an executive role as a member to the Project Executive Board.
Ministry of Irrigation <ul style="list-style-type: none"> • Department of Water Induced Disasters and Prevention (DWIDP) 	The Department of Water Induced Disasters and Prevention (DWIDP - Ministry of Irrigation) will be an implementing agency for this project. DWIDP is implementing a number of flood management and flood mitigation projects in the Terai/Churia area. DWIDP will have an executive role as a member of the Project Executive Board.
Ministry of Local Development (MoLD)	MoLD will be one of the implementing partner agencies for this project. MoLD has a link to all district-level government institutions/bodies and is the nodal agency for local development planning. The proposed project will deliver its localized community-based activities in the context of MoLD planning processes. MoLD will support the project activities as a member to the Project Executive Board.
Ministry of Agriculture and Cooperatives (MoAC)	The Ministry of Agriculture and Cooperatives (MOAC) is included as a key stakeholder. They have experience in working in climate change adaptation and disaster risk reduction.
International Center for Integrated Mountain Development (ICIMOD)	The proposed project will build on ICIMOD’s long-standing experience in monitoring and analyzing GLOF risk in the Himalaya Hindukush region. ICIMOD’s technical input will inform all GLOF-related aspects of the proposed project and bring previous experiences working on GLOF drainage and EWS issues to bear. ICIMOD will have an advisory role to the project as a member to Advisory Board.

UK Aid / DFID	UK Aid / DFID have been a dedicated partner to the Government of Nepal in addressing climate change issues. UNDP and DIFD have a good working relationship and this partnership was well recognized while supporting implementation of the NAPA project. The proposed project is a follow up to the NAPA and dovetails with DFID's commitment to climate risk management and disaster risk reduction. DFID is seen as a potential partner and donor to the proposed project to support community based climate risk management and GLOF risk reduction. DIFD will have an advisory role to the project as a member to the Advisory Board and possibly – pending their financial involvement in the project - a decision making role as a member to Project Executive Board.
UNDP	Adopting the project implementation arrangements of the CDRMP, UNDP will provide the Government of Nepal with an option to serve as Implementing Partner for this project (implementation arrangements will be explored during the PPG stage). In this role, UNDP would ensure project execution on time, on scope and on budget and draw on technical services provided by its regional offices and headquarters to provide technical quality assurance.
UN-HABITAT	UN-HABITAT will have a technical advisory role under this project and a seat on the Project Advisory Board. The joint work of UNDP and UN-HABITAT on Koshi Flood Early Recovery will be built upon to ensure effective flood prevention design and implementation.
FAO	FAO will have a technical advisory role under this project and a seat on the Project Advisory Board. Through its vulnerability assessment work on food security, FAO can support community-based consultations with regards to the links between food and water security in the target areas.
Key NGO & private sector partners	The NGO federation will represent the role of beneficiaries under this project. They will also be a member of the Advisory Board.
District level authorities <ul style="list-style-type: none"> • District Disaster Relief Committee • District Soil Conservation Office • District Chapter of DWID • District Development Committee • District Forest Office • Women Development Office • District Energy and Environment Unit/Sections • Emergency Operations Centers 	District level authorities are essential stakeholders for this project. They will systematically coordinate and link with the central level authority of respective agencies, and represent the contributions and interests of their agencies in the context of the project. Emergency Operations Centers (EOC) in the proposed districts will coordinate/build collaboration with the project team to act as multipliers for disaster preparedness activities.

B.6. OUTLINE THE COORDINATION WITH OTHER RELATED INITIATIVES:

As outlined in Section B.1, the proposed project will build on UNDP's existing Disaster Risk Reduction portfolio and thereby coordinate with the following UNDP-led initiatives:

- 1) Comprehensive Disaster Risk Management Programme (CDRMP);
- 2) Regional Climate Risk Reduction Project in the Himalayas (RCRRP-Nepal Component);
- 3) Regional GLOF Risk Reduction Project (Nepal component);
- 4) Climate Risk Management Technical Assistance Support Project (CRM-TASP)

These projects will provide hazard, risk and vulnerability data to enable the definition of target sites and evident investment gaps for climate risk management; provide financial resources for complementary investments, especially in the field of community preparedness and early warning; mobilize partnerships with community-based planners, NGOs and CBOs at the local level; enable established consultative

planning processes to provide input to the project design; and mobilize community members as a workforce for infrastructure-related works. In parallel, these projects ensure systematic feedback of field-based experiences to the national policy level, enable capacity development of national disaster management planners, and facilitate evidence-based reviews of existing disaster management strategies and plans.

In addition, the project will coordinate with the **Strategic Programme for Climate Resilience (SPCR)**, which is currently under review by the Government of Nepal. Component 2 of the SPCR focuses on investments in hydro-meteorological infrastructure, weather and flood forecast and information systems, and community hazard warning systems. The proposed project expects to inform SPCR investment in the field of Early Warning system (EWS) installation, particularly with the perspective of establishing a GLOF EWS downstream of potentially hazardous glacier lakes, including Imja and Tsho Rolpa.

The proposed project will coordinate with the DFID/EC-supported initiative “**Support for Climate Change Adaptation in Nepal – Design and Piloting phase**”. Under this initiative, the component ‘Climate Adaptation Design and Piloting Nepal’ (CADP-N) is being implemented in 12 districts through 7 NGOs. The project has an objective to develop Local Adaptation Plans of Action (LAPA) in the selected districts and a framework to integrate adaptation needs into local plans. LAPA frameworks / approaches refer to bottom-up planning processes that will enable local adaptation needs and capacities to be integrated into development planning at micro, meso and macro scales. Such mechanisms will ensure that local adaptation plans are able to ‘reach-up & out and draw down & in’ on policy, institutional & information support and financial resources to address their adaptation priorities. The proposed project will take LAPA findings in the proposed target districts into account, and address ‘no regrets’ climate change adaptation investments in flood risk reduction on the basis of LAPA-related consultative processes wherever possible.

The project will also coordinate with the 4th **Flagship Programme of the Nepal Risk Reduction Consortium (NRRC)**, which focuses on integrated community based disaster risk reduction/management. The NRRC was formed in May 2009 to support the Government of Nepal in developing a long term Disaster Risk Reduction Action Plan building on the National Strategy for Disaster Risk Management (NSDRM). The founding members of the Consortium are the Asian Development Bank (ADB), the International Federation of the Red Cross and Red Crescent Societies (IFRC), United Nations Development Programme (UNDP), UN Office for the Coordination of Humanitarian Affairs (OCHA), UN International Strategy for Disaster Reduction (ISDR) and the World Bank. The flagship area on integrated community based disaster risk reduction/management, which is led by the IFRC, acknowledges that the disaster risk management system within Nepal is currently undergoing changes driven by the recognition of the need to shift from reactive and relief-based approaches to proactive mitigation and adaptation architecture. This requires institutional, legislative and policy change to support the decentralization of responsibility in support of engaging all stakeholders at national, district and village levels. Through this shift, local government and civil society will be empowered to develop capacity and build sustainable approaches to reducing disaster risk and consequently avoiding costly and external response interventions. The 4th flagship programme is therefore addressing the connection between national and local authorities in relation to resource allocation, planning, hazard mitigation and vulnerability reduction in partnership with a strong civil society. Drawing from the National Strategy for Disaster Risk Management, a series of components are being promoted to address priority needs in supporting the scaling up of local level disaster risk management (DRM) which includes: enhancing local level risk assessment methodologies; improving the reliability and geographical coverage of community based early warning systems; scaling up of community based preparedness and mitigation actions; developing community capacity for engaging in local level risk reduction action; and undertaking vulnerability reduction measures.

USAID is currently implementing a number of climate change-related initiatives such as ‘Sacred Himalayan Landscape’, ‘Hariyo Ban’ and **SERVIR** which deal with biodiversity, climate change and to a certain extent disaster preparedness and management. SERVIR is a regional visualization and₂₃

monitoring system that integrates earth observations such as satellite imagery and forecast models together with in situ data and other knowledge for timely decision-making. SERVIR evolved through a ‘non-traditional’ partnership between USAID (United States Agency for International Development) and NASA (National Aeronautics and Space Administration) to make earth observation data, decision-support tools for interpreting the data, and online mapping capability, more generally available. SERVIR enables scientists, educators, project managers and policy implementers to respond better to a range of issues including disaster management, agricultural development, biodiversity conservation, and climate change. SERVIR is being implemented by ICIMOD focusing on the Hindu Kush-Himalayan region. Baseline data generated by SERVIR/ICIMOD has been helpful in assessing the risk associated with GLOF and flood component under the proposed project.

The project will coordinate closely with the **International Centre of Integrated Mountain Development (ICIMOD)** to benefit from the extensive knowledge and experience on GLOF risk monitoring, especially in relation to Imja Tsho and Tsho Rolpa. In collaboration with the KEIO Research Institute in Japan, ICIMOD has installed a wireless sensor network at Imja Lake which is connected through a wireless connection with monitoring sites in the downstream valley. This work can be integrated with Output 1.2 and 1.3 of the proposed project. ICIMOD will also be a gateway to the latest state-of-the-art regional monitoring system, known as SERVIR-Himalaya. SERVIR features web-based access to satellite imagery, decision-support tools and interactive visualization capabilities, and puts previously inaccessible information into the hands of scientists, environmental managers, and decision-makers.

Finally, the project will coordinate closely with the **Strategic Programme for Climate Resilience (SPCR)**, which was prepared under the World Bank-supported Pilot Programme for Climate Resilience (PPCR). At the time of PIF submission, the SPCR is defining concrete activities and is in the process of approval by the Government of Nepal. That said, should the SPCR get approved, it is an explicit intention of the proposed project to establish a co-financing relationship and ensure complementary investments in the target areas. Along these lines, Component 2 of the SPCR (‘Building Resilience to Climate-Related Hazards’), which is planning to invest in hydro-meteorological infrastructure, weather and flood forecast and information systems, and community hazard warning systems, is expected to integrate with Output 1.2 of the proposed project and cover part of the GLOF Early Warning system in the selected target area.

C. DESCRIBE THE GEF AGENCY’S COMPARATIVE ADVANTAGE TO IMPLEMENT THIS PROJECT:

UNDP’s comparative advantage for the proposed project lies in its long-standing experience working with different government entities to advance disaster risk reduction in Nepal. UNDP has a long track record investing its own core resources in disaster risk reduction and climate risk management projects, as documented in the assessment of ‘who does what’ in climate-related disaster risk reduction (UNDP, 2010). As indicated by the substantive cash and parallel co-financing it is contributing to the proposed project, all of which is funded by bilateral and core resources (outlined in Section B.1), UNDP is well positioned to support the targeted allocation of LDCF financing to urgent and immediate local climate risk management needs. UNDP support is provided to this project in both technical as well as financial terms (see Section C.1).

In addition to evident alignment in terms of UNDP’s existing portfolio in Nepal and a verifiable track record in providing financial and technical support to climate risk management projects, the proposed project matches with UNDP’s comparative advantage in capacity development (as articulated in the GEF Council Paper C.31.5 “Comparative Advantage of GEF agencies”). In this context, it is important to highlight that UNDP has garnered extensive experience in the implementation of GLOF and flood risk management projects, most notably in Bhutan (LDCF-funded) and Pakistan (AF-funded). These efforts provide immediate entry points for South-South technical cooperation and the sharing of lessons learned. Through its network of country offices and regional advisors who act as conduits for the exchange of technical and project management experience, UNDP is well positioned to assist Nepal in the design and

implementation of the proposed project.

C.1 INDICATE THE CO-FINANCING AMOUNT THE GEF AGENCY IS BRINGING TO THE PROJECT:

UNDP will contribute USD 400,000,- in cash co-financing and 5,960,000 USD in parallel grant financing to the proposed project.

C.2 HOW DOES THE PROJECT FIT INTO THE GEF AGENCY'S PROGRAM (REFLECTED IN DOCUMENTS SUCH AS UNDAF, CAS, ETC.) AND STAFF CAPACITY IN THE COUNTRY TO FOLLOW UP PROJECT IMPLEMENTATION:

The project is aligned with the United Nations Development Assistance Framework (UNDAF) for Nepal: It corresponds with UNDAF Outcome C.3 ("Environment and energy mainstreamed into national and local development planning with a focus on gender, social inclusion, and post conflict environmental rehabilitation") and UNDAF Outcome C.4 ("Risks of natural hazards to rural and urban livelihoods and infrastructure reduced").

In alignment with the UNDP Nepal Country Programme Action Plan (CPAP) Document, the project is aligned with CPAP Outcome 4.1.6 "Priority adaptation actions implemented in selected districts to build communities resilience to climate change" and CPAP Outcome 4.2.1 "Capacities of key ministries, local bodies, CSOs and communities enhanced for planning and implementation of disaster risk management, emergency response and early recovery in selected districts".

In terms of staffing capacity, UNDP-Nepal is in a position to effectively supervise the implementation of the proposed project. Its staff members' substantial experience in the successful implementation of GEF-funded projects; its recent move to develop and staff a dedicated Disaster Risk Management team; and its substantive experience working at decentralized level with local communities, private sector entities, policy makers and civil society in the proposed target districts, justify UNDP's capacity and qualification to implement the proposed project.


At the regional level, UNDP technical advisors are supporting the interface between the proposed project and other projects which focus on GLOF and flood risk reduction issues. This includes the sharing of technical reports, connecting project engineers with each other to exchange know-how on workforce safety measures and engineering plans, and increasing the visibility of GLOF risk issues and the impact of LDCF-funded projects in the international media (<http://regionalcentrebangkok.undp.or.th/Video/HimalayanMeltdownTrailer.html>)

PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)

A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S): (Please attach the [Operational Focal Point endorsement letter\(s\)](#) with this template. For SGP, use this [OFP endorsement letter](#)).

NAME	POSITION	MINISTRY	DATE (MM/dd/yyyy)
L. S. Ghimire	Joint-Secretary and GEF Operational Focal Point	MINISTRY OF FINANCE	06/27/2011

B. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF/LDCF/SCCF policies and procedures and meets the GEF/LDCF/SCCF criteria for project identification and preparation.					
Agency Coordinator, Agency name	Signature	DATE (MM/dd/yyyy)	Project Contact Person	Telephone	Email Address
Yannick Glemarec Executive Coordinator, UNDP/GEF		July 17, 2011	Gernot Laganda Regional Technical Advisor, UNDP (LECRDS)	+66 2288 2644	gernot.laganda@undp.org