

**United Nations Development Programme**

**Country: Pakistan**

**PROJECT DOCUMENT**

**Project Title:** Reducing Risks and Vulnerabilities from Glacier Lake Outburst Floods in Northern Pakistan

**UNDAF Outcome(s)/ Indicator(s):** Improved living conditions through environmental management for Sustainable Development.

**UNDP Strategic Plan Environment and Sustainable Development Primary Outcome:** Strengthened national capacities to mainstream environment and energy concerns into national development plans and implementation systems. Strengthened national capacities to mainstream environment and energy concerns into national development plans and implementation systems

**UNDP Strategic Plan Secondary Outcome:** Countries develop and use market mechanisms to support environmental management

**Expected CP Outcomes:** Comprehensive approach integrating environmentally sustainable development, and global and global environmental concerns and commitments in national development planning, with emphasis on poverty reduction and with quality gender analysis

**Expected CPAP Outcome(s) /Output/Indicator(s):** Commitments under global conventions on climate change being implemented.  
Indicator: Progress on meeting international commitments.

**Executing Entity/Implementing Partner:** Ministry of Environment, Government of Pakistan

**Implementing Entity/Responsible Partner:** UNDP

**Brief Description**

The proposed project will reduce risks and vulnerabilities from GLOFs and snow-melt flash floods in Northern Pakistan. The main objectives of the project are to develop the human and technical capacity of public institutions to understand and address immediate GLOF risks for vulnerable communities in Northern Pakistan and to enable vulnerable local communities in northern areas of Pakistan to better understand and respond to GLOF risks and thereby adapt to growing climate change pressures.

Programme Period:	2011 – 2015	Total Allocated Resources	\$ 7,600,000
Atlas Award ID:	00061318	Regular	
Project ID:	00077650	Adaptation Fund:	\$ 3,600,000
PIMS #	4454	UNDP Core Resources)	\$ 500,000
Start date:	May 2011	Co-financing	
End Date	April 2015	Government (in-kind)	\$ 3,500,000
Management Arrangements	NIM		

Agreed by Ministry of Environment

*[Signature]*  
Date/month/year

Agreed by (UNDP):

*[Signature]*  
Date/month/year

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*As overleaf*  
Date/month/year

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## List of Acronyms

AKRSP	Aga Khan Rural Support Programme
EWS	Early Warning System
ERRA	Earthquake Relief and Rehabilitation Authority
GIS	Geographical Information System
GCISC	Global Change Impact Studies Centre
GLOFs	Glacier Lake Outburst Floods
GFDRR	Global Facility for Disaster Reduction and Recovery
HKH	Himalayan Karakorum Hindukush
ICIMOD	International Centre for Integrated Mountain Development
ISDR	International Strategy for Disaster Reduction
IPCC	Intergovernmental Panel on Climate Change
IGIS	Institute of Geographical Information Systems
LDCF	Least Developed Country Fund
MTE	Mid-Term Evaluation
NDMA	National Disaster Management Authority
PMD	Pakistan metrological department
PRSP	Poverty Reduction Strategy Paper
PMCs	Project Management Committees
PCRWR	Pakistan Council of Research on Water Resources
SLMP	Sustainable Land Management project
TFCC	Task Force on Climate Change
UNISDR	United Nations International Strategy for Disaster Reduction
WWF	World Wide Fund for Nature

## 1. SITUATION ANALYSIS

The Himalayan Karakorum Hindukush (HKH) mountain ranges in northern Pakistan possess the largest glaciers in the world outside the Polar Regions. This region plays an important role in global atmospheric circulation, biodiversity, water resources, and the hydrological cycle. It is the source of large river systems. People living in the HKH region of northern Pakistan are annually affected by a number of climate-related hazards. These include floods, avalanches and landslides and result in extensive human and material losses. Climate change is projected to further exacerbate some of these natural hazards and lead to significant impacts on the regions' development.

A major part of the snow and ice mass of the HKH region in Pakistan is concentrated in the watersheds of the Indus basin. As a result of rapidly changing climatic conditions, the glaciers in Pakistan are receding at a rate of almost 40 – 60 meters per decade. The melting ice from these glaciers is increasing the volume of water in the glacial lakes. According to the IPCC'S fourth assessment report, eleven of the last twelve years (1995 – 2006) rank among the 12 warmest years of in the history of global surface record since 1850. This rapid change in the world's temperatures is related with a faster rate of glacier melt.

Various studies suggest that the warming trend in the HKH 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 Glacier 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 glacier lakes and glacier fed rivers are particularly at risk, as they live in remote and marginalized areas and depend heavily on fragile eco-systems for their livelihoods.

According to a study conducted by ICIMOD (2007), 5218 glaciers (15040 sq km) and 2420 lakes were identified and mapped in Pakistan. Among the identified lakes, 52 lakes have been classified as potentially hazardous, and likely to cause GLOFs over the next few years to decades. The glaciers, glacial lakes and potentially GLOF-prone glacial lakes in the studied area of the Hindu Kush Himalaya Region are summarized in Figure 1 and Table 1.

# Potentially Dangerous Glacial Lakes

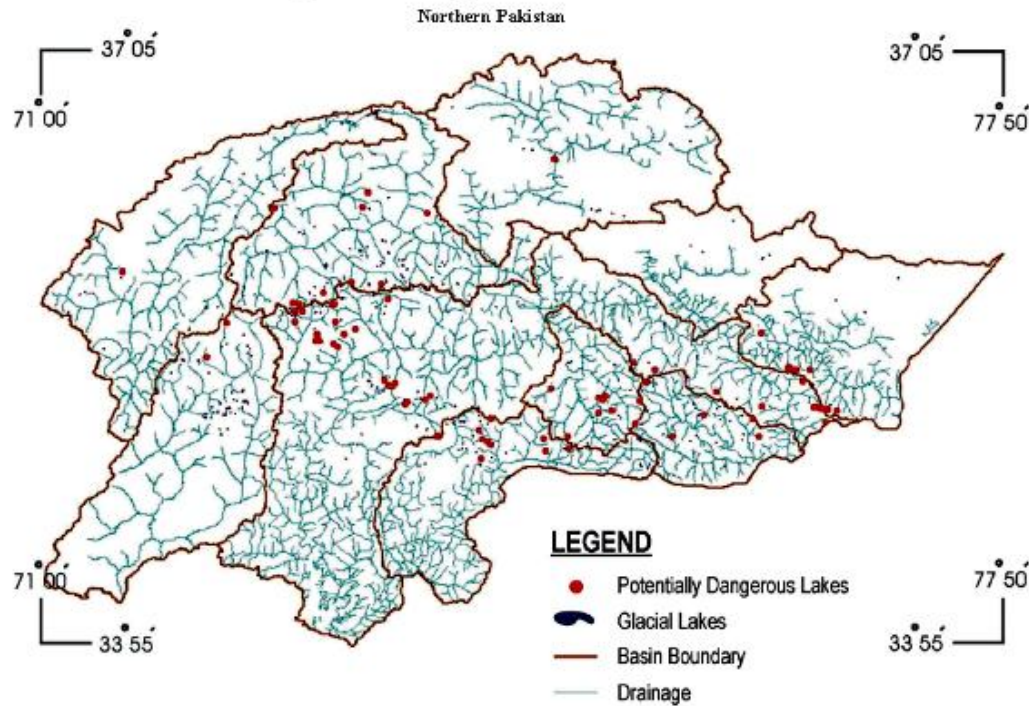


Figure 1: Potentially dangerous glacial lakes in Northern Pakistan (source: ICIMOD)

River Basins	Glaciers			Glacial Lakes		
	No.	Area (km <sup>2</sup> )	Ice Reserve (km <sup>3</sup> )	No.	Area (km <sup>2</sup> )	Potentially dangerous
<b>Indus River Basin</b>						
Swat	233	223.55	12.221	255	15.86	2
Chitral	542	1903.67	258.817	187	9.36	1
Gilgit	585	968.1	83.345	614	39.17	8
Hunza	1050	4677.34	808.794	110	3.21	1
Shigar	194	2240.08	581.27	54	1.09	0
Shyok	372	3547.84	891.8	66	2.68	6
Indus	1098	688	46.38	574	26.06	15
Shingo	172	36.91	1.009	238	11.59	5
Astor	588	607.03	47.931	126	5.52	9
Jhelum	384	148.18	6.943	196	11.78	5
	<b>5218</b>	<b>15040.7</b>	<b>2738.51</b>	<b>2420</b>	<b>126.32</b>	<b>52</b>

Table 1: Potentially dangerous glacier lakes in the Indus River basin

Records show that on average, GLOF events occur in the Himalayas every 3-10 years, with varying degrees of socio-economic impact. From 1950 to 1999, recorded flood damages have amounted to property damage of Rs.380.181,- million, a death toll of 5,832 lives, and 84,475 affected villages. A total of 35 destructive outburst floods have been recorded in the Karakoram region in the past 200 years and at least 11 surges of exceptional scale have been recorded so far in the Upper Indus Basin.

The detail of some of these lakes in as follows:

Type of lake	Lake no	Area (km <sup>2</sup> )	Associated Glacier	Distance to Glacier	Remarks
End Moraine	Chitr_gl61	0.05	Chitr_gr108	-	In contact with mountain glacier
End Moraine	Gil_gl550	0.10	Gil_gr191	464	Followed by large glacier source
End Moraine	Gil_gl590	0.19	Gil_gr366	-	In contact with large hanging glacier
End Moraine	Gil_gl505	0.21	Gil_gr79	820	Massive hanging glacier source
End Moraine	Gil_gl336	0.21	Gil_gr22	225	Near to hanging glacier source
End Moraine	Gil_gl469	0.27	-	375	Near massive mountain glacier
End Moraine	Gil_gl399	0.73	Gil_gr28	-	In contact with hanging glaciers
Valley	Gil_gl589	0.20	-	412	Near several hanging glaciers
Valley	Gil_gl611	0.29	-	159	Near several hanging glaciers

Table 2: Potentially dangerous glacier lakes in the target area of the project (ICIMOD, 2010)

### Barriers in Responding to the Climate Change-induced Problem

Accurate and comprehensive knowledge of glaciers and glacial lakes are of utmost importance to understand and manage the risk of GLOFs in northern Pakistan. At present, the country faces a critical gap in *knowledge* of hydrological forecasting, risk mapping and disaster prevention planning. The information currently available about the glaciers in the water shed of the Indus basin is limited and scattered, and the understanding of the snow and ice conditions associated with the mountainous headwater of the Indus is largely inadequate.

As the current status of the identified glacial lakes is changing, the number of potentially hazardous lakes and their location/origin is shifting, and new lakes are developing rapidly, a need has developed for a formal monitoring and evaluation system to validate the information on the status of potentially hazardous glacial lakes. A digital repository is be required to consolidate the existing knowledge on glaciers, glacial lakes, and GLOF events, which will enhance the ability of policy makers to understand the associated vulnerabilities and finance/implement appropriate risk mitigation and disaster preparedness measures.

Current (baseline) disaster management policies and risk reduction and preparedness plans in Pakistan address recurrent natural hazards (e.g.flooding, landslides and seismic events) in the country, but are not yet geared to deal with the new dimension of GLOF threats. Due to the limited information on the expected distribution and the impacts of GLOFs, there are capacity deficits in existing *early warning* systems. According to the United Nations International Strategy for Disaster Reduction (UNISDR) defines early warning system, as “the provision of timely and effective information through identified

institutions that allows individuals exposed to a hazard to take action to avoid or reduce their risks and prepare for effective response (2006). Current disaster mitigation and preparedness initiatives (including early warning systems) do not have the capacity to manage effectively the risks posed by rising water levels in glacial lakes, including issuing early warning of GLOFs.

Communities settling in GLOF-prone mountain valleys are highly vulnerable, with vulnerabilities being compounded by poverty, increasing pressure on natural resources, high-risk settlement patterns, and the need for greater education and public *awareness* on how to reduce risk from GLOF threats. Resources from the Adaptation Fund will therefore be required to ensure local community *participation* in GLOF risk management and disaster prevention activities, and to create an enabling institutional environment at all levels of policy making, investment and communications planning to support community-based implementation of targeted risk reduction activities. As there is a need for the capacity enhancement of the communities so that a community based monitoring system is established; the project will involve the community members in the committees dealing with infrastructure, conservation of natural resources, operations and management of project activities. This will have a positive effect not only on communal resilience, but will also be helpful in connecting isolated target communities to broader economic and social development benefits.

## 2. PROJECT STRATEGY

Two hazardous glacier lakes in Gilgit-Baltistan and Chitral have been identified as target sites (see ANNEX IV): The **Bagrot valley** in Gilgit-Baltistan is considered at high risk of GLOF from the Bagrot Glacier. Bagrot valley covers an area of 452 km<sup>2</sup>. It is characterized by an extreme geomorphological relief, ranging from 1500 m up to 7788 m at the summit of Rakaposhi. Local agriculture relies on irrigation for growing crops. In Bagrot valley, the main valley glaciers are Hinarche, Burche, Gutumi, and Yune while several smaller cirque glaciers exist in the higher reaches. The glaciated area is about 42.3 km<sup>2</sup> and major part of the lower tongue is covered by supra-glacial debris, similar to the other glacier tongues in the valley. In greater Rakaposhi/Diran group, Hinarche Glacier can be considered representative of the valley glaciers with a strong vertical gradient in the accumulation zone, an extra debris cover on its tongue and a medium size area. In a first approximation, the melt water production for the entire valley results in about 300 million m<sup>3</sup> /year, which is still rather rough estimate, especially because the different supraglacial debris distribution of Burche Glacier needs to be mapped in greater detail. The valley has 1100 households with an estimated population of 10,000 people. Similarly, **Drongagh** has been selected as a demonstration site in Chitral. The village lies in the vicinity of Gohkir Glacier and has almost 500 households with a population of almost 3500 people and lies at a distance of approximately 40 kms from Chitral municipality. Both sites are highly vulnerable to flooding related to glacial lake outbursts or glacial outbursts, which occur almost every year. The floods do not only result in damages to community infrastructure, communication networks, roads and crops, but also cause human casualties.

The proposed project will reduce risks and vulnerabilities from GLOFs and snow-melt flash floods in Northern Pakistan. The main objectives of the project are as follows:

- To develop the human and technical capacity of public institutions to understand and address immediate GLOF risks for vulnerable communities in Northern Pakistan
- To enable vulnerable local communities in northern areas of Pakistan to better understand and respond to GLOF risks and thereby adapt to growing climate change pressures

<b>PROJECT COMPONENTS</b>	<b>EXPECTED CONCRETE OUTPUTS</b>	<b>EXPECTED OUTCOMES</b>	<b>AMOUNT (US\$)</b>
1. Policy recommendations & institutional strengthening to prevent climate change induced GLOF events in northern Pakistan	1.1. Policy framework and guidelines to Address GLOF risks in northern Pakistan institutionalized 1.2. Indicators and criteria for GLOF vulnerability developed and systematically applied to enable priority allocation of risk reduction efforts and investments	1. Strengthened Institutional capacities to implement policies, plans and investments that prevent human and material losses from GLOF events in vulnerable areas of Northern Pakistan	100,000
2. Strengthening Knowledge and Information about GLOF risks in northern Pakistan	2.1. Systematic engagement with global and regional research networks and centers working on GLOF issues 2.2. Risk and hazard maps for mountain valleys with the highest GLOF risk and exposure of lives, livelihoods and infrastructure	2. Improved access of Disaster management planners and policy makers to knowledge, information and research on GLOF risks	250,000
3. Demonstration of community-based GLOF risk management in Vulnerable mountain valleys of northern Pakistan	3.1. Preparedness actions for vulnerable communities conducted to reduce risks from GLOF events 3.2. A community based system for GLOF risk monitoring & early warning established in priority communities 3.3. Targeted GLOF risk reduction measures such as check dams, spill-ways, slope stabilization or controlled drainage established in Bagrot and Drongagh valleys	3. Reduced human and material losses in vulnerable communities in the Northern areas of Pakistan through GLOF early warnings and other adaptation measures	2,790,000
4. Documentation, analysis and continued application of lessons learnt	4.1. Technical knowledge and project lessons documented for use in future initiatives 4.2. Project experiences disseminated to policy makers	4. Project experiences documented	100,000



	and disaster management planners in Pakistan and the wider HKH region	
4. Project/Programme Execution cost		360,000
5. Total Project/Programme Cost		3,600,000
6. Project Cycle Management Fee charged by the Implementing Entity <sup>1</sup>		306,000
<b>Amount of Financing Requested</b>		<b>3,906,000</b>
<b>Co-financing by Government of Pakistan (In-kind)</b>		<b>3,500,000</b>
<b>Co-financing by UNDP</b>		<b>500,000</b>

<b>MILESTONES</b>	<b>EXPECTED DATES</b>
Submission of Concept to AF	April 26, 2010
Approval of the Concept by the AF Board	June 15, 2010
Development of a Full Project Proposal	June-October 2010
Submission to AF of a Full Project Proposal	October 2010
Start of Project/Programme Implementation	May 2011
Mid-term Review (if planned)	July 2014
Project Closing	April 2015
Terminal Evaluation	May 2015

The project will help by reducing climate change induced risks and vulnerabilities from GLOFs in the Northern Areas of Pakistan by encouraging community based adaptation measures for climate change induced GLOFs. The components of the project are described below.

<sup>1</sup> On the request of the Government of Pakistan, the project will be implemented by UNDP using the MIE modality. UNDP is able to provide the following implementation services through its country office, regional and headquarters networks: project identification, formulation, and appraisal; determination of execution modality and local capacity assessment of the national executing entity; briefing and de-briefing of project staff; oversight and monitoring of AF funds, including participation in project reviews; receipt, allocation and reporting to the AF Board of financial resources; thematic and technical capacity building and backstopping; support with knowledge transfer; policy advisory services; technical and quality assurance; and troubleshooting assistance to the national project staff. Further details on the types of specialized technical support services which may be provided are articulated in the table provided to the AFB Secretariat on 14 May 2010 (see Annex III).

### ***Component 1: Policy recommendations & institutional strengthening to prevent climate change induced GLOF events in northern Pakistan***

This project component responds to the need for systematic integration of GLOF risk management into the processes, policies and plans of institutions that have a stake in avoiding human and material losses from GLOF events in vulnerable areas of northern Pakistan. Project inputs will be utilized to develop the capabilities of local level institutions (Agriculture, Livestock and Forest departments of Gilgit Baltistan and Chitral) and federal level institutions (Ministry of Kashmir Affairs and Gilgit Baltistan, Ministry of Environment and National Disaster Management Authority) to understand the nature and extent of GLOF risks in Pakistan, and their effects on human and economic development in all sectors. Targeted, evidence-based policy recommendations on GLOF prevention and risk management will be prepared and disseminated for adoption at national and provincial levels, which will enable the integration of GLOF risk awareness in all potentially affected sectors. Contingency plans & incentive schemes to address GLOF risks at the policy level will be developed, based on collaboration between affected stakeholders.

#### ***Output 1.1: Policy framework and guidelines to address GLOF risks in northern Pakistan institutionalized.***

Indicative activities under Output 1.1 will include:

- 1.1.1 Establish an inter-agencies working group to incorporate climate change risk management considerations into existing disaster management policy frameworks and new legislation
- 1.1.2 Revise the existing National Disaster Risk Management plan to incorporate climate risk and GLOF issues and submit for endorsement by NDMA.
- 1.1.3 Develop and institutionalize comprehensive GLOF risk management guidelines at the district and community level especially which are vulnerable to GLOF

#### ***Output 1.2: Indicators and criteria for GLOF vulnerability developed and systematically applied to enable priority allocation of risk reduction efforts and investment.***

Indicative activities under Output 1.2 will include:

- 1.2.1 Establish a central database that captures flood and GLOF risk indicators, building on analysis conducted under Output 2.2
- 1.2.2 Train Gilgit-Baltistan and Chitral Disaster Management Authorities, National Disaster Management Authority, and Forest Department in accessing the GLOF risk database and interpret the information available to support policy, planning and investment decisions
- 1.2.3 Develop and implement a capacity building roadmap for national, provincial and district level authorities to integrate GLOF risk considerations into national, provincial and district development planning.

### ***Component 2: Strengthening Knowledge and Information about GLOF risks in northern Pakistan***

This project component addresses the need for more accurate and comprehensive knowledge of glacier lakes and their associated flooding risks in northern Pakistan. Such

knowledge is essential for better risk mapping, early warning and disaster prevention planning. Based on a targeted mapping exercise of flooding hazards downstream of potentially hazardous glacier lakes, a locally anchored knowledge base & analytical framework for long-term tracking & management of GLOF risks will be developed. Systematic networking and exchanges with global & regional research institutions and resource centers, as well as with other GLOF risk management projects in the region (e.g. the Least Developed Country Fund (LDCF) GLOF risk reduction project in the Punakha-Wangdi and Chamkhar Valleys of Bhutan) will contribute to a widening the knowledge base about GLOF risks in Pakistan, eventually leading to a critical mass of knowledge required for specific and targeted risk reduction investments. Existing indigenous knowledge, cultural beliefs and coping mechanisms to address flooding risks in Northern Pakistan will be documented and factored into the risk reduction and preparedness activities employed by this project.

Component 2 will encompass the following Outputs and indicative activities:

*Output 2.1: Systematic engagement with global and regional research networks and centres working on GLOF issues.*

Indicative activities under Output 2.1 will include:

- 2.1.1 Establish cooperative links between national and provincial disaster management authorities specialized research organizations like GCISC and ICIMOD to take stock of available knowledge on glacial melt effects and associated flooding patterns in the Himalaya-Hindukush region
- 2.1.2 Capture lessons from other GLOF projects in Bhutan, Nepal, China, India, Peru, Chile and European countries to define

*Output 2.2: Risk and hazard maps for mountain valleys with the highest GLOF risk and exposure of lives, livelihoods and infrastructure*

Indicative activities under Output 2.2 will include:

- 2.2.1 Acquire remote sensing and GIS data of all mountain valleys in Pakistan which have a potential GLOF risk.
- 2.2.2 Prepare detailed risk and hazard zonation maps for all mountain valleys with the highest GLOF risks
- 2.2.3 Undertake consultations with community members and other stakeholders in Bagrot and Drongagh to assess vulnerabilities in communal risk hot spots, as well as existing technical, natural, human and social capital that can be employed to reduce disaster risk
- 2.2.4 Prepare detailed GLOF vulnerability maps (combining hazard exposure and livelihood sensitivity) for the project target sites of Bagrot and Drongagh

***Component 3: Demonstration of community-based GLOF risk management in vulnerable mountain valleys of northern Pakistan***

Adaptation Fund resources will be used to demonstrate GLOF risk management at the village and district levels, with the aim to provide an evidence base for replication and up-scaling. Based on the systematic capturing of hazard information and vulnerabilities in Component 2, awareness raising activities will be undertaken to educate disaster-

prone communities about the nature of GLOF risks, the particular behavior of GLOF events, evacuation routes and appropriate early warning and risk reduction measures. These awareness activities will be connected with the production and dissemination of communication products, such as posters, leaflets and videos illustrating the topic. Institutional arrangements to devise, operate, test, and maintain a community-based GLOF risk monitoring & early warning system will be established in at least 2 high-risk target communities, providing an evidence base on the strengths and weaknesses of different types of high- and low-tech early warning systems. Based on such analyses, a prototype GLOF Early Warning system will be devised for replication in other vulnerable areas. In addition to the demonstration of an Early Warning system, the project will demonstrate targeted GLOF risk mitigation measures for at least 2 communities which are located in high-risk sites.

Vulnerability analysis on the basis of GLOF hazard exposure and sensitivity mapping has been considered a critical feature for the selection of target communities to participate in and benefit from this project. The target areas have been selected on the basis of the following criteria:

1. *Technical geography:*

The target demonstration sites are representative with respect to their geographical location, area and height of glaciers, track of glacier lakes, hydrology, direction of sloping land surface, disintegrating ice and/or sediment barriers, geological structure and build-up, size of affected communities, and their general vulnerability profile. The geographical locations and other related features of the glaciers and lakes will be captured and analyzed by means of a Geographical Information System (GIS) under Component 2 of the project.

2. *Recurring GLOF events / history:*

Recurring GLOF events have been identified through a time series analysis, using existing maps, satellite data and other records available from different years.

3. *Affected communities and accessibility of the area:*

Considerations have included: The size of the community under consideration, the number of persons exposed to flooding risk; population density, traditions/culture of the community, present land use, accessibility and livelihood structure, awareness level of community about the possible impacts of GLOF.

Based on verification of the above criteria with local stakeholders, two potentially hazardous glacier lakes in Gilgit-Baltistan and Chitral have been identified as target sites for the project: The **Bagrot valley** in Gilgit-Baltistan is considered at high risk of GLOF from the Bagrot Glacier. Bagrot valley covers an area of 452 km<sup>2</sup>. It is characterized by an extreme geomorphological relief, ranging from 1500 m up to 7788 m at the summit of Rakaposhi. Local agriculture relies on irrigation for growing crops. In Bagrot valley, the main valley glaciers are Hinarche, Burche, Gutumi, and Yune while several smaller cirque glaciers exist in the higher reaches. The glaciated area is about 42.3 km<sup>2</sup> and major part of the lower tongue is covered by supra-glacial debris, similar to the other glacier tongues in the valley. In greater Rakaposhi/Diran group, Hinarche Glacier can be considered representative of the valley glaciers with a strong vertical gradient in the accumulation zone, an extra debris cover on its tongue and a medium size area. In a first approximation, the melt water production for the entire valley results in about 300

million m<sup>3</sup> /year, which is still rather rough estimate, especially because the different supraglacial debris distribution of Burche Glacier needs to be mapped in greater detail. The valley has 1100 households with an estimated population of 10,000 people. Similarly, **Drongagh** has been selected as a demonstration site in Chitral. The village lies in the vicinity of Gohkir Glacier. has almost 500 households with a population of almost 3500 people and lies at a distance of approximately 40 kms from Chitral municipality. Both sites are highly vulnerable to flooding related to glacial lake outbursts or glacial outbursts, which occur almost every year. The floods do not only result in damages to community infrastructure, communication networks, roads and crops, but also cause human casualties.

*Technical considerations for the design of an Early Warning System (EWS):*

Existing flood early warning systems in the 2 target sites of Bagrot Valley and Drongagh will be established to enable the dissemination of flashflood warning signals on a 24 hour basis. EWS design is expected to involve:

- i) Threat detection (sensor), relay and warning stations;
- ii) GLOF watch advisories issued by Pakistan metrological department (PMD) to communities at risk via print and electronic media
- iii) Establishment of an SMS messaging system to communicate warning signals to community based organizations, local NGOs and Government departments;
- iv) Establishment of a central voice response system where end users may get flood risk information via phone/mobile call around the clock;
- v) Early warning awareness and training workshops for community, NGOs, government and media representatives to ensure that EWS procedures are internalized;
- vi) Real-time mock drills at community level to simulate a GLOF disaster and verify functionality of the EWS

Selected community and NGO members will be trained in the calibration, operation and maintenance of sensor equipment installed by PMD at the target sites.

*Technical considerations for the design of community-based GLOF risk mitigation measures:*

Potential outburst flood hazards can be alleviated by various techniques. The primary objective is to reduce the risk of a flood from the lake. However, coordinated measures to protect life and property in the downstream area must also be undertaken, hence the importance to combine these techniques with EWS-based mechanisms downstream. The most common structural mitigation measures are aimed at reducing the volume of water in the lake. Reduction of the volume of water in the lake should reduce the potential peak surge discharge as well as the hydrostatic pressure exerted on the moraine dam, and is the most effective mitigation measure. There are different ways to achieve this that can be used alone or in combination:

1. Controlled breaching of the moraine dam
2. Construction of an outlet control structure
3. Pumping or siphoning the water from the lake

#### 4. Tunnelling through the moraine barrier or under an ice dam

Mitigation measures must be brought into play in such a way that no unintentional increase in danger occurs. Since moraine dam stability is a major part of the problem, it follows that artificial disturbance of the dam itself during construction activity could actually increase the degree of danger while mitigation measures are being put into place. Thus, choice of an appropriate method for each individual lake is critical. Physical monitoring systems for the dam, lake, glacier, and surroundings are necessary at all stages of the mitigation process.

In addition to reducing the volume of lake water, there are other preventative measures around the area that can help reduce the likelihood, or impact of, a GLOF. These include removing masses of unstable rocks to guard against avalanches or rockfalls hitting the lake surface and causing a surge wave, and protecting infrastructure in the downstream area. Other measures include check-dams, mini dams, spill-ways, slope stabilization and -reinforcement. Check dams are helpful in reducing the flow of water coming down by gravity flow and conserving soil and thus provide downstream protective measures. Removing or restraining trigger mechanisms include stabilization of adjacent slopes. Slope stabilization may be through vegetation or engineering structures.

In all structural mitigation measures undertaken by the project, experience from other GLOF risk reduction projects (including GLOF risk reduction projects in India, China, Nepal and Bhutan) will be integrated and adopted where appropriate.

Component 3 will encompass the following Outputs and indicative activities:

##### Output 3.1: Preparedness actions for vulnerable communities conducted to reduce risks from GLOF events

Indicative activities under Output 3.1 will include:

- 3.1.1 Disseminate climate watch advisories issued by the Pakistan Meteorological Department to end users/farmers at grass-root level in Bagrot and Drongagh.
- 3.1.2 Organize workshops and seminars for district and local level authorities in Bagrot and Drongagh on GLOF preparedness and risk reduction measures.
- 3.1.3 Undertake awareness raising activities for communities in Bagrot and Drongagh, including posters and brochures in local language, radio programmes, local consultations and newspaper articles
- 3.1.4 Incorporate specific awareness activities for women and vulnerable groups (children, elderly, disabled) into all communication activities to reduce disproportional vulnerabilities and ensure inclusivity of the measures.

##### Output 3.2: A community based system for GLOF risk monitoring and early warning established in priority communities

Indicative activities under Output 3.2 will include:

- 3.2.1 Establish an early warning communication network of local NGOs and government departments, using different communication links such as telephone trees, SMS and e-mail networks.

- 3.2.2 Establish a centralized early warning and response desk which registers and relays warning messages on a full-time basis via telephone.
- 3.2.3 Design and install technical elements of a fully functional EWS, including hazard sensors, relay stations and warning signal installations and a low-tech backup system to buffer technology-related risks.
- 3.2.4 Train staff for the operation and maintenance of the EWS and conduct at least one real-time GLOF mock drill

*Output 3.3: Targeted GLOF risk reduction measures such as check dams, spill ways, slope stabilization or controlled drainage established in Bagrot and Drmqrah valleys.*

Indicative activities under Output 3.3 will include:

- 3.3.1 Establish criteria for the potential GLOF risk reduction measures in consultation with GCISC, district and local level authorities and community members, based on analysis conducted under Output 2.2
- 3.3.2 Engage technical experts to determine the most appropriate GLOF risk reduction measures at the two target sites.
- 3.3.3 Engage local communities in the installation of GLOF risk reduction measures at both target sites
- 3.3.4 Construct appropriate GLOF risk reduction measures with the help of local community members, employing volunteer action as well as cash-for-work components where appropriate.

***Component 4: Documentation, analysis and continued application of lessons learnt***

Building on participative processes initiated under Components 1 and 2 of the project, and drawing on the technical experiences in the establishment of early warning and risk mitigation measures under Component 3, Component 4 of the proposed project will introduce targeted activities to enable the analysis, replication and upscaling of the project approach in other communities who are vulnerable to GLOF risks. This will entail a campaign to present the findings from the project to different public entities and development partners, as well as other district entities with similar degrees of vulnerability. This campaign will integrate all vulnerable districts (based on the vulnerability maps generated under Outputs 1.2. and 2.2.) and aim at the replication of the project approach in at least 3 other vulnerable areas. Exchange programmes to the target sites will be facilitated to promote learning and transfer of experience (especially with regards to the design of coupled EWS that covers as many vulnerable mountain valleys as possible).

By taking a systematic approach to the codification, analysis and dissemination of knowledge about GLOF risks and how they can be addressed, the project will allow replication of effective risk reduction measures for GLOF both within Pakistan and beyond. This systematic management will assist the replication of early warning systems and targeted risk mitigation measures in other GLOF prone areas in northern Pakistan. Other countries facing GLOF risks, such as China, India, Nepal and Bhutan, will also benefit from the knowledge generated through the project. This proposed initiative will contribute to a critical mass of experience on GLOF risks in the Himalaya region and enhance systematic regional cooperation on this critical adaptation issue.

Output 4.1: Technical knowledge and project lessons documented for use in future initiatives

Indicative activities under Output 4.1 will include:

- 4.1.1 Document all technical specifications and decision-making processes pertaining to the establishment of early warning and risk mitigation systems under the project.
- 4.1.2 Draft a manual on the GLOF risk reduction based on the lessons learnt from the project
- 4.1.3 Establish a website for documenting project activities and Lessons learned, and connect this website with the GLOF risk database established under Component 1

Output 4.2: Project experiences disseminated to policy makers and disaster management planners in Pakistan and wider HKH region.

Indicative activities under Output 4.2 will include:

- 4.2.1 Organize at least two workshops for national, provincial and district level authorities to disseminate project experiences
- 4.2.2 Organize site visits and community consultations for district authorities, NGOs and CBOs in other GLOF-prone areas
- 4.2.3 Broadcast the project on national and international radio and television programmes.
- 4.2.4. Conduct at least one study visit to another GLOF risk reduction project in the HKH region to ensure south-south transfer of technical know-how and experience

**Key Indicators, Risks, and Assumptions**

Key risks underlying the project have been analyzed and qualitatively assessed in connection with the context of the target sites for the project. Potential risks and means to mitigate these risks are given in the matrix below:

<b>Risk/ Assumption</b>	<b>Risk Rating</b>	<b>Mitigation Strategy</b>
Adverse climatic conditions may damage adaptation measures being implemented.	H	Capacity building and training of community members and other relevant stakeholders in adaptation measures.
The political and security situation in pilot districts may affect project implementation or weaken the interest of stakeholders to address adaptation planning issues.	M	The local government authorities and key stakeholders will be involved at all stages of the project implementation and the project activities will be implemented with mutual consensus.
Delays in recruitment of qualified project staff may affect the timeframe of different project activities.	L	A proactive follow-up of the project procedures will be done. Staff hired on short-term contracts to avoid delays.



Risk/ Assumption	Risk Rating	Mitigation Strategy
Project stakeholders may disagree on institutional mechanisms for project implementation and refrain from providing the necessary coordination.	M	The project stakeholders will be taken on-board from the very initial stages of implementation to avoid any dis-agreements later.
Government co-financing contributions may only come forth in batches and may not be available in full at the beginning of the project.	M	Government co-financing is in the form of in-kind contributions providing the infra-structure and support with their established institutions.
Lack of incentives for particular local communities to cooperate in activities that do not yield immediate financial value, but aim at longer-term resilience, may reduce stakeholder engagement and comprehensive participation.	M	Awareness raising activities will be carried out to enhance community's understanding about the beneficial effects of project activities.
Implementing partners for local level initiatives and pilot sites for project implementation may shift during project implementation, due to unforeseen (e.g. political) reasons	L	The project activities will be implemented with few community based organizations at a particular site. The activities will be assigned to the other organization in-case of shifting

Over the course of the project, a UNDP risk log will be regularly updated in intervals of no less than every six months in which critical risks to the project have been identified. At the time of project formulation, strong political as well as financial commitment from national as well as provincial Government authorities is evident which will limit a number of risks from materializing. Consistent involvement of a diverse set of partners, including local government agencies/departments, NGOs and communities will further reduce these risks.

### **Expected Global, National and Local Benefits**

The socio-economic impacts of GLOF events in the Hindu-Kush and Himalayas are significant, as demonstrated by historic GLOF events. The geomorphologists of the International Karakoram project surveyed the Hunza valley between Gilgit and Gulmit along the Karakoram Highway in 1980 and identified traces of 339 disastrous incidents including a wide range of short lived mass movements. Among these hazards, the most destructive ones are related to movements of glaciers, in particular when glacier advance/retreat is leading to outburst of glacial lakes damaging and burying cultivated lands, irrigation systems and infrastructure downstream. Generally, detailed information on specific GLOF events is limited. Thirty-five destructive outburst floods are recorded in the Karakoram region in the past two hundred years.

The proposed project has selected the target sites of Bagrot and Drongagh, which are highly vulnerable to recurrent flooding events and located in the pathway of potentially hazardous glacier lakes on the Bagrot and Gohkir glaciers. Within these target sites, the project will directly benefit 1600 households and 15,000 people, which have experienced

flooding – related human and material losses in the past. The GLOF vulnerability assessment conducted under Output 2.2 will be founded in comprehensive consultations with community members in Bagrot and Drongagh to assess the existing exposure of all households and describe the current dispersion of technical, natural, human and social capital in the target communities. This will ensure that the most vulnerable groups in the most exposed locations receive the most benefits out of this project.

An additional social benefit of the project is the capacity it creates in non-governmental and community-based organisations. In the process of achieving enhanced disaster preparedness, community members and community-based organizations will be enabled to improve their communication and outreach activities, and engage with GLOF early warning systems in important relay functions.

Project measures will have a positive effect not only on the environmental conditions in the area, e.g. by conserving existing forested slopes and maintaining the natural state of natural flooding buffers along riverbanks and floodplains, but will also be helpful in connecting isolated communities to initiatives which will ultimately provide potential for income generation (such as community-based management of drainage channels, which could be one particular mitigation activity supported and financed by the project). This will contribute to broader economic and social development benefits for local communities in the area. At the policy level, the project will provide an enabling environment for the integration of climate change adaptation and risk management considerations into GLOF-affected sectors, such as land use planning, agriculture, forestry and disaster management. The interface between the policy level and local level institutions will be enhanced, in order to ensure evidence-based policy making that is informed by community needs. Involvement of communities from the planning and design to the implementation and monitoring stages of project will further enhance the economic and social benefits of the project, and ensure that communities are empowered to be in charge of their own protection from climate-induced risks.

### **Cost-Effectiveness**

Records show that on average, GLOF events occur in the Himalayas every 3-10 years, with varying degrees of socio-economic impact. From 1950 to 1999, recorded flood damages in Pakistan have amounted to property damage of Rs.380.181,- million, a death toll of 5,832 lives, and 84,475 affected villages. A total of 35 destructive outburst floods have been recorded in the Karakoram region in the past 200 years and at least 11 surges of exceptional scale have been recorded so far in the Upper Indus Basin.

With regards to assessing which course of action is most suitable and cost-effective to prevent such losses, a joint study by ICIMOD, ISDR and GFDRR (“Formation of Glacial Lakes in the Hindu Kush-Himalayas and GLOF Risk Assessment”)<sup>2</sup> from 2010 provides clear indication that the set of adaptation measures proposed under this project does not have a justifiable alternative in terms of achievable vulnerability reduction and adaptive capacity. The study considers GLOF Early Warning systems as an essential part of disaster preparedness that has excellent potential to greatly reduce loss of life and property. Alternative options to EWS-based approaches, such as the retrofitting of

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<sup>2</sup> [http://www.unisdr.org/preventionweb/files/14048\\_ICIMODGLOF.pdf](http://www.unisdr.org/preventionweb/files/14048_ICIMODGLOF.pdf)

critical infrastructure, would ultimately imply much higher investments. For the analysis of GLOF hazards, the project will apply remote sensing technology, which is considered as the most effective first phase approach in GLOF risk reduction and preparedness. Remote sensing under this project will facilitate rapid and complete coverage of large and extremely remote mountainous areas, thus allowing potentially dangerous localities to be pin-pointed for closer inspection. This is important because the total area of such localities will be a small percentage of the entire region under initial survey. In this manner, time and expenses are reduced. Overall, the project's three-pronged hazard analysis, risk reduction and capacity building approach has a better cost-benefit ratio than the scaling up of disaster response and Search & Rescue systems in Pakistan.

The project will utilize existing national institutions, NGOs and Community Based Organizaions (CBOs) developed under the Aga Khan Rural Support Programme (AKRSP) which will reduce transaction costs. AKRSP has a long time presence on the ground in Northern Pakistan and it has established community organizations that have become self sustaining in many parts. The project will make use of these already established forums.

At the operational level, cost effectiveness of the project concept is reflected through the following characteristics:

- 1) Throughout the project, AF resources will be aligned with the financing and delivery of project outputs that have competitive procurement components to ensure best value for money;
- 2) The project has made a successful effort to increase the co-financing portion of the project, which diversifies financial risks and increases financial flexibility.
- 3) A number of project activities will involve local communities and connect directly to local opportunities for the purchase of goods and services.

### **Consistency with National or Sub-National Sustainable Development Strategies**

Addressing the risks and vulnerabilities from climate change induced hazards is considered a high-priority under Pakistan's National Environment Policy (2005), the second Poverty Reduction Strategy Paper (PRSP-II), as well as provincial sustainable development strategies and district development plans. Pakistan's Initial National Communication to the UNFCCC (2003) highlights that a detailed meso-scale atmospheric model and a regional hydrological model for the upper Indus basin are required to accurately quantify the long term effects of increased temperatures on the melting of glaciers and behavior of the westerlies in a hotter climate. Such data would be invaluable when future water management strategies are being planned, and would be useful in the prediction of floods that also include Glacier Lake Outburst Floods. That said, without the availability of additional risk and vulnerability information in relation to rapidly growing glacier lakes (such as proposed under Components 1 and 2 of this project), it is not possible to address this dimension of risk in national policies. It is hoped that as the threat of glacier lake outburst floods and other associated occurrences (e.g. Hunza lake formation), are becoming better understood (e.g. by building on the hazard and vulnerability assessments proposed by this project), policy documents such as the second and third National Communications will be more explicitly referring to the very real and rapidly growing threat of Glacier Lake Outburst Floods.

At this point, it is critical to note that the National Disaster Management Framework of Pakistan, which was developed by the National Disaster Management Authority (2007) makes explicit reference to GLOF risk issues and the necessity to address them. In addition, the Task Force on Climate Change (TFCC) installed by the Planning Commission has highlighted GLOF issues in Gilgit-Baltistan as one of the key vulnerabilities and consequently included it in its final report (2010).

The IPECHO/UNDP-funded Regional Climate Risk Reduction Project that was initiated in four countries (Pakistan, India, Bhutan and Nepal) in 2008 started recognizing the importance of risks posed by GLOF and the inadequate attention it has received amongst governments / communities and development actors. The project has focused mostly on the Gulkin and Passu glaciers, adopting community based risk reduction approaches to better prepare vulnerable communities. Low-tech early warning systems have been established in a number of sites, which are operated manually. In addition, the project has completed a needs assessment on the impacts of GLOF events in the Hunza River Basin. Community members from Gulkin, Passu and Hussaini villages have been trained in disaster risk reduction and first aid, which provides some relevant experiences the proposed project will draw on.

### **Relevance with National Technical Standard**

There are national technical standards and guidelines which are applied when new projects are implemented. The provincial Environmental Protection agencies monitor the implementation of these guidelines. The guidelines for **Environmental Impact Assessment** have been devised for any infrastructure and land use planning projects, and will be applied throughout this project. Other environmental standards such as **National Environment Quality standards** have also been devised and will be applied by provincial and district authorities in connection with this project. **GIS and Remote Sensing** is extensively used in the development and planning projects in Northern Pakistan. National institutions such as SUPARCO are acquainted with the latest technical standards in relation to satellite imagery and GIS mapping. These standards will be applied under the proposed project. Technical guidelines are available in order to utilize satellite imagery and GIS maps for planning purposes.

In connection with technical standards, it is worth highlighting that the proposed AF project will be the first project with a focus on GLOF risk reduction that will be implemented at the national level. Presently, there are no guidelines or technical guidelines for GLOF risk reduction, which is one of the reasons the project has integrated corresponding Outputs into its design. Existing Environmental Impact Assessment guidelines, building codes, land use planning and zoning regulations, and risk assessment guidelines in the Gilgit-Baltistan and Chitral areas have yet to incorporate the dimension of GLOF risk. The proposed project will be the vehicle to undertake this task.

### **Duplication**

At present, there is no major national level project in Pakistan which exclusively addresses the need for ground-level work on GLOF risk reduction. During the formulation phase of the proposed project, inputs from the UNDP/DIPECHO-funded "Regional GLOF Risk Reduction Project" have been analyzed and incorporated into the project document. The focus of this regional project is on comparative risk analysis and

regional knowledge exchange, and is thus expected to complement Component 4 of the proposed project; While the regional GLOF Risk Reduction project has a limited financial scope of 295,000 Euro (spread over 4 countries), the proposed project is expected to go beyond comparative analysis and work on a much more concrete technical scale.

Some surveys have been conducted to assess basic GLOF hazards in the Indus River Basin, but there has been limited progress on the establishment of a comprehensive GLOF risk assessment. The World Wide Fund for Nature (WWF), ICIMOD and the World Conservation Union (IUCN) have conducted initial hazard mapping exercises in the Gilgit-Baltistan districts, which provide part of the scientific foundation for this project. A DIPECHO/UNDP-funded regional project on climate risk reduction has carried out a detailed risk assessment and community based survey for GLOF risk in the Hunza River basin. With the exception of these initial efforts, and a regional ICIMOD study (2010) which was integrated into the formulation of this project document, there is no finer-grained risk and hazard analysis in mountain valleys which have been characterized as potentially hazard-prone.

At the level of institutional cooperation, the regional DIPECHO/UNDP-funded GLOF risk reduction project has facilitated first interregional exchanges between research Institutions dealing with GLOF risk analysis, but there is a need to institutionalize these linkages much better operationally, with a view of supporting concrete risk reduction measures at the community level.

Ongoing DRM projects aim predominantly at community preparedness in the event of likely hazard occurrences. The specific needs of communities vulnerable to GLOF hazards are not covered under these projects. The already on-going One – UN Joint Programme on Disaster Risk Management has gathered experience devising systems for seasonal flood forecasting: A Sustainable Land Management project (SLMP) has initiated a small-scale project with the Pakistan Meteorological Department (PMD) for the upgrading of a seasonal flood early warning system. The existing Early Warning System needs to be up-graded and a training programme is required for communities to operate such a system effectively.

Even after comprehensive analysis of other regional GLOF-related interventions with a link to Pakistan, the risk of duplication can be assessed as negligible. Financing from the Adaptation Fund will therefore enable the implementation of Pakistan's first tangible, community- and evidence-based GLOF risk reduction effort.

### **Learning and Knowledge Management and Lessons Learned**

Knowledge Management is a central component of the proposed project, which relates to very concrete technical as well as analytical activities. While Components 2 and 3 create analytical and technical know-how on vulnerability assessment and risk prevention measures, Component 1 anchors and disseminates this knowledge at the policy level. Component 4, which is aimed at replication and upscaling of project knowledge, disseminates this know-how beyond the policy level and connects the project with the 'club' of GLOF risk reduction projects that are already under way in china, India, Nepal and Bhutan..

As described in Section A of this project document, the project will develop a locally institutionalized knowledge base and analytical framework for long-term tracking and

management of GLOF risks in Pakistan. Networking with global and regional research and resource centres working on GLOF issues will be established to institutionalize a well connected knowledge base and analytical framework for decision-making.

A communication strategy for the project will be developed, which will highlight dissemination of project experiences to communities, educational institutions, NGOs, Civil Society Organizations, private sector institutions with a stake in the issue, and the larger public. This strategy will detail the use of print and electronic media and other communication channels (roundtables, participative community workshops, posters, brochures, booklets, pamphlets, news articles, radio and TV broadcasts, and web-based items).

Technical knowledge and lessons in the artificial lowering of glacier lake levels, as well as the stabilizing of slopes, moraine dams and drainage channels, will be systematically captured and documented for future use. Lessons learnt from the project will be provided via a number of national, regional and international communication channels to increase their outreach (including radio and TV news pieces). This will enable adoption of project experiences in the up-scaling of early warning systems outside of the immediate project area, and benefit other disaster-prone areas downstream of potentially hazardous glacier lakes.

### List of Stakeholders Involved

This project was prepared using inputs from a number of stakeholders, including non-environmental agencies that are working in GLOF-prone areas. Consultations were held with the Ministry of Environment and GCISC in order to discuss the project concept and the potential project sites. Subsequently, other relevant government departments were consulted. The communities in Gilgit-Baltistan and Chitral were also involved in the stakeholders' consultations and community representatives participated in the discussions. The project design, criteria for potential sites and site selection was done with the stakeholders. These stakeholders will be the main partners of the full-size project.

<b>Stakeholders' Involvement Plan</b>	
<b>Agency Name</b>	<b>Role in Project</b>
Ministry of Environment	Ministry of Environment has taken the lead in designing and implementing the National Environment Action Plan. This Ministry will play a lead role in the implementation of this project. The Ministry of Environment is also hosting the Designated National
Pakistan Meteorological Department	The Pakistan Meteorological Department will work closely with the project team and provide guidance and support in the establishment of an Early Warning System (EWS)
Global Change Impact Study Centre (GCISC)	GCISC will provide overall policy guidance and technical assistance on the impacts of climate change in Northern Pakistan, with specific reference to GLOF risk assessment.
Pakistan Council of Research on Water Resources (PCRWR)	PCRWR will provide technical assistance and information about the glacial lakes in the project areas.

Earthquake Relief and Rehabilitation Authority (ERRA)	ERRA will help in incorporating GLOF risk reduction measures in national disaster management framework and plans.
Federal Flood Commission	The Federal Flood Commission (FFC) is responsible for establishment of a countrywide, integrated flood response management system. The project implementation team will work closely with the FFC to integrate GLOF risk considerations into national policies and strategies.
Institute of Geographical Information Systems (IGIS)	The Institute of Geographical Information Systems will help in generating maps of the project areas and help in acquiring the satellite imageries of the project sites.
ICIMOD facilitate regional exchange of project experiences and help in designing capacity development elements of the project.	ICIMOD will work closely with the project management team on knowledge management matters. It will
World Wide Fund for Nature (WWF)	The World Wide Fund for Nature will work with the project team and help in organizing the communities and sensitize community organizations.
Lead – Pakistan	Pakistan will work with the project implementers in designing and delivering training programmes on GLOF risk reduction.
IUCN	IUCN – Pakistan sub-offices in project areas will help in organizing communities and provide information about the community based organizations and their activities.
Karakoram University	The Karakoram University situated in Gilgit will help in technical scientific aspects of the project. The climate risk reduction measures could be integrated into the environmental curriculum.
Communities in the target areas	Local communities in Bagrot and Drongagh valleys are the direct beneficiaries of the project. They will be actively involved in any planning, implementation and analysis functions performed by the project.
District government in the target areas.	All district level administration offices involved in the project will work closely with GBDMA and DDMA in the districts where the project activities will be implemented.
Provincial authorities in the target areas	The provincial level administration offices will work closely with the GBDMA and DDMA for the project activities and provide overall support and guidance
UNDP	UNDP Pakistan Country Office will provide technical and financial implementation support and monitoring to the project. It will help mobilize and coordinate support from other partners (especially GLOF and DRR projects in the HKH region) through its global network.
Ministry of Foreign Affairs	The ministry will help in establishing international linkages of the project and emphasize policy recommendations.

The proposed project was prepared in cooperation between UNDP, the Regional Glacial Lake Outburst Floods Risk Reduction Initiative, ICIMOD, the National Agricultural Research Center, the Ministry of Food, NDMA-Pakistan, and the Pakistan Meteorological Department and local communities in Bagrot and Drongagh.

## **Funding Justification**

### ***Component 1: Policy recommendations & institutional strengthening to prevent climate change induced GLOF events in northern Pakistan***

#### *Baseline:*

At present, decision-makers and disaster management planners at the national, provincial and district levels do not have sufficient knowledge to assess the consequences of growing GLOF risks on their constituencies. Although international organizations such as ICIMOD have carried Pakistan, the hot spots for GLOF risks at a finer resolution (especially at the level of individual communities in hazard-prone valleys) are not known. A regional, DIPECHO/UNDP-funded GLOF risk reduction project has undertaken a comparative analysis of GLOF experiences in 4 countries (India, Nepal, Pakistan, Bhutan), but doesn't provide the financial means to implement concrete risk reduction measures on the ground. With regards to requirements for GLOF Early Warning systems, applied knowledge to inform the population effectively and comprehensively about impending flooding hazards is clearly insufficient. Climate Change risks are mentioned in existing policies and disaster management frameworks, but no comprehensive guidelines exist at the district and local levels to deal with tangible vulnerabilities from particular large-scale flooding hazards. Consequently, district authorities are not fully equipped to incorporate long-term GLOF risk reduction into on-going and recurrent development planning activities. While Pakistan generally has capacity to respond to disasters after particular hazards have materialized (especially through deployment of military logistical capacities), the capacities for proactive and anticipatory disaster risk reduction are much less developed. Institutional mechanisms and policy instruments are not informed by evidence from risk reduction projects from the field, and likely to remain generic in the absence of concrete projects that can provide tangible evidence about hazard exposure, sensitivity and soft as well as hard measures to address these.

#### *Adaptation alternative:*

AF funding under Component 1 will be used to systematically integrate a dimension of GLOF risks into the decision-making processes, policies and plans of institutions that have a stake in avoiding human and material losses from natural hazards in northern Pakistan. An inter-agency working group will incorporate climate change risk management considerations into existing disaster management policy frameworks and provide policy notes to inform new risk management legislation. The existing National Disaster Risk Management Framework will be revised to incorporate climate risk and GLOF risks, and district authorities will have a comprehensive set of GLOF risk management guidelines available to reduce human and material losses in disaster-prone communities. AF resources will be used to compile a standardised glacial lake inventory of all glaciated regions in northern Pakistan, which is considered essential in view of the



realisation that the potential for serious losses to glacial lake outburst is growing steadily. Such an inventory will be up-dated periodically, in alignment with activities financed under Component 2 of this project. Such a central database solution is considered highly practical, as it enables progressively inexpensive access to remotely sensed imagery and the use of more sophisticated methods for its analysis. Relevant government departments will be enabled to interpret the information available in such a database in support of policy, planning and investment objectives. Finally, AF resources will enable the integration of GLOF risk management into national, provincial and district development plans.

## ***Component 2: Strengthening Knowledge and Information about GLOF risks in northern Pakistan***

### *Baseline:*

The knowledge about glacier lakes in Pakistan and their associated flooding patterns is limited. Some surveys have been conducted to assess basic GLOF hazards in the Indus River Basin, but there has been limited progress on the establishment of a comprehensive GLOF risk assessment. The World Wide Fund for Nature (WWF), ICIMOD and the World Conservation Union (IUCN) have conducted initial hazard mapping exercises in the Gilgit-Baltistan districts, which provide part of the foundation for this project. A DIPECHO/UNDP-funded regional project on climate risk reduction has carried out a detailed risk assessment and community based survey for GLOF risk in the Hunza River basin. With the exception of these initial efforts, and a regional ICIMOD study (2010) which was integrated into the formulation of this project document, there is no finer-grained risk and hazard analysis in mountain valleys which have been characterized as potentially hazard-prone. Better hazard and vulnerability information is essential for better risk mapping, early warning and disaster prevention planning, but at present there are no comprehensive datasets that are sufficiently detailed to enable the planning and design of concrete GLOF risk reduction measures in a hazard-prone mountain valley downstream of a potentially hazardous glacier lake. The target areas of Bagrot and Drongagh have been characterized by ICIMOD as two of the mountain valleys which are most at risk from GLOF events, but finer-grained assessment information is still needed to characterize the level of the threat, the extent of the hazard, the communal assets at risk and the sensitivity of different livelihood groups to different levels of flooding threat. At the level of institutional cooperation, the regional IPECHO/UNDP-funded GLOF risk reduction project has facilitated first interregional exchanges between research institutions dealing with GLOF risk analysis, but there is a need to institutionalize these linkages much better operationally, with a view of supporting concrete risk reduction measures at the community level.

### *Adaptation alternative:*

AF resources will be dedicated to the application of remote sensing, which is the most effective first phase approach in GLOF risk reduction and preparedness. Potentially dangerous glacial lakes in northern Pakistan will be identified and prioritised for further investigation, and monitored on a continuing basis. High resolution time series satellite images will provide the means of achieving this economically. A list of the largest and most rapidly expanding lakes in northern Pakistan, which are also situated above areas of intensive human utilization, will be developed and made available to decision-makers

at all planning levels (national, provincial, district). AF resources will finance detailed risk and hazard zonation maps in those mountain valleys that are defined as the most hazardous ones in terms of GLOF risk. A more complete assessment, which will require fieldwork and community-based assessment, will be conducted in Bagrot and Drongagh. This will include the application of geophysical techniques as well as an inventory of the vulnerability of human assets in the downstream area. Vulnerability maps will be prepared for target sites, displaying households and infrastructure most at risk in terms of exposure as well as structural integrity and sensitivity. Existing technical, natural, human and social capital that can be employed to reduce disaster risk will be assessed. Over-flight observations of the prioritised lakes and their immediate downstream areas will be utilized, if financially feasible. Building on these activities, AF resources will be used to address the urgent need for region-wide collaboration in the development of standardised approaches and, eventually, of uniform standards with regards to early warning and hazard mitigation. South-South collaboration will be facilitated for the sharing of know-how and experiences about GLOF risk management. Consideration will be given to link up professionals in the Himalaya Hindu Kush region with Andean professionals who have successfully tackled problems of GLOF risk assessment and mitigation in the Peruvian Andes. Lessons learnt from other GLOF projects in Bhutan, Nepal, China, India, Peru, Chile and European countries will be analyzed to define a catalogue of available know-how and technologies for GLOF risk reduction.

### ***Component 3: Demonstration of community-based GLOF risk management in vulnerable mountain valleys of northern Pakistan***

#### *Baseline:*

Existing flood early warning systems in the Bagrot and Drongagh valleys rely on telephones and messaging services. Once there is a flood, dissemination of warning messages is commonly based on informal and uncoordinated communication of telephone messages, which leaves huge gaps in coverage. The current systems provide insufficient lead time for evacuation, and communities are ill prepared for the scope and dimension of flooding that are associated with GLOF events. At present, the Bagrot and Drongagh valleys do not have hazard sensors, relay stations for warning signals, or signaling devices that work together as a close coupled early warning system. No community focal points are trained in the operation and maintenance of early warning system components, and no GLOF evacuation areas have been identified. As a result, communities downstream of the glacier lakes are not able to receive and react to GLOF early warning messages in a timely and appropriate manner. In addition to insufficient EWS capacity, the government of Pakistan is unable, on its own, to bear the costs of reducing the threat of flooding from rising water levels in the glacier lakes associated with the Bagrot glacier in Giltgit-Baltistan and the Gohkir Glacier in Chitral (upstream of Drongagh). Although punctual monitoring of the stability of moraine dams at these sites is taking place, no structural measures have been implemented to reduce the risk of large-scale flashfloods to downstream communities.

#### *Adaptation alternative:*

Adaptation Fund resources will be used to enhance the resilience of the vulnerable population in Bagrot and Drongagh by establishing an early warning system for GLOF and other flash floods. Existing rudimentary early warning approaches will be up-graded with a technically sound system that is able to receive, trigger and relay early warning

signals on a 24 hours basis. Community and NGO focal points will be trained to access, monitor and interpret data from sensor equipment installed by PMD at a number of local sites, and involved in the operation, maintenance and calibration of these systems. Based on the systematic capturing of hazard information and vulnerabilities in Component 2, awareness raising activities will be undertaken to educate disaster-prone communities about the nature of GLOF risks, the particular behavior of GLOF events, evacuation routes and early warning protocols. These awareness activities will be connected with the production and dissemination of communication products, such as posters, leaflets and videos illustrating the topic. Institutional arrangements to devise, operate, test, and maintain a community-based GLOF risk monitoring & early warning system will be established. An evidence base on the strengths and weaknesses of different types of high- and low-tech early warning systems will be created, which will enable replication in other vulnerable areas. In addition to the establishment of an Early Warning system, the project will implement concrete risk mitigation measures for the potentially hazardous glacier lakes associated with the Bagrot glacier in Giltgit-Baltistan, and the lakes associated with the Gohkir Glacier in Chitral (upstream of Drongagh). AF resources will be used to establish check dams, mini dams, spill-ways, slope stabilization and –reinforcement structures, and controlled drainage where feasible. These measures will reduce the gravity flow of water in times of flooding, conserve soil stability, and control lake levels by means of spillways or siphons. Slopes adjacent to glacier lakes will be stabilized, preventing landslides and rockfalls and thereby reducing the risk of compound disasters. Existing knowledge from other GLOF risk management projects in Bhutan and Nepal will assist to prioritize measures.

#### ***Component 4: Documentation, analysis and continued application of lessons learnt***

##### *Baseline:*

At present, there is a limited pool of knowledge and experience on how to involve communities in the design, implementation and maintenance of concrete GLOF risk reduction measures. While Pakistan has institutional mechanisms for knowledge sharing on disaster response, knowledge on pre-disaster risk management is yet to be developed and systematically disseminated. The lack of community preparedness, especially with respect the need of training in first aid, search and rescue, community contingency planning, marking the flood basin to ensure proper land use planning is one aspect of disaster preparedness Capacity building and training programmes at the community level would reduce their dependency on government. The local community has yet not visualized the risk of GLOFs in many parts of the area. In spite of the fact that repeated incidents of flash floods and the resultant damage have occurred, the risks of GLOF or flash flood events is still not being factored into the community level livelihood and occupational patterns. There is inadequate understanding of the capacity required to prepare for such events and to mitigate their impacts.

##### *Adaptation alternative:*

Building on participative processes initiated under Components 1 and 2 of the project, and drawing on the technical experiences in the establishment of early warning and risk mitigation measures under Component 3, Component 4 of the proposed project will enable the analysis, replication and upscaling of project experiences in other communities that are vulnerable to GLOF risks. Technical specifications and decision-

making processes pertaining to the establishment of early warning and risk mitigation systems under the project will be captured and codified in a GLOF risk management manual. A dissemination campaign will be launched to present the findings from the project to relevant public entities and development partners, as well as other district entities with similar degrees of vulnerability. This campaign will integrate all vulnerable districts (based on the vulnerability maps generated under Outputs 1.2. and 2.2.) and facilitate the replication of the project approach in at least 2 other vulnerable districts.

Exchange programmes between project sites, potential target sites and other GLOF risk management projects outside of Pakistan will promote learning and transfer of experience, both on a national as well as international basis. Other countries facing GLOF risks, such as China, India, Nepal and Bhutan, will thereby benefit from the knowledge generated through the project. In conjunction with GLOF risk management projects under way in Bhutan, India and China, the project will contribute to a critical mass of experience on GLOF risks in the Himalaya region and enhance systematic regional cooperation.

### 3. PROJECT RESULTS FRAMEWORK

<p><b>This project will contribute to the following Country Programme Outcome as defined in CPAP or CPD:</b>  A comprehensive approach integrating environmentally sustainable development, global environmental concerns and commitments in national development planning, with emphasis on poverty reduction and with quality gender analysis.</p>
<p><b>Country Programme Outcome Indicators:</b> Commitments under global conventions on climate change being implemented</p>
<p><b>Primary applicable Key Environmental and Sustainable Development Key result Area:</b> 1 Mainstreaming environment and energy OR 2. Catalyzing environmental finance OR 3. Promote climate change adaptation OR 4. Expanding access to environmental and energy services for the poor.</p>

Project Strategy	Objectively verifiable indicators				
Goal	To enhance adaptive capacity to prevent climate change-induced GLOF disasters in Pakistan				
	Indicator	Baseline	Target	Sources of verification	Risks and Assumptions
<p><b>Objective: To reduce climate change-induced risks of Glacial Lake Outburst Floods (GLOFs) in Gilgit-Baltistan and Chitral</b></p>	<ul style="list-style-type: none"> <li>•No. of potentially dangerous glacier lakes in Gilgit-Baltistan and Chitral</li> <li>•No. of institutions with increased capacity to minimize human and material losses from GLOF events</li> <li>•Number of people living in Gilgit-Baltistan and Chitral suffering losses from extreme weather events</li> </ul>	<ul style="list-style-type: none"> <li>•There are 52 potentially dangerous lakes in Gilgit-Baltistan and Chitral areas.</li> <li>•35 destructive outburst floods are recorded in Gilgit-Baltistan and Chitral areas in last two hundred years.</li> </ul>	<ul style="list-style-type: none"> <li>•The GLOF risk from at least 2 potentially dangerous glacier lakes in Gilgit-Baltistan and Chitral is successfully reduced</li> <li>•At least 80% of disaster management institutions in Gilgit-Baltistan and Chitral (national, provincial and district level) are able to access, interpret and use GLOF risk information for planning purposes</li> <li>•At least 2 GLOF-prone mountain valleys are comprehensively covered by a GLOF Early Warning system</li> </ul>	<ul style="list-style-type: none"> <li>•Questionnaire-based surveys (QBS)/ Interviews at the beginning, mid-term and end of the project</li> <li>•Impact assessment at the end of the project</li> <li>•Satellite imagery of glacier lakes and vulnerable sites before and after the project</li> </ul>	<ul style="list-style-type: none"> <li>•The political situation stays stable throughout the project duration.</li> <li>•Stakeholders are able to perceive reductions in vulnerability over the time-scale determined by project duration</li> <li>•No flooding disasters in target communities occur throughout the</li> </ul>

Project Strategy	Objectively verifiable indicators				
Goal	To enhance adaptive capacity to prevent climate change-induced GLOF disasters in Pakistan				
	Indicator	Baseline	Target	Sources of verification	Risks and Assumptions
					project lifetime
<b>Outcome 1:</b> Strengthened Institutional capacities to implement policies, plans and investments that prevent human and material losses from GLOF events in vulnerable areas of Northern Pakistan	<ul style="list-style-type: none"> <li>No. of targeted institutions with increased capacity to minimize exposure to GLOF risks</li> <li>Number of policies introduced to address GLOF risks or adjusted to incorporate GLOF risks</li> </ul>	<ul style="list-style-type: none"> <li>National, provincial and local disaster management institutions and development planners are unable to design, finance and analyze GLOF risk reduction measures on the basis of reliable, comprehensive information</li> </ul>	<ul style="list-style-type: none"> <li>By the end of Year 3, 100% of the national and 90% of district and community authorities in the Gilgit-Baltistan and Chitral regions are able to prioritize and plan measures to minimize potential losses from GLOFs</li> <li>By the end of the project, at least two policies have been reviewed and/or revised to address or incorporate GLOF risk reduction</li> </ul>	<ul style="list-style-type: none"> <li>QBS, training protocols and attendance lists</li> <li>Review of climate change, DRM and development policies and plans at the national, district, and community levels</li> </ul>	<ul style="list-style-type: none"> <li>Government remains supportive to link longer-term climate change planning with current disaster risk management initiatives</li> </ul>
<b>Output 1.1:</b> Policy framework and guidelines to address GLOF risks in northern Pakistan institutionalized	<ul style="list-style-type: none"> <li>Number of policies introduced to address GLOF risks or adjusted to incorporate GLOF risks</li> </ul>	<ul style="list-style-type: none"> <li>Climate change risks are mentioned in the current Task Force on Climate Change (TFCC) report.</li> <li>No comprehensive disaster management</li> </ul>	<ul style="list-style-type: none"> <li>By the end of the project, a Disaster Management Act is formulated that incorporates GLOF and other climate risk issues</li> <li>By the end of the project, existing DRM guidelines integrate longer-term climate risk planning</li> </ul>	<ul style="list-style-type: none"> <li>Review of Disaster Management Act, DRM policies, plans, and institutional structures</li> </ul>	<ul style="list-style-type: none"> <li>Government continues to support climate-resilient DRM.</li> </ul>

Project Strategy	Objectively verifiable indicators				
Goal	To enhance adaptive capacity to prevent climate change-induced GLOF disasters in Pakistan				
	Indicator	Baseline	Target	Sources of verification	Risks and Assumptions
		guidelines exist for the Gilgit-Baltistan and Chitral regions			
Output 1.2: Indicators and criteria for GLOF vulnerability developed and systematically applied to enable priority allocation of risk reduction efforts and investments	<ul style="list-style-type: none"> <li>Number of potentially GLOF-prone communities that are integrated in a centralized, web-based GLOF risk database</li> <li>Availability of a government action plan to address GLOF risks in Pakistan, starting from the highest risk zones and the most vulnerable communities</li> </ul>	<ul style="list-style-type: none"> <li>No comprehensive database and action plans exist for addressing GLOF risk in Pakistan.</li> </ul>	<ul style="list-style-type: none"> <li>By year 1 of the project, all GLOF risk sites in Pakistan are identified and inventoried in a central, web-based GLOF risk database</li> <li>By the end of the project, a comprehensive disaster risk reduction plan is available to address the biggest GLOF threats in the most vulnerable communities</li> </ul>	<ul style="list-style-type: none"> <li>GLOF risk database,</li> <li>Satellite imagery</li> <li>Action plan document</li> </ul>	<ul style="list-style-type: none"> <li>Turnover of staff does not counteract benefits of capacity building efforts</li> </ul>
<b>Outcome 2:</b> Improved access of disaster management planners and policy makers to knowledge, information and research on GLOF	<ul style="list-style-type: none"> <li>No. and type of government-led initiatives which conduct and update risk and vulnerability assessments</li> </ul>	<ul style="list-style-type: none"> <li>Level of knowledge about GLOF exposure and sensitivity in northern Pakistan is very limited.</li> </ul>	<ul style="list-style-type: none"> <li>By the end of the project, 95 percent of population has sufficient knowledge about GLOF risks and mitigation measures.</li> </ul>	<ul style="list-style-type: none"> <li>QBS</li> <li>Surveys on communication channels</li> </ul>	<ul style="list-style-type: none"> <li>Continued government support for the project</li> </ul>

Project Strategy	Objectively verifiable indicators				
Goal	To enhance adaptive capacity to prevent climate change-induced GLOF disasters in Pakistan				
	Indicator	Baseline	Target	Sources of verification	Risks and Assumptions
risks					
Output 2.1: Systematic engagement of the project with global and regional research networks and centres working on GLOF issues	<ul style="list-style-type: none"> <li>Number of specialized institutions actively connected in the exchange of relevant technical information that can inform GLOF vulnerability analysis and risk reduction planning</li> </ul>	<ul style="list-style-type: none"> <li>Regional platform established by the regional GLOF risk reduction project, with punctual interaction until the project has ended.</li> </ul>	<ul style="list-style-type: none"> <li>By the end of year 2, at least 10 other GLOF risk reduction initiatives from other countries are analyzed to inform risk assessment and –planning under the proposed project</li> </ul>	<ul style="list-style-type: none"> <li>Comparative analysis report</li> </ul>	<ul style="list-style-type: none"> <li>Other GLOF projects have codified their lessons in an accessible format</li> <li>Relevant partners remain interested in cooperation</li> </ul>
Output 2.2: Risk and hazard maps for mountain valleys with the highest GLOF risk and exposure of lives, livelihoods and infrastructure.	<ul style="list-style-type: none"> <li>Number of GLOF hazard and vulnerability maps for GLOF-prone mountain valleys</li> </ul>	<ul style="list-style-type: none"> <li>No comprehensive risk and vulnerability maps for mountain valleys with highest GLOF risks available</li> </ul>	<ul style="list-style-type: none"> <li>By year 1, all GLOF risk areas in Pakistan are covered by remote sensing information</li> <li>By year 2, at least 2 GLOF-prone mountain valleys are analyzed by a detailed hazard zonation and vulnerability assessment.</li> </ul>	<ul style="list-style-type: none"> <li>Hazard maps</li> <li>Vulnerability maps</li> <li>Risk maps</li> </ul>	<ul style="list-style-type: none"> <li>Availability of field staff to conduct vulnerability assessment</li> <li>Availability of unrestricted satellite imagery</li> <li>No natural disasters in project area</li> </ul>
<b>Outcome 3:</b> Reduced human and material	<ul style="list-style-type: none"> <li>Number of vulnerable households in</li> </ul>	<ul style="list-style-type: none"> <li>No GLOF early warning system for Bagrot and</li> </ul>	<ul style="list-style-type: none"> <li>By the end of the project, 90% of households in target communities are able to receive and respond to early</li> </ul>	<ul style="list-style-type: none"> <li>QBS with households</li> </ul>	<ul style="list-style-type: none"> <li>No tampering with early warning</li> </ul>



Project Strategy	Objectively verifiable indicators				
Goal	To enhance adaptive capacity to prevent climate change-induced GLOF disasters in Pakistan				
	Indicator	Baseline	Target	Sources of verification	Risks and Assumptions
losses in vulnerable communities in the Northern areas of Pakistan through GLOF early warnings and other adaptation measures	Bagrot in Gilgit-Baltistan and Drongagh valley in Chitra covered by a GLOF early warning system <ul style="list-style-type: none"> <li>No. of physical assets strengthened or constructed to withstand or mitigate the effects of GLOF events</li> </ul>	Drongagh Valley in place <ul style="list-style-type: none"> <li>Vulnerable households are not able to receive and react to GLOF early warning messages</li> <li>No physical structures in place to mitigate the effect of GLOF events.</li> </ul>	warnings and take the appropriate actions following the warning <ul style="list-style-type: none"> <li>By the end of the project, at least 2 targeted engineering structures (biological and/or mechanical) have been established to reduce the effects of GLOF events on livelihood assets</li> </ul>	<ul style="list-style-type: none"> <li>Site visits before/after the project</li> </ul>	system installations <ul style="list-style-type: none"> <li>Community workforce available to support engineering measures</li> </ul>
Output 3.1: Preparedness actions for vulnerable communities conducted to reduce risks from GLOF events	<ul style="list-style-type: none"> <li>Percentage of targeted population aware of GLOF impacts and appropriate responses to the threat</li> </ul>	<ul style="list-style-type: none"> <li>Limited awareness by vulnerable communities in the Gilgit-Baltistan and Chitral valleys on GLOF risks and risk reduction measures</li> </ul>	<ul style="list-style-type: none"> <li>By the end of the project, at least 90% of households in the target area are aware of the functionality of the GLOF EWS and able to respond to warning signals</li> <li>By the end of the project, at least 2 full-scale GLOF early warning drills have been conducted, involving all households in the target communities</li> </ul>	<ul style="list-style-type: none"> <li>QBS</li> <li>Video of mock drills, simulation protocol</li> <li>Debriefing notes</li> </ul>	<ul style="list-style-type: none"> <li>Messages are delivered in an appropriate way to enhance awareness, receptiveness and understanding</li> <li>Messages are delivered in a concerted, coordinated and</li> </ul>

Project Strategy	Objectively verifiable indicators				
Goal	To enhance adaptive capacity to prevent climate change-induced GLOF disasters in Pakistan				
	Indicator	Baseline	Target	Sources of verification	Risks and Assumptions
					consistent manner
Output 3.2: A community based system for GLOF risk monitoring & early warning in priority communities.	<ul style="list-style-type: none"> <li>Number of households in Bagrot and Drongagh valley reached by a GLOF early warning system</li> <li>Percentage of households receiving and responding to warnings in time to avoid human losses.</li> </ul>	<ul style="list-style-type: none"> <li>No GLOF early warning system for Bagrot and Drongagh valleys in place.</li> <li>Vulnerable households are not able to receive and react to GLOF early warning messages</li> </ul>	<ul style="list-style-type: none"> <li>By the end of the project, 90% of households in each target valley are able to receive and respond to GLOF early warning signals and take the appropriate actions following the warning.</li> <li>By the end of the project , at least 2 CBOs are trained in the operation and maintenance of the EWS and ensure its continued functionality</li> </ul>	<ul style="list-style-type: none"> <li>QBS with households</li> <li>Mock drill protocols</li> <li>Field visits to EWS sensor, relay and communication sites</li> </ul>	<ul style="list-style-type: none"> <li>No tempering with the early warning system installations,</li> <li>Functioning backup systems in place.</li> </ul>
Output 3.3: Targeted GLOF risk reduction measures such as check dams, spill-ways, slope stabilization or controlled drainage established in Bagrot and Drongagh valleys	<ul style="list-style-type: none"> <li>No. of physical assets strengthened or constructed to withstand or mitigate the effects of GLOF events</li> </ul>	<ul style="list-style-type: none"> <li>No risk reduction measures for GLOF in place in the target sites</li> </ul>	<ul style="list-style-type: none"> <li>By the end of the project, concrete engineering measures are in place to reduce the impact of GLOF events on vulnerable communities in each target valley (as appropriate: check dams, mini dams, ponds, spill ways, slope stabilization, tree plantation, controlled drainage)</li> </ul>	<ul style="list-style-type: none"> <li>Field visits to engineering structures</li> </ul>	<ul style="list-style-type: none"> <li>Communities are receptive to the adoption of mitigation measures and participate actively in construction efforts.</li> <li>EIA yields</li> </ul>

Project Strategy	Objectively verifiable indicators				
Goal	To enhance adaptive capacity to prevent climate change-induced GLOF disasters in Pakistan				
	Indicator	Baseline	Target	Sources of verification	Risks and Assumptions
					positive result for the mitigation measures under consideration
<b>Outcome 4:</b> Project experiences documented and replicated	<ul style="list-style-type: none"> <li>Number of proposals, papers, and other documents that incorporate learning from the project</li> </ul>	<ul style="list-style-type: none"> <li>Experiences regarding climate change-induced GLOF mitigation and preparedness in Pakistan have not been systematically captured and shared</li> </ul>	<ul style="list-style-type: none"> <li>By the end of the project, at least 2 other GLOF mitigation and early warning initiatives or studies draw on learning from experiences in Pakistan.</li> </ul>	<ul style="list-style-type: none"> <li>Proposals, papers, and other documents referring to AF-funded GLOF project in Pakistan</li> </ul>	<ul style="list-style-type: none"> <li>Political circumstances in Pakistan are conducive for international exchange on GLOF mitigation and preparedness efforts</li> </ul>
Output 4.1. Technical knowledge and project lessons documented for use in future initiatives	<ul style="list-style-type: none"> <li>Number of technical documents capturing project knowledge</li> </ul>	<ul style="list-style-type: none"> <li>No technical papers capturing project knowledge available</li> </ul>	<ul style="list-style-type: none"> <li>By the end of the project, all technical decisions and lessons are captured in dedicated reports</li> <li>By the end of the project, a GLOF risk reduction manual is available and disseminated both nationally and internationally</li> <li>By the end of the project, a project website is established and linked to the GLOF risk database developed under</li> </ul>	<ul style="list-style-type: none"> <li>Technical briefs prepared by the project</li> <li>Manual</li> <li>Project website</li> </ul>	<ul style="list-style-type: none"> <li>Technical knowledge is consistently codified and reflected upon over the lifetime of the project</li> </ul>

Project Strategy	Objectively verifiable indicators				
Goal	To enhance adaptive capacity to prevent climate change-induced GLOF disasters in Pakistan				
	Indicator	Baseline	Target	Sources of verification	Risks and Assumptions
			Outcome 1		
Output 4.2. Project experiences disseminated to policy makers and disaster management planners in Pakistan and the wider HKH region.	<ul style="list-style-type: none"> <li>Number of organizations actively involved in knowledge transfer within and across district borders</li> <li>Number of policy makers and disaster management practitioners within and outside of Pakistan who are aware of the project and willing to adopt lessons learned</li> </ul>	<ul style="list-style-type: none"> <li>No systematic knowledge transfer on GLOF risks from Pakistan to other countries</li> </ul>	<ul style="list-style-type: none"> <li>By the end of the project, at least 1 international exchange visit between GLOF risk reduction projects has taken place</li> <li>By the end of the project, DRM planning authorities of at least 3 GLOF-prone districts in Pakistan visit the target sites with a view on replication of the project approach in other vulnerable sites</li> <li>By the end of the project, at least 2 project dissemination workshops have been conducted in Pakistan, with attendance by stakeholders from all GLOF-prone districts</li> </ul>	<ul style="list-style-type: none"> <li>Study visit report</li> <li>Site visits, consultation protocols</li> <li>Workshop proceedings</li> </ul>	<ul style="list-style-type: none"> <li>Other regions and countries believe experiences from the project will be valuable for future GLOF mitigation and preparedness initiatives</li> <li>Project is sufficiently visible to other GLOF-prone districts</li> <li>Project is able to mobilize follow-up financing for replication and up scaling.</li> </ul>

## 2. TOTAL BUDGET AND WORK PLAN

<b>Award ID:</b>	<b>00061318</b>	<b>Project ID:</b>	<b>00077650</b>
<b>Award Title</b>	Pakistan: Reducing Risks and Vulnerabilities from Glacier Lake Outburst Floods in Northern Pakistan		
<b>Business unit</b>	PAK10		
<b>Project title:</b>	Pakistan: Reducing Risks and Vulnerabilities from Glacier Lake Outburst Floods in Northern Pakistan		
<b>PIMS no.</b>	4454		
<b>Implementing partner</b>	Ministry of Environment		

AF Outcome/Atlas Activity	Responsible Party/ Implementing Agent	Fund ID	Donor Name	Atlas Budgetary Account Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Total (USD)	See Budget Note:
<b>OUTCOME 1:</b>  Policy Recommendations and institutional strengthening to prevent climate change induced GLOF events in Northern Pakistan	Party 1	11602	AF	72100	Contractual Service Companies	7,050	5,875	5,875	4,700	23,500	
				71300	Local Consultants	7,282	6,069	6,069	4,855	24,275	
				74200	Audio Visual and Print prod Costs	3,968	3,306	3,306	2,645	13,225	
				71600	Travel	7,200	6,000	6,000	4,800	24,000	
				74500	Miscellaneous	4,500	3,750	3,750	3,000	15,000	
					<b>sub-total AF</b>	<b>30,000</b>	<b>25,000</b>	<b>25,000</b>	<b>20,000</b>	<b>100,000</b>	
					<b>Total Outcome 1</b>	<b>30,000</b>	<b>25,000</b>	<b>25,000</b>	<b>20,000</b>	<b>100,000</b>	
<b>OUTCOME 2:</b> Strengthening knowledge and information about GLOF risks in Northern Pakistan.	Party 1	11602	AF	72100	Contractual Service Companies	17,100	14,250	14,250	11,400	57,000	
				71300	Local Consultants	18,000	15,000	15,000	12,000	60,000	
				74200	Audio Visual and Print prod Costs	7,200	6,000	6,000	4,800	24,000	
				72400	Communication & Audio Visual Equipments	12,750	10,625	10,625	8,500	42,500	
				71600	Travel	13,500	11,250	11,250	9,000	45,000	
				74500	Miscellaneous	6,450	5,375	5,375	4,300	21,500	
					<b>sub-total AF</b>	<b>75,000</b>	<b>62,500</b>	<b>62,500</b>	<b>50,000</b>	<b>250,000</b>	
	<b>Total Outcome 2</b>	<b>75,000</b>	<b>62,500</b>	<b>62,500</b>	<b>50,000</b>	<b>250,000</b>					

<b>OUTCOME 3: Demonstration of community based GLOF risk management in vulnerable mountain valleys of Northern Pakistan</b>	<b>Party 1</b>	<b>11602</b>	<b>AF</b>	71200	International Consultants	228,500	232,500	182,500	36,500	730,000	
				72100	Contractual Service Companies	225,500	47,500	97,500	19,500	390,000	
				71300	Local Consultants	72,000	40,000	40,000	8,000	160,000	
				74200	Audio Visual and Print prod Costs	9,000	5,000	5,000	1,000	20,000	
				72400	Communication & Audio Visual Equipments	38,250	21,250	21,250	4,250	85,000	
				71600	Travel	133,650	74,250	74,250	14,850	297,000	
				74500	Miscellaneous	20,250	11,250	11,250	2,250	45,000	
				72200	Equipment	478,350	265,750	265,750	53,150	1,063,000	
					<b>sub-total AF</b>	<b>1,255,500</b>	<b>697,500</b>	<b>697,500</b>	<b>139,500</b>	<b>2,790,000</b>	
	<b>Party 1</b>	<b>04000</b>	<b>UNDP</b>	71300	Local Consultants	45,000	37,500	37,500	30,000	150,000	
				71600	Travel	15,000	12,500	12,500	10,000	50,000	
				74500	Miscellaneous	12,000	10,000	10,000	8,000	40,000	
				72200	Equipment	30,000	25,000	25,000	20,000	100,000	
					<b>Sub-total UNDP</b>	<b>102,000</b>	<b>85,000</b>	<b>85,000</b>	<b>68,000</b>	<b>340,000</b>	
				<b>Total Outcome 3</b>	<b>1,357,500</b>	<b>782,500</b>	<b>782,500</b>	<b>207,500</b>	<b>3,130,000</b>		
<b>OUTCOME 4: Documentation analysis and continued application of lessons learnt</b>	<b>Party 1</b>	<b>11602</b>	<b>AF</b>	72100	Contractual Service Companies	7,500	6,250	6,250	5,000	25,000	
				74200	Audio Visual and Print prod Costs	3,000	2,500	2,500	2,000	10,000	
				72400	Communication & Audio Visual Equipments	7,500	6,250	6,250	5,000	25,000	
				71600	Travel	6,000	5,000	5,000	4,000	20,000	
				74500	Miscellaneous	6,000	5,000	5,000	4,000	20,000	
					<b>sub-total AF</b>	<b>30,000</b>	<b>25,000</b>	<b>25,000</b>	<b>20,000</b>	<b>100,000</b>	
					<b>Total Outcome 4</b>	<b>30,000</b>	<b>25,000</b>	<b>25,000</b>	<b>20,000</b>	<b>100,000</b>	

<b>Project Management Unit and Monitoring and Evaluation</b>	<b>Party 1</b>	<b>11602</b>	<b>AF</b>	71300	Local Consultants	34,200	28,500	28,500	22,800	114,000			
				72100	Contractual Service Companies	51,000	42,500	42,500	34,000	170,000			
				71600	Travel	15,000	12,500	12,500	10,000	50,000			
				72500	Office Supplies	7,800	6,500	6,500	5,200	26,000			
					<b>sub-total AF</b>	<b>108,000</b>	<b>90,000</b>	<b>90,000</b>	<b>72,000</b>	<b>360,000</b>			
		<b>04000</b>	<b>UNDP</b>	72200	Equipment and Furniture	24,000	20,000	20,000	16,000	80,000			
				71600	Travel	6,000	5,000	5,000	4,000	20,000			
				72100	Contractual Service Companies	18,000	15,000	15,000	12,000	60,000			
					<b>sub-total UNDP</b>	<b>48,000</b>	<b>40,000</b>	<b>40,000</b>	<b>32,000</b>	<b>160,000</b>			
					<b>Total Management</b>	<b>156,000</b>	<b>130,000</b>	<b>130,000</b>	<b>104,000</b>	<b>520,000</b>			
		<b>PROJECT TOTAL</b>						<b>1,648,500</b>	<b>1,025,000</b>	<b>1,025,000</b>	<b>401,500</b>	<b>4,100,000</b>	

Summary of Funds	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Total (USD)
AF	1,498,500	900,000	900,000	301,500	3,600,000
UNDP	150,000	125,000	125,000	100,000	500,000
GoP (In-kind)	945,000	875,000	875,000	805,000	3,500,000
<b>Total</b>	<b>2,593,500</b>	<b>1,900,000</b>	<b>1,900,000</b>	<b>1,206,500</b>	<b>7,600,000</b>

#### 4. MANAGEMENT ARRANGEMENTS

This project will be implemented by the Ministry of Environment, Government of Pakistan, in collaboration with the provincial governments of Khyber-Pakhtoonkhawa and Gilgit-Baltistan. A **Project Steering Committee** (PSC) will be established at the federal level which will provide strategic guidance for the implementation of the project. The PSC will be chaired by the Secretary, Ministry of Environment and the representatives from relevant departments, NGOs and community members. The composition and TORs of the Project Steering Committee are attached as Annex – I. Similarly, two **Project Management Committees** (PMCs) will be established at the provincial level for the smooth implementation of the project activities. These PMCs will be established in both Gilgit-Baltistan and Chitral. The composition and TORs of the Project Management Committees are attached as Annex – I. At the provincial levels of Gilgit- Baltistan and Khyber Pakhtoonkhawa, **provincial offices** will be established under the respective Planning and Development Departments. National and local NGOs such as ICIMOD, WWF, IUCN and LEAD – Pakistan and/or Government agencies/departments will be selected to lead the implementation of local level activities, based on a proposition by the Project Manager and approval by the PSC. These partners will work through community based organizations and ensure their sustainable participation during the planning, implementation and monitoring stages of the initiative.

The project team will be led by a National Project Director who will be an ex-officio government official. The day to day management of the project will be handled by National Project Manager and the support team of the Project Management Unit (TORs attached as Annex IV). The provincial teams in Gilgit and Chitral will be led by field managers. The implementation arrangements and the representation in the PSCs and PMCs have been finalized after consultations with the local stakeholders. All main stakeholders are represented in PSC and PMCs.

#### 5. MONITORING AND EVALUATION PLAN AND BUDGET

Project monitoring and evaluation (M&E) will be in accordance with established UNDP procedures and will be carried out by the Project team, verified by the Ministry of Environment, Government of Pakistan and the UNDP Country Office in Islamabad. Dedicated support by the technical adaptation teams in the UNDP Regional Center for Asia/Pacific and UNDP New York will be provided on a regular basis. A comprehensive Results Framework of the project will define execution indicators for project implementation as well as the respective means of verification. A Monitoring and Evaluation system for the project will be established based on these indicators and means of verification. Targeted M&E activities for the proposed project include the following:

A **Project Inception Workshop** will be conducted within four months of project start up with the full project team, relevant government counterparts, co-financing partners, and UNDP. The Inception Workshop is crucial to building ownership for the project results and to plan the first year annual work plan. A fundamental objective of the Inception Workshop will be to present the modalities of project implementation and execution, document mutual agreement for the proposed executive arrangements amongst stakeholders, and assist the project team to understand and take ownership of the project's goals and objectives. Another key objective of the Inception Workshop is to introduce the project team which will support the project during its implementation. An



Inception Workshop Report will be prepared and shared with participants to formalize various agreements decided during the meeting.

A UNDP **risk log** will be regularly updated in intervals of no less than every six months in which critical risks to the project have been identified. **Quarterly Progress Reports** will be prepared by the Project team and verified by the Project Steering Committee. **Annual Project Reports** will be prepared to monitor progress made since project start and in particular for the previous reporting period. These annual reports include, but are not limited to, reporting on the following:

- Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative);
- Project outputs delivered per project Outcome (annual);
- Lessons learned/good practices;
- Annual expenditure reports;
- Reporting on project risk management.

Government authorities, members of Steering Committees and UNDP staff will conduct regular **field visits** to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress.

In terms of financial monitoring, the project team will provide UNDP with **certified periodic financial statements**, and with an **annual audit** of the financial statements relating to the status of funds according to the established procedures set out in the Programming and Finance manuals. The Audit will be conducted by a legally recognized auditor of the Government, or by a commercial auditor engaged by the Government.

The project will undergo an independent **Mid-Term Evaluation (MTE)** at the mid-point of project implementation, which will determine progress being made toward the achievement of outcomes and 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. A summative **Terminal Evaluation** will be conducted 3 months before project closure.

The budgeted Monitoring & Evaluation plan is as follows:

<b>Type of M&amp;E activity</b>	<b>Responsible Parties</b>	<b>Budget US\$</b> <i>Excluding project team Staff time</i>	<b>Time frame</b>
Inception Workshop (IW)	<input type="checkbox"/> National Project Coordinator <input type="checkbox"/> UNDP CO	10,000	Within first 6 months
Inception Report	<input checked="" type="checkbox"/> Project Team <input checked="" type="checkbox"/> UNDP CO	None	Within 1 month of IW
Measurement of Means of Verification	National Project Coordinator	None	Start, mid and end of project

for project indicators			
Annual and Quarterly Progress reviews	Project Team UNDP-CO	None	Quarterly and Annually
National and Provincial Steering Committee Meetings	<ul style="list-style-type: none"> <li>▪ National Project Coordinator</li> <li>▪ UNDP CO</li> </ul>	10,000	Following Project IW and subsequently at least once a year
Periodic status reports	<ul style="list-style-type: none"> <li>▪ Project team</li> </ul>	4,000	To be determined by Project team and UNDP
Technical reports	<ul style="list-style-type: none"> <li>▪ Project team</li> <li>▪ Hired consultants as needed</li> </ul>	8,000	To be determined by Project Team and UNDP
Mid-term External Evaluation	<ul style="list-style-type: none"> <li>▪ Project team</li> <li>▪ UNDP- CO</li> <li>▪ External Consultants (i.e. evaluation team)</li> </ul>	20,000	At mid-point of project implementation.
Terminal Report	<ul style="list-style-type: none"> <li>▪ Project team</li> <li>▪ UNDP-CO</li> <li>▪ External Consultant</li> </ul>	none	At least 1 month before the end of the project
Audit	<ul style="list-style-type: none"> <li>▪ UNDP-CO</li> <li>▪ Project team</li> </ul>	8,000	Yearly
Visits to field sites	<ul style="list-style-type: none"> <li>▪ Project staff</li> <li>▪ Government representatives</li> </ul>	40,000	At all stages of project implementation
Final Evaluation	<ul style="list-style-type: none"> <li>▪ Independent external Consultants</li> </ul>	20,000	Six months prior to the terminal tripartite review meeting.
<b>TOTAL indicative COST</b>		<b>US\$ 120,000</b>	

## 6. LEGAL CONTEXT

This document together with the CPAP signed by the Government and UNDP which is incorporated by reference constitute together the instrument envisaged in the [Supplemental Provisions](#) to the Project Document, attached hereto.

Consistent with the above Supplemental Provisions, the responsibility for the safety and security of the implementing partner and its personnel and property, and of UNDP's property in the implementing partner's custody, rests with the implementing partner.

The implementing partner shall:

- a) put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;
- b) assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan.

UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.

The implementing partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via <http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm>. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.

## 7. ANNEXES

### **ANNEX I**

#### **Project Steering Committee (PSC):**

A Project Steering Committee will be established to provide policy guidance to the project and monitor progress and performance. The PSC will facilitate inter-agency co-ordination of the project at the national level, provide avenues for maintaining inter-provincial linkages, and ensure that the lessons learned from implementation of the project are integrated into Pakistan's overall adaptation programme. The Committee will be chaired by the Secretary, Ministry of Environment. Members will include ,UNDP, DG (Environment), Designated National Authority for Adaptation Fund, ICIMOD, Economic Affairs Division, Pakistan Metrological Department, Gilgit-Baltistan Disaster Management Authority, Chitral Disaster Management Authority, the Project Manager, the Inspector General of Forests General Manager, AKRSP, IUCN-Pakistan, WWF-Pakistan and community member representatives. The office of the National Project Manager's office will serve as the Secretariat to the Committee and will take responsibility for organising meetings, recording minutes and ensuring that decisions are implemented.

The frequency of PSC meetings will be decided by the Chair, but initially the Committee will be convened twice a year. The first PSC meeting each year will follow the preparation of a detailed Annual Project Report (APR) on implementation. The second PSC meeting will be convened during the middle of each year. PSC meetings will normally be convened in Islamabad.

The PSC will be responsible for the following activities:

- project review, monitoring and co-ordination;
- approval of annual work plan (including training and consultancies) and annual budget, including all components;
- co-ordination of government actions and provision of policy guidance;
- facilitating policy and legislative reform regarding management of GLOF as part of adaptation measures
- monitoring efforts to establish financial mechanism;
- ensuring adherence to UNDP guidelines for the administration of project funds; and
- ensuring linkages with the national environmental policies and adaptation plans.

## **Project Management Committees (PMCs)**

The Project Management Committees will be formed in both Gilgit-Baltistan and Chitral to supervise project implementation, ensure that project targets are met, and monitor on-the-ground impacts.

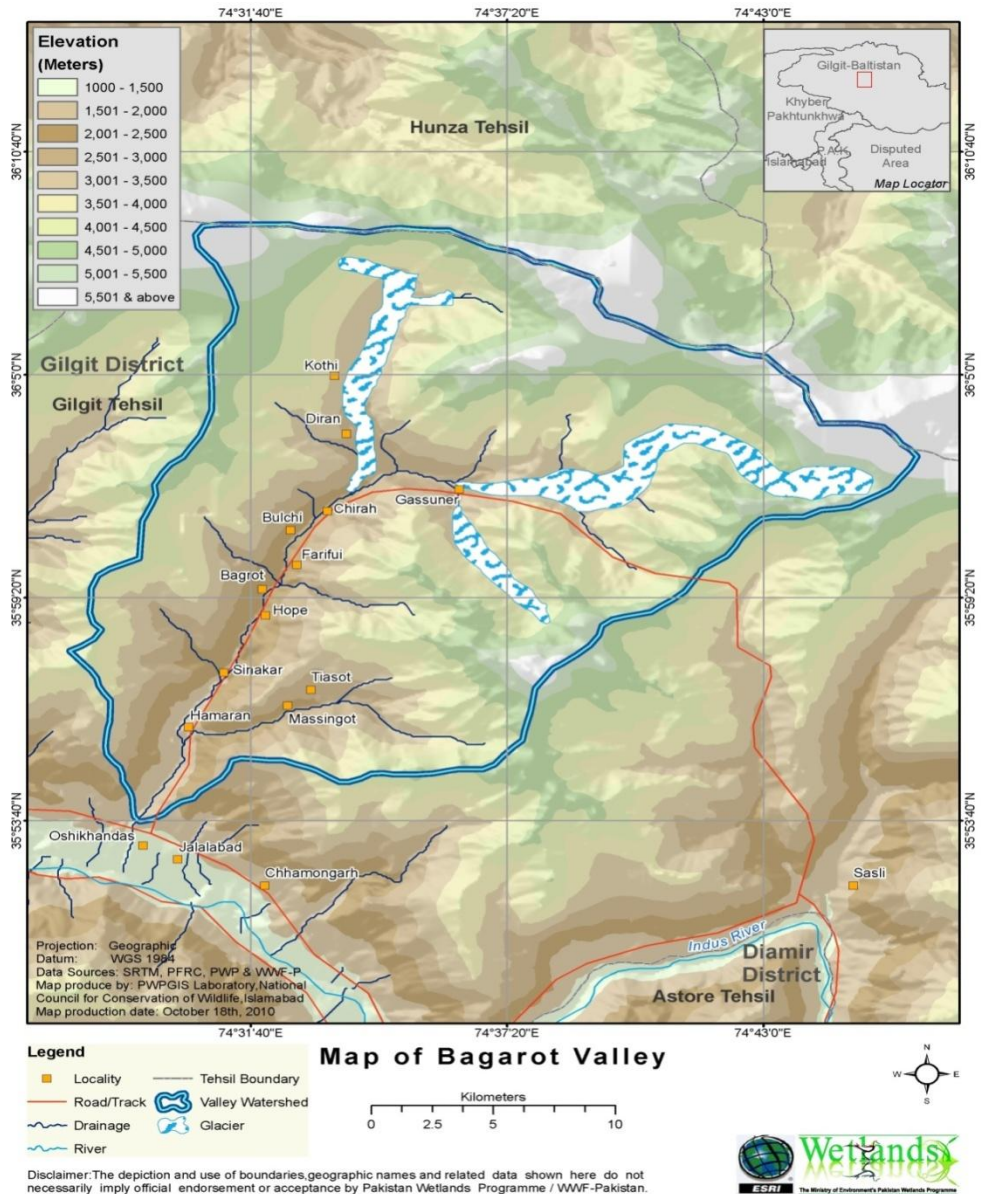
In NAs, membership will be chaired by chief Gilgit-Baltistan Disaster Management Authority and Chief, Disaster Management Authority in Chitral respectively. The membership will include the Regional Programme Manager, AKRSP, ICIMOD, WWF, a local representative each from IUCN, and WWF.

The Project Manager and a UNDP representative will also be members of both PMC's. The PMC's will meet at least twice a year at times and locations to be decided by the Chair. The Committees will be responsible for:

- monitoring the results of efforts to establish and strengthen GLOF related activities in the project sites;
- co-ordinating institutional arrangements for management of the activities;
- co-ordinating policy and legislative development regarding GLOF
- overseeing awareness and education activities;
- ensuring that partner agency programmes are fully integrated into the project framework;
- monitoring the results of the demonstration projects and supporting their integration into wider development programmes;
- monitoring technical assistance provided by the contracting agencies, including all institutional strengthening services provided to local communities and government bodies;
- monitoring all training activities;
- ensuring linkages to regional GLOF activities; and
- reviewing quarterly and annual workplans

**ANNEX II:**

**Project Location**







## Topographic Map of Drongagh Area, District Chitral



Disclaimer :The depiction and use of boundaries , geographic names and related data shown here do not necessarily imply official endorsement or acceptance by Pakistan Wetlands Programme / WWF-Pakistan.

## ANNEX III

### UNDP Services to Adaptation Fund Project: Reducing Risks and Vulnerabilities from GLOFs in Northern Pakistan

Stage	UNDP Services
<b>Identification, Sourcing and Screening of Ideas</b>	<p>Provide information on substantive issues in adaptation associated with the purpose of the Adaptation Fund (AF). Engage in upstream policy dialogue related to a potential application to the AF.</p> <p>Verify soundness and potential eligibility of identified idea for AF.</p>
<b>Feasibility Assessment / Due Diligence Review</b>	<p>Provide up-front guidance on converting general idea into a feasible project/programme.</p> <p>Source technical expertise in line with the scope of the project/programme.</p> <p>Verify technical reports and project conceptualization.</p> <p>Provide guidance on AF Board expectations and requirements.</p> <p>Provide detailed screening against technical, financial, social and risk criteria and provide statement of likely eligibility against AF requirements.</p> <p>Assist in identifying technical partners.</p> <p>Validate partner technical abilities.</p> <p>Obtain clearances from AF.</p>
<b>Development &amp; Preparation</b>	<p>Provide technical support, backstopping and troubleshooting to convert the idea into a technically feasible and operationally viable project/programme.</p> <p>Source technical expertise in line with the scope of the project/programme needs.</p> <p>Verify technical reports and project conceptualization.</p> <p>Provide guidance on AF expectations and requirements.</p> <p>Verify technical soundness, quality of preparation, and match with AF expectations.</p> <p>Negotiate and obtain clearances by AF.</p> <p>Respond to information requests, arrange revisions etc.</p>
<b>Implementation</b>	<p>Technical support in preparing TORs and verifying expertise for technical positions.</p> <p>Participate, guide and train project teams on setting up operational plan for implementation of the project during inception phases of the approved project.</p> <p>Verification of technical validity / match with AF expectations of inception report.</p> <p>Provide technical information as needed to facilitate implementation of the project activities.</p> <p>Provide advisory services as required.</p> <p>Provide technical support, participation as necessary during project activities.</p> <p>Provide troubleshooting support if needed.</p>



<b>Stage</b>	<b>UNDP Services</b>
	<p>Undertake a minimum of one technical support and oversight visit per year.</p> <p>Provide additional support and oversight missions as necessary.</p> <p>Provide technical monitoring, progress monitoring, validation, and quality assurance throughout.</p> <p>Allocate and monitor Annual Spending Limits based on agreed workplans.</p> <p>Return unspent funds to AF.</p>
<b>Evaluation and Reporting</b>	<p>Provide technical support in preparing TOR and verifying expertise for technical positions involving evaluation and reporting.</p> <p>Participate in briefing / debriefing.</p> <p>Verify technical validity / match with AF expectations of all evaluation and other reports</p> <p>Undertake technical analysis, validate results, compile lessons.</p> <p>Disseminate technical findings</p>

## **ANNEX IV TERMS OF REFERENCES**

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**Post Title:** National Project Manager

**Project Title:** Reducing Risks and Vulnerabilities from Glacier Lake Outburst Floods in Northern Pakistan

**Duty Station:** Islamabad

**Salary band:** SC-9

### **Background**

Reducing Risks and Vulnerabilities from Glacier Lake Outburst Floods in Northern Pakistan seeks to develop the human and technical capacity of public institutions to understand and address immediate GLOF risks for vulnerable communities in Northern Pakistan and to enable vulnerable local communities in northern areas of Pakistan to better understand and respond to GLOF risks and thereby adapt to growing climate change pressures. The proposed project will reduce risks and vulnerabilities from GLOFs and snow-melt flash floods in Northern Pakistan.

### **Duties and Responsibilities**

- Facilitate the day-to-day functioning of the Project Management unit; Coordinate the distribution of responsibilities amongst team members and organize the monitoring and tracking of all project-related services;
- Manage human and financial resources, in consultation with the project's senior management, to achieve results in line with the Outcomes and Outputs outlined in the project document;
- Prepare Annual Work Plan (AWP), seek PSC approval, manage implementation of AWP and prepare required reports for submission to PSC and UNDP;
- Mobilize goods and services to initiative project activities, including drafting of TORs and work specifications;
- Monitor events as determined in the Project Monitoring Schedule Plan, and update the plan as required;
- Manage requests for the provision of financial resources by UNDP, using advance of funds, direct payments, or reimbursement using the FACE (Fund Authorization and Certificate of Expenditures) form;
- Monitor financial resources and accounting to ensure accuracy and reliability of financial reports;
- Engage and network with project stakeholders and partners to produce project Outcomes and Outputs in a participatory manner;
- Keep track and maintain accounts of the project funds in line with the relevant guidelines of UNDP /PCOM;
- Prepare the Annual Project Review, and submit the annual Project Implementation Report (PIR) report to the PSC; Manage and monitor the project risks initially identified, submit new risks to the Project Board for consideration and decision on

possible actions if required; update the status of these risks by maintaining the Project Risks Log;

- Prepare the Project Progress Report (progress against planned activities, update on Risks and Issues, expenditures) and submit the report to the PSC to maintain Project Assurance;
- Work with co-funding partners to ensure that their activities/programs are integrated and complementary with those of the project;
- Link up project activities with related and parallel activities both within government and external partner agencies;
- Support the National Project Director (NPD) in organizing PSC meetings;
- Report and provide feedback to UNDP and the PSC on project strategies, activities, progress, and barriers;
- Manage relationships with project stakeholders including donors, NGOs, government agencies, and others as required.

### ***Qualifications/ Requirements***

- Graduate with at least 10 years working experience in the disciplines of environmental science, geography, engineering, disaster management or a related field;
- Previous work experience in Pakistan on issues relevant to the project;
- Ability and willingness to travel within and outside of Pakistan
- Proven track record of project management and project team experience
- Demonstrated experience in applying Results Based Management tools in managing complex donor funded projects or the projects under the National/Provincial Governments
- Demonstrable skills in office computer use - word processing, spread sheets etc.
- Excellent verbal and written skills in English
- Excellent inter-personal, communication and negotiating skills

### **TERMS OF REFERENCE**

**Post Title:** Admin & Finance Assistant

**Project Title:** Reducing Risks and Vulnerabilities from Glacier Lake Outburst Floods in Northern Pakistan

**Duty Station:** Islamabad

**Salary band:** SC-5

**Background**

Reducing Risks and Vulnerabilities from Glacier Lake Outburst Floods in Northern Pakistan seeks to develop the human and technical capacity of public institutions to understand and address immediate GLOF risks for vulnerable communities in Northern Pakistan and to enable vulnerable local communities in northern areas of Pakistan to better understand and respond to GLOF risks and thereby adapt to growing climate change pressures. The proposed project will reduce risks and vulnerabilities from GLOFs and snow-melt flash floods in Northern Pakistan.

### **Duties and Responsibilities**

Under the overall direction of Programme Manager, the Admin & Finance Officer would be responsible for the following tasks.

- Assist the National Project Manager in preparation of work plans, budgets and financial plans.
- Develop and process requests for advances to the UNDP-Country Office and ensure settlement of all advances in accordance with PCOM and UNDP procedures and guidelines;
- Manage utilization of quarterly advances in accordance with quarterly workplans in collaboration with NPM and keep track of all project funds received, disbursements, financial obligation and advances;
- Resolve issues pertaining to payment of taxes and duties on project procurements, shipments and transactions and initiate follow-up with agencies concerned;
- Prepare and maintain ledger for monitoring financial commitments, monthly financial statements, non expendable property ledger;
- Process financial claims/impress account and facilitate approval through ensuring appropriate documentation and record keeping in line with UNDP rules.
- Prepare Cash Payment Vouchers, Bank Payment Vouchers, and Journal Vouchers together with complete supporting documentation in support to every financial transaction.
- Prepare and maintain financial disbursement ledger for monitoring and controlling of expenditures in line with the financial management procedures.
- Maintain and update all ledgers, project account and petty cash accounts in accordance with UNDP financial rules.
- Provide support services to all other staff members in financial matters.
- Prepare financial reports along with all relevant documents on regular basis for submission project management for payment/ settlement.
- Prepare payment requests/ travel claims and ensure that all supporting documentations are attached before submission to National Project Manager/National Project Director for signatures.
- Act as focal person for project's audit for the UNDP and GoP fund and facilitate auditors during annual/quarterly project audit.
- Keep track of all advances released for local expenditure and complete necessary documentation for settlement of such advances.
- Coordinate administrative and logistical arrangements for meetings, workshops and conferences; Prepare different correspondences on the above matters and ensure follow up system;
- Responsible for the Project Record Management, Supervise the work of support staff; and manage vehicle, sign the vehicle log book on daily basis.
- To perform any other duties as required by the NPD and National Project Manager for achieving the above objectives.

**Qualification & skills**

The candidate should possess a Masters degree preferable in Management Sciences (MBA - Finance, M.Com, CA, Statistics), with minimum 5 years of experience in financial management of GoP/NGOs or development assistance work; Knowledge of computers, including basic hardware maintenance and use of recent accounting software; Expertise in project formulation and implementation will be an added advantage.

The candidate should have strong interpersonal skills and excellent command of English language.

**Post Title:** Field Manager

**Project Title:** Reducing Risks and Vulnerabilities from Glacier Lake Outburst Floods in Northern Pakistan

**Duty Station:** Project sites in GB/Chitral

**Salary band:** SC-7

### **Background**

Reducing Risks and Vulnerabilities from Glacier Lake Outburst Floods in Northern Pakistan seeks to develop the human and technical capacity of public institutions to understand and address immediate GLOF risks for vulnerable communities in Northern Pakistan and to enable vulnerable local communities in northern areas of Pakistan to better understand and respond to GLOF risks and thereby adapt to growing climate change pressures. The proposed project will reduce risks and vulnerabilities from GLOFs and snow-melt flash floods in Northern Pakistan.

### **Duties and Responsibilities**

Under the direct supervision of the National Project Manager (NPM), the terms of reference for Field Manager NWFP will be as follows:

- Work with the Project Manager for planning and prioritization of activities in the field;
- Determine, in consultation with stakeholders, the specific needs for equipment, temporary staff and trainings in all identified locations;
- Assist the training coordinator as required for the effective implementation of the training component;
- Coordinate with the local government partners and other project partners to ensure timely delivery of outputs;
- Oversee all the financial and administrative aspects of the project in the field, on a day-to-day basis;
- Provide quarterly and annual progress reports to the National Project Manager;
- Provide administrative and logistical support to the key meetings, which may be held during the life of the project

The candidate should possess a Masters degree in Environmental Sciences, Social Sciences, or related discipline, with 5 – 10

5 to 10 years of experience in programme/project management, implementation and monitoring; Knowledge of the Local Government System and institutions in Pakistan;

Excellent organizational, coordination and communication skills; demonstrated

capacity to plan, prioritize and deliver tasks on time to meet goals in a highly pressured environment;

Demonstrated experience of managing a team; Computer skills in common office programs (Word, Excel Power-Point, etc); Demonstrated capacity to respond flexible and positively to change through active involvement and generation of innovative, practical solutions to challenging situations. Problem solving skills and results oriented