Baseline Assessment Report

Scaling-up of Glacial Lake Outburst Flood (GLOF) risk reduction in Northern Pakistan

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Contents

List of acronyms

AKHA	Aga Khan Humanitarian Assistance
AKRSP	Aga Khan Rural Support Programme
AWP	Project Annual Workplan
BTTAP	Billion Tree Tsunami Afforestation Project
10BTTAP	10 Billion Tree Tsunami Afforestation Project
CBDRMCs	Community Based Disaster Risk Management Committees
CBDRMFs	Community Based Disaster Management Funds
CC	Climate Change
CCA	Climate Change Adaptation
CCPAP	Climate Change Adaptation Action Plan
CFU	Climate Finance Unit
DIG	Deputy Inspector General
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
ECCU	Environment and Climate Change Unit
EPA	Environmental Protection Agency
FAA	Funded Activity Agreement
FGD	Focus Group Discussion
GB	Gilgit Baltistan
GBDMA	Gilgit Baltistan Disaster Management Authority
GBFD	Gilgit Baltistan Forest Department
GBRSP	Gilgit Baltistan Rural Support Programme
GCF	Green Climate Fund
GLOF	Glacial Lake Outburst Floods
GLOF-II Project	Scaling-up of Glacial Lake Outburst Flood (GLOF) risk reduction in Northern Pakistan
ICIMOD	International Center for Integrated Mountain Development
KAP	Knowledge Aptitude and Practices
KII	Key Informant Interview
KP	Khyber Pakhtunkhwa
KPFD	Khyber Pakhtunkhwa Forest Department
KPIs	Key Performance Indicators
LPAC	Local Project Appraisal Committee
MHVRA	Multi Hazard Vulnerability Assessment
MoCC	Ministry of Climate Change
NDMA	National Disaster Management Authority
NGOs	Non-Government Organisations
NPM	National Project Manager
O&M	Operation and Maintenance
OIC	Office In charge
PDMA	Provincial Disaster Management Authority
P&D Department	Planning and Development Department
PMD	Pakistan Meteorological Department
ProDoc	Project Document
QBS	Questionnaire Based Survey
RP	Responsible Party
SCOM	Special Communication

TORs	Terms of Reference
UNDP	United Nations Development Programme
VC KIU	Vice Chancellor Karakorum International University
WWF-Pakistan	World Wide Fund for Nature Pakistan

1. Executive Summary

1.1 Objectives and scope of the assignment

The study aims to validate and update the existing baseline situation and indicators of GLOF-II project for updating the project interim and final targets. The study comprises of three specific tasks;

2. Assess key socio-economic indicators in target districts and valleys in Khyber Pakhtunkhwa (KP) and Gilgit Baltistan (GB). (Population, age, gender, income, vulnerability to GLOFs, etc.)
3. Define data collection tools (interviews, surveys, questionnaires etc.)
4. Develop and implement a data collection system (a Progress tracker) that will capture the information needed to monitor and evaluate outputs, outcomes and impacts of the project.

1.2 Methodology and Study Design

The study was conducted in six selected valleys out of the total 24 project valleys in 15 districts of Khyber Pakhtunkhwa and Gilgit Baltistan. The study used both secondary and primary data sources. The secondary data sources consisted of GLOF-II Project documents and reports, GLOF-I Project documents and reports, other UNDP Projects' reports and data, reports and information of federal and provincial bureaus of statistics and line departments, and reports and documents of Non-Government Organsations (NGOs). For primary data collection Key Informants' Interviews (KIIs), Focus Group Discussions (FGDs) and Questionnaire Based Survey (QBS) were used. A total of 16 KIIs were conducted with representatives from Government Organizations, Non-Government Organizations and academia at federal and provincial levels. Similarly, FGDs were conducted in with community representatives in six valleys one each in Chitral, and Kohistan districts of Khyber Pakhtunkhwa and Hunza, Ghizer, Astor and Ghanche districts of Gilgit Baltistan. To crosscheck the information collected through FGDs, questionnaire survey of 120 respondents was also conducted in the six selected valleys.

1.3 Key Findings and recommendation

After reviewing the project logical framework some minor gaps were found in the indicators, baselines and targets. The fund level impact indictor-1.0 and baseline statements do not match with each other. Similarly, the target under impact indictor-1.0 also needs to match with the indicator. Baseline statement under outcome indicator 7.2 also needs to be updated. Baseline-2 against output indicator 1.2 needs to be updated as well. Baseline-2, 3 and 4 under output indicator 2.2, 2.3 and 2.4 regarding number of GLOF EWSs, number of physical structures and Community Based Disaster Management Committees (CBDRMCs) and Community Based Disaster Management Funds (CBDRMFs) need to be updated. Similarly, targets under indicator 2.3 of ouptut-2 need to mention bioengineering measures also. On the bases of recommendations, a revised Logical Framework has been developed and included as Annexure-1. In addition, a framework has also been developed for capturing necessary information and data to monitor and evaluate outputs, outcomes and impacts of the project. The framework indicates different parameters for collecting necessary information and data, and suitable tools and techniques for data collection and processing. In the framework a total of 33 different parameters/ sub-indicators have been listed under five main categories. These are 1). Disaster Risk Reduction/ Disaster Risk Management (DRR/ DRM) policies, strategies and plans; 2). GLOF events and damage; 3). GLOF Early Warning Systems; 4).

Flood protection structures and; 5). Community organizations and funds. The framework also indicates proper output data needed for monitoring and evaluation of impacts, outcomes and outputs (Annexure-4 and 5).

2 Project Context

2.1 Background

The project "Scaling-up of Glacial Lake Outburst Flood (GLOF) risk reduction in Northern Pakistan" shortly called GLOF-II project was developed in response to the increasing frequency of GLOF incidents due to rising temperature and increase in melting of glaciers. The project is financed by the Green Climate Fund with a total funding of US$ 36.96 million for a period of five years. The project is executed by the Ministry of Climate Change with the technical support of UNDP.

GLOF-II project is the scaling up of the successful interventions of GLOF-I project implemented during 2011-2015. It aims to empower communities to identify and manage risks associated with GLOFs and related impacts of climate change, strengthen public services to lower the risk of disasters related to GLOF, and improve community preparedness and disaster response. In addition, the project supports the development of sustainable livelihoods options for project communities, with a particular focus on women participation to ensure food security and livelihoods. The project is being implemented in 24 GLOF vulnerable valleys in 15 districts with five districts in KP and 10 in GB.

The project was formally started with the inception workshop held in June 2018 with a delay of almost one year. The Funded Activity Agreement (FAA) became effective in June 2017 while funds were issued in April 2018. As mandated under the Funded Activity Agreement (FAA) the Green Climate Fund (GCF) requires updated and confirmed baseline situation, indicators, interim and final targets as identified in the project logical framework. These updated and confirmed baselines, indicators and targets are to be used throughout the project life to track project progress. The present study is therefore conducted to validate and update the baseline situation, indicators, interim and final targets as identified in the project logical framework.

2.2 Objectives

The overall objective of the study is to validate and update the existing project baseline situation and indicators for updating the project interim and final targets. The study was conducted in six selected valleys out of the total 24 project valleys in 15 districts of Khyber Pakhtunkhwa and Gilgit Baltistan. As provided in the study Terms of Reference (TORs) following specific tasks were mandated to be undertaken under the present study;

- Assess key socio-economic indicators in target districts and valleys in KP and GB (population, age, gender, income, vulnerability to GLOFs, etc.)
- Define data collection tools (interviews, surveys, questionnaires etc.)
- Develop and implement a data collection system (a Progress tracker) that will capture the information needed to monitor and evaluate outputs, outcomes and impacts of the project.

2.3 Key socio-economic indicators of target areas in KP and GB

Keeping in view the Project Result Framework and the Project Logical Framework following key socioeconomic indicators were considered for the baseline validation under this assignment.

A. **DRR/ DRM/ Climate change policies, strategies and plans at national, provincial and district level:**
   - Geographic area and land uses:
   - Total area of valley;
   - Agricultural land;
   - Pastures and rangelands;
   - Protected areas;

B. **Population and Literacy:**
   - Total population (male, female, old people, children, special people).
   - Overall literacy, male and female literacy;

C. **Livelihoods and sources:**
   - Livelihood sources
   - Livelihood assets (Agri land holding, livestock holding)
   - Annual household level income

D. **GLOF Vulnerability and response:**
   - Number of glaciers and glacial lakes;
   - GLOF events
   - Damage and cost of damage
   - GLOF Early Warning Systems (EWSs) and Operation and Maintenance (O&M) trainings
   - Flood protection structures (engineering and bioengineering).

E. **Rural infrastructure**
   - Health facilities
   - Education facilities
   - Roads condition
   - Communication (mobile network)

F. **Community organizations and capacity;**
   - Existence of community organizations
   - Existence of community funds
   - Trainings in financial management

2.4 Outcomes and outputs

As mentioned in the ProDoc and Project Results Framework GLOF-II project is in line with the One-UN Programme II (2013-17) Strategic Priority Area-3 “Increased national resilience to disasters, crises and external shocks” and Outcome: 3.2 “Vulnerable populations benefit from improved sustainable environmental management practices, including climate change mitigation and adaptation”. The project is also in line with the CCPAP (2013-2017) Outcome 3.2: Vulnerable populations benefit from improved sustainable environmental management practices, including climate change mitigation and adaptation.

GLOF-II project contributes to the UNDP Strategic Plan's output 1.4 "Scaled up action on climate change adaptation and mitigation across sectors which is funded and implemented".

The project contributes to the Green Climate Fund (GCF) Fund Level Impact-A1.0 "Increased resilience and enhanced livelihoods of the most vulnerable people, communities and regions" and its outcome 7.0 "Strengthened adaptive capacity and reduced exposure to climate risks".

At the implementation level GLOF-II project has two outputs and six major activities to achieve these outputs. These are given as under.

1. Project/ programme output-1: Strengthened sub-national institutional capacities to plan and implement climate change resilient development pathways.
   1.1 Provincial line and planning departments have technical capacities to mainstream Climate Change (CC) into development plans
   1.2 Sub-national institutions have improved capacities to coordinate, plan, and implement Climate Change Adaptation (CCA) measures across sectors.
2. Project/ programme output-2: Community-based EWS and long-term measures are up-scaled to **increase communities' adaptive capacity**
   2.1 Expanded weather surveillance and discharge measuring networks.
   2.2 Early warnings are effective in protecting communities from climate-induced risks.
   2.3 Vulnerable communities have adequate long-term measures in place to address GLOF-related risks.
   2.4 Improved financial capacity to adapt to GLOFs and CC-induced risks.

2.5 Current Baselines, Indicators and Targets

After critical review of indicators, baselines and targets provided in the Project Document (ProDoc), project logical framework and updated project results framework following gaps were found.

- **The fund level impact indictor-1.0 and baseline statements need to match with each other**: The indicator and baseline statements do not match with each other. The indicator mentions "Change in expected losses of lives and economic assets (US$) due to the impact of extreme climate-related disasters" while the baseline mentions the number of GLOF vulnerable lakes and GLOF events in the project areas".
- **The target under the impact indictor-1.0 also needs to be amended**. The target states "By the end of the project 100% of households in KP and GB target communities are benefiting from engineering measures and early warnings in place to reduce the impact of GLOF events" which is not in line with the indicator. Slight amendment is needed to reflect reduction in losses of lives and economic assets of vulnerable communities.
- **Baseline statement under outcome indicator 7**.2 states "number of districts covered by EWSs" while its actually the valleys covered not districts. The statement is not in line with the ground situation. Only selected valleys in KP and GB have been covered by GLOF-1 project, World Wide Fund for Nature Pakistan (WWF-Pakistan) and Aga Khan Humanitarian Assistance (AKHA).

- **Baseline-2 under output indicator-1.2 needs to be updated.** In addition to the DRM guidelines for KP and GB, the NDMA has developed MHVRAs guidelines-2017.
- **Baselines-2, 3 and 4 under output indicators-2.2, 2.3 and 2.4 need to be updated**. The number of GLOF EWSs and the communities trained in Operation and Maintenance (O&M) of EWSs are more than mentioned in the baseline. Similarly, there are flood protection engineering and bioengineering structures constructed under the GLOF-I project in GLOF vulnerable valleys of Chitral and Gilgit. Baseline-4 under indicator 2.4 needs to be rephrased to match with the indicator and targets regarding community driven initiatives.
- **Missing targets against output indicator 2.3:** Output indicator 2.3 is "No. of physical assets constructed to withstand the effects of GLOF events". The midterm and final targets mention only engineering structures while bioengineering measures are missing in the results framework. Targets regarding bioengineering structures need to be added.

3 Methodology

In order to review and validate GLOF-II Project indicators and their baselines both secondary and primary data sources were used. A thorough review of existing literature and secondary information was conducted followed by field assessment using Key Informants' Interviews (KIIs), Focus Group Discussions (FGDs) and Questionnaire Based Survey (QBS) in federal and provincial headquarters, and selected project sites. Details of the methods used are given as under.

3.1 Data Sources

3.1.1 Review of literature and secondary information

The secondary data sources comprised of literature and documents as well as official records and information. These are grouped in to five different categories. Details of literature reviewed are also provided under "**References**" at the end of this report.

A. GLOF-II Project documents and reports;
   - ✓ Funded Activity Agreement (FAA)
   - ✓ GCF Funding Proposal and annexes
   - ✓ Local Project Appraisal Committee (LPAC) meeting minutes
   - ✓ UNDP/GCF Project Document
   - ✓ Project Inception Report
   - ✓ Project Steering Committee Meetings
   - ✓ Project Annual Workplans (AWPs)
   - ✓ Project Annual Performance Reports (2017, 2018, 2019)
   - ✓ Studies and assessments carried out under the project (KAP study, capacity and needs assessment, ground-truthing/ feasibility studies of Pakistan Meteorological Department (PMD)
   - ✓ Field Visit reports

B. GLOF-I Project documents and reports;
   - ✓ GLOF-1 ProDoc

- ✓ GLOF-I AWPs
- ✓ Project Performance Report-2014, 2015
- ✓ Terminal Evaluation Report 2015

C. Other UNDP Projects' reports and data;
- ✓ District Disaster Management Plan for Chitral (draft) 2020 by UNDP DRR Project;

D. Reports and information of federal and provincial bureaus of statistics and line departments;
- ✓ Crop statistics of KP 2016-17
- ✓ Development statistics of KP 2019
- ✓ District-wise Economic Profiles of KP 2019
- ✓ Multiple Indicator Cluster Survey of GB 2016-17
- ✓ Livestock census report of KP 2006
- ✓ Deosai National Park Management Plan from GB Forest and Wildlife Department
- ✓ Official record and data from GB Forest Department
- ✓ Official record and data from KP Forest Department
- ✓ and information available with provincial line departments

E. Reports and documents of NGOs;
- ✓ Central Karakorum National Park Management Plan from MPA Project from EV-K2-CNR;
- ✓ Qurumbar National Park Management Plan 2015 (draft) from WWF-Pakistan
- ✓ Third Party Monitoring Report of Billion Tree Tsunami Afforestation Project in KP (Phase-I) 2016 by WWF-Pakistan
- ✓ Third Party Monitoring Report of Billion Tree Tsunami Afforestation Project (BTTAP) in KP (Phase-II) 2016 by WWF-Pakistan

3.1.2 Primary data collection

3.1.2.1 Sample design and selection of project valleys and respondents

According to the Project document signed on 28 August 2017 GLOF-II project is going to be implemented in 24 GLOF vulnerable valleys falling in 15 districts (five districts/ 10 valleys in KP and 10 districts/ 14 valleys in GB). Some initial studies and surveys have been conducted under the project. These include KAP survey in 30 valleys in 15 districts, stakeholders' needs and capacity assessment, and glacial lakes surveys and ground truthing. As a result of the glacial lakes and ground truthing 12 GLOF vulnerable valleys have so far been notified for GLOF-II project implementation while assessment for identifying the remaining nine valleys is underway.

For the baseline assessment the project area was stratified into four geographic strata i.e. civil administrative divisions (Malakand and Hazara in KP, and Gilgit, Diamer and Baltistan in GB), districts (5 districts in KP and 10 in GB) and project valleys (1-2 per district). Districts and valleys were selected on the basis of the recently conducted Glacial Lakes and Ground Truthing Surveys of PMD. To ensure that the sample districts and valleys are evenly distributed at least one district was selected in each civil division in KP (Malakand and Hazara division) and GB (Gilgit, Diamer and Skardu division). Project stakeholders and beneficiaries were divided into three clusters; Government organizations (ministries, departments and authorities (federal and provincial)), NGOs and local communities (men and women). Based on the above sampling design two districts were selected in KP and four in GB covering two and four GLOF vulnerable

valleys respectively (total 6 GLOF vulnerable valleys). Table-1 and 2 show KIIs and FGDs conducted for data collection.

3.1.2.2 Data collection tools and techniques

For collection of primary data and information a combination of techniques and tools were used. These techniques included Key Informants Interviews (KIIs), Focus Group Discussions (FGDs) and Questionnaire Based Survey. Keeping in view the time constraints and restricted mobility due to Covid-19 pandemic virtual tools such as online meetings, online interviews and telephone calls were also used in combination with physical meetings and interviews.

3.1.2.2.1 Key Informants Interviews

Key Informants Interviews were conducted for indicators requiring qualitative information as well as finding further secondary sources for getting reliable and updated quantitative data. The KIIs were also used to validate the existing baseline as well as updated information from secondary sources. KIIs were conducted with representatives of Government organizations, NGOs, and community leaders. An interview checklist was developed keeping in view the project Key Performance Indicators (KPIs), the baseline information and the required information and data to be collected and/ or crosschecked.

3.1.2.2.2 Focus Group Discussions

Focus group discussions were conducted to validate and crosscheck the baseline information especially against indicators 2.1, 2.3 and 2.4 which required more in-depth assessment and analysis. Moreover, information about new indicators and their baselines was also assessed and discussed during the FGDs. A checklist of relevant questions based on the review of secondary information and literature was discussed in FGDs. Two FGDs one each for men and women were conducted in each selected valley.

3.1.2.2.3 Questionnaire based survey

Questionnaire based survey (QBS) was conducted for validating and collecting quantitative baseline data. According to the initial baseline situation the project has a total of 696,342 direct beneficiaries. Keeping in view the time constraint a sample of 120 respondents was selected having 95% confidence level and confidence interval of less than 9. The respondents were selected randomly from the same six districts and valleys selected for the KIIs and FGDs. The QBS was conducted along with the KIIs and FGDs and telephone calls.

3.1.3 Data cleaning and analysis

Raw data obtained from different literature, officials records and field was entered and cleaned by removing extra spaces, inaccurate figures and information, repetition and duplication, unwanted data and information, figures and information that could not be crosschecked and confirmed, correction of spelling mistakes, deletion of unnecessary formatting and bringing different measurement units to uniform standard units. Data cleaning was done using Excel sheets. The cleaned and tabulated data was then converted in short summaries comprising of totals, averages, and percentages for further extraction of information and discussion.

Table 1: Key Informants Interviews conducted

Date	Name of Key Informant	Designation Organization	Remarks
25 Aug 2020	Rab Nawaz	Senior Director WWF Pakistan	Telephonic call
26 Aug 2020	Dr. Raja Umar	Deputy Inspector General (DIG) Forest Ministry of Climate Change (MoCC)	Telephonic call
26 Aug 2020	Ahsan Kundi	Office in Charge Climate Finance Unit (OIC CFU) MoCC	Telephonic call
26 Aug 2020	Naeem Iqbal	NPM DRR Project ECCU UNDP	Telephonic call
26 Aug 2020	Usman Manzoor	Programme Officer ECCU UNDP	Telephonic call
26 Aug 2020	Dr. Hanif	Chief Met PMD	In person
27 Aug 2020	Muhammad Shoab	Conservator KPFD	Telephonic call
28 Aug 2020	Shazia Atta	P&D Khyber Pakhtunkhwa	Telephonic call
03 Sep 2020	Shaukat Fayaz Khattak	Divisional Forest Officer KPFD	Telephonic call
06 Sep 2020	Muhammad Ismaiel	Provincial Project Director 10BTTAP GBFD	Telephonic call
14 Sep 2020	Muhammad Alam and his team	Assistant Chief P&D GB	In person
14 Sep 2020	Zaheer Ud Din Babar	Assistant Director GBDMA	In person
14 Sep 2020	Usman Zeb	Programme Manager GBRSP	In person
14 Sep 2020	Dr. Kiramat Ali and his team	VC KIU GB	In person
15 Sep 2020	Dr. Zaker Hussain	Chief Conservator Forest GBFD	In person
16 Sep 2020	Dr. Sher Jehan	Director General Water Management GB	In person

Table 2: FDGs conducted with project communities

Date	District and valley	No. of community representatives in FDG	Remarks
04 Sep 2020	Chitral/ Arkari	21	6 females and 15 males
09 Sep 2020	Ghanche/ Khaplu	28	8 females and 20 males
13 Sep 2020	Hunza/ Ghulkin and Hussaini	09	2 females and 7 males
15 Sep 2020	Ghizer/ Bad Swat	14	Only males
17 Sep 2020	Astor/ Rupal	15	Only males
19 Sep 2020	Kohistan/ Kandia	13	Only males

4 Key findings from secondary and primary sources

4.1 Key findings from secondary data and KIIs

4.1.1 National, provincial and district level policies, strategies and plans

Information related to national, provincial and district level DRR strategies and plans were collected during the Key Informants Interviews as well as secondary sources. These are presented as under;

National DRR Policy 2013

The National DRR policy is based on eight principles; Multi-hazard approach, Vulnerability and risk analysis as the basis of DRR, Strengthening community participation and resilience, Strengthening the resilience

of vulnerable groups, Compatibility with local customs and norms, Clearly defined division of roles and responsibilities between different layers of government, Promoting inter-organizational partnerships (Govt. /CS; Govt./Govt./; Govt./Private), and Transparency and accountability in all DRR interventions (NDMA 2013). The context of the policy acknowledges GLOFs along with other hydro-meteorological, geophysical and biological hazards. It also highlights policy measures ranging from climate change focused research, creation of integrated multi-hazard damage- loss database for systematic vulnerability and risk monitoring, research on the impact of climate change on glaciers and ice caps for informed scenarios and DRR planning (NDMA, 2013).

National Climate Change Policy 2012

The national climate change policy 2012 has detailed policy measures for disaster preparedness and adaptation measures. It includes setting up appropriate mechanisms to monitor the development of glacial lakes and develop evacuation strategies in case of Glacial Lake Outburst Floods (GLOF) for vulnerable areas.

Framework for Implementation of Climate Change Policy (2014 - 2030)

The framework for implementation of Climate Change Policy (2014-2030) has elaborated the causes and impacts of GLOFs. Moreover, it includes activities and measures like conducting GLOF related research and development of projects to conserve the glaciers of northern regions, especially Gilgit Baltistan, and setting-up remote-sensing and ground-based mechanism to monitor the development of Glacial Lakes Outburst Floods (GLOF). Environment and Climate Change Unit of UNDP Pakistan is now planning to evaluate and revise the framework.

Provincial Climate Change policies and Climate Change Adaptation Action Plans

The Khyber Pakhtunkhwa Climate Change policy-2016 was developed by the provincial Environmental Protection Agency (EPA). The policy includes GLOF related hazards in KP under the overall heading of Floods as one of the main causes of climate change and glacial melt. The Climate Change Policy recommends development of a provincial DRR policy, and strengthening forecasting, monitoring, early warning systems and evacuation planning for extreme weather events. Gilgit Baltistan does not have its provincial Climate Change Policy.

The Gilgit Baltistan EPA has developed a Climate Change Strategy and Action Plan 2017. The plan has duly incorporated the GLOF related risks and adaptation measures.

National Disaster Management Plan-2012

The National Disaster Management Plan 2012 also acknowledges the GLOF as one of the climate induced risks along with other hydro-meteorological, geophysical and biological hazards. It also includes GLOF related activities both at the assessment, planning and implementation level. It includes activities to estimate damages due to GLOFs and establishment of EWSs (NDMA, 2012).

Provincial level DRR strategies in KP and GB

Regarding provincial DRR strategies the Khyber Pakhtunkhwa Disaster Management Authority has developed a Roadmap for DRM 2014-19, which serves as a DRM strategy. The Gilgit Baltistan province has no DRM strategy in place. The Roadmap for DRM 2014-19 though has mentioned the GLOF as one of the natural disasters yet did have any further measures to mainstream it in the assessment, planning and adaptation and response measures. Rather flashfloods have been elaborately addressed.

District DRR/ DRM Plans

Both Khyber Pakhtunkhwa and Gilgit Baltistan have some District DRR/ DRM plans for selected districts. These include Chitral, Swat and Shangla districts in KP and Gilgit district in Gilgit Baltistan province.

- District DRM Plan for Chitral district-2015 and DRM plan 2020 (draft). The draft DRM Plan 2020 has been developed under the DRR project of UNDP and includes detailed measures regarding GLOF hazards in Chitral.
- District DRM Plan for Swat-2015. The plan has no GLOF risks and adaptation measures. However, it includes floods and flashfloods as high-risk hazards and the required planning, adaptation and mitigation measures.
- District DRR Plan for Gilgit was prepared under the GLOF-I project in 2015. GLOF risks and adaptation measures are duly incorporated.

National and provincial disaster management guidelines

The National Disaster Management Authority has developed the Multi Hazard Vulnerability Assessment (MHVRA) Guidelines -2017, which provides standard methodologies, procedures and protocols for conducting the MHVRAs. Though it provides detailed methodology, equations and data sources for flood and landslide hazards it does not have anything specifically for GLOF related hazards. In addition to the above the NDMA has also developed Provincial Disaster Management Planning Guidelines-2007 and District Disaster Management Planning Guidelines-2007.

4.1.2 GLOF vulnerability and response

GLOF Vulnerable lakes in Khyber Pakhtunkhwa and Gilgit Baltistan

According to the KII conducted with Dr. Hanif and Mr. Adnan at Pakistan Meteorological Department the total number of GLOF vulnerable lakes has gone up to 110 with 40 in Khyber Pakhtunkhwa province and 70 in Gilgit Baltistan. Out of these 45 glacial lakes (18 in KP and 27 in GB) are highly vulnerable to outbursts (KII at PMD).

Early Warning Systems

Regarding early warning a total of eight EWSs have been established by GLOF-I, World Wide Fund for Nature (WWF), International Center for Integrated Mountain Development (ICIMOD) and AKAH in Gilgit Baltistan in 2015 and 2018-19. Out of these four are GLOF EWSs, one for debris flow and three for flashfloods (KII at WWF and GBDMA). On average 450 households (3500 people 48% male and 52%

female) are covered by each EWS. The concerned CBOs have also been trained in O&M of these EWSs by GLOF-I, WWF and FOCUS. Despite of these developments there is lack of proper coordination, communication and timely sharing of information especially among the concerned government organizations (PMD, GBDMA and District Administration etc.). Strong support is needed to overcome these issues (KII, P&D GB). Location wise details are given in the table-3 below.

Table 3: Details of EWSs established in KP and GB

Year	Particulars	Valley	District	People covered	Organization
2014-15	EWS for GLOF	Golain Gol	Chitral	3000 (50% M/ 50% F)	GLOF-I project
2014-15	EWS for GLOF	Bindo Gol	Chitral	As above	GLOF-I project
2014-15	EWS for GLOF	Bagrot	Gilgit	As above	GLOF-I project
2018-19	EWS for Debris Flow	Damas	Ghizer	As above	WWF
2018-19	EWSs for Flashflood	Sherqillah	Ghizer	As above	WWF
2018-19	EWS for GLOF	Passu	Hunza	As Above	AKHA/ FOCUS
2018-19	EWS for flash floods	Shigar center	Shigar	As above	WWF
2018-19	EWS for flash floods	Khaplu	Ghanche	As above	WWF

Sources: KII at WWF, GBDMA, GB P&D, KIU

Multi Hazard Vulnerability Assessments

In addition to Early Warning Systems MHVRAs have also been conducted in parts of Gilgit Baltistan by different organizations (KII at GBDMA). Some organizations have also developed village level DRM plans (KII at WWF-Pakistan). These include MHVRAs conducted by AKHA in five districts of Gilgit Baltistan, HVRA by WWF-Pakistan in Gilgit district (2016), and Village Disaster Risk Management Plans prepared by WWF-Pakistan for Nomal and Nalter valleys in Gilgit district, for Hisper valley in Nagar district and Derlay & Bubin valleys in Astore district.

Flood protection structures in project districts

A total of 111 engineering structures have been constructed with 30 by the GLOF-I project, 60 by the KPFD, 19 by the GBFD and 2 by WWF-Pakistan) mostly in Upper Dir, Swat, Mansehra, Shigar, Ghanche and Khaplu districts. A total of 32 bioengineering structures have been developed under the GLOF-I project in Bindo Gol, Golain Gol and Bagrot valleys (UNDP, 2015). The Khyber Pakhtunkhwa Forest Department has established a total of 383 bioengineering structures under the One Billion Tree Tsunami Afforestation Project mostly in Kaghan valley of Mansehra district (WWF-Pakistan, 2016). Only GLOF-I project structures are within the GLOF vulnerable valleys while others are along the main rivers and are outside the GLOF vulnerable sites (UNDP, 2015; WWF-Pakistan, 2016; Official data of GB FD, 2020, FGDs with Communities

of Hussaini and Bad Swat). More than 70% of these structures have been damaged due to floods and GLOF events (KII, P&D GB).

4.1.3 Community organizations and funds

The Aga Khan Rural Support Programme (AKRSP) has been working community development since 1980s. The AKRSP has established Local Support Organizations (LSOs) in Astor, Skardu, Hunza, Nagar, Gilgit, Ghizer, Ghanche and Chitral (AKRS, 2020; KII, GBRSP). The LSOs are the cluster of Village Organizations and Women Organizations aimed for community development. Similarly, Gilgit Baltistan Rural Support Programme was initiated to work on community mobilization in Diamer and Astor districts mainly left out of the LSO network of AKRSP (KII at GBRSP). In Khyber Pakhtunkhwa the KP FD has its own Village Conservation Committees in all the project districts of KP (Chitral, Upper Dir, Swat, Mansehra and Kohistan). These are mainly aimed at protection of forests and engagement in forest plantation drives. Most of the GLOF-II project sites also include designated Protected Areas i.e. either Community Controlled Hunting Areas (CCHAs) or National Parks. The CCHAs are community controlled with full powers of planning and management. They, have proper community organizations and fund. Eighty percent of the trophy hunting income is deposited in these funds, which are utilized for protection of wildlife and community development schemes. Except Upper Dir and Swat the remaining 13 project districts of KP and GB have CCHAs. Similarly, there are nine National Parks in the GLOF-II project districts; Chitral Gol National Park and Broghal National Park (in Chitral), Saiful Malook National Park and Lulusar-Dodipathsar National Park (in Mansehra district), Khunjerab National Park (in Hunza district), Qurmbar National Park and Shandur-Hunderap National Park (in Ghizer district), the Deo Sai National Park (Astor and Skardu and Kharmang districts), and Central Karakorum National Park (in Skardu district) (UNDP, 2019). The buffer zone communities around these national parks are also mobilized and organized in conservation and development structures by the provincial wildlife departments (UNDP, 2019).

4.1.4 Project districts and their major land uses

At the time of the project conception and development there were 12 districts five in KP and 7 in GB. Later on, new districts were notified in KP and GB bringing the total number of districts to 18 (i.e. 8 in KP and 10 in GB). Three new districts were notified in GB in 2016 (Hunza-Nagar was split into two districts, along with Khramang and Shigar) making the total number of districts in GB to 10. Similarly, Chitral has been split in to two districts i.e. Upper Chitral and Lower Chitral and Kohistan district has been split in to three districts i.e. Upper Kohistan, Lower Kohistan and Palas.

Although new districts were notified both in KP and GB, the geographic target area remains the same and has no impact on coverage by project interventions. The project districts have a total area of 105,647 sq. km (10,564,700 ha) with 2.9% agricultural land, 10.3% forest and 27.8% of rangelands and pastures. Moreover, there are nine National Parks in the target districts, which cover a total area of 1,707,556 (16.2%). Names of National Parks have been mentioned above (Table-4).

Table 4: District wise major land uses

Districts	Total area (Sq. km)	Total area (Ha)	Forest (ha)	Rangelands & pastures (ha)	Agri. (ha)	National Parks	
						Number	Area (Ha)
Khyber Pakhtunkhwa							
Chitral (Upper and Lower)	14,850	1,485,000	69,800	80,003	21,500	2	150,627
Upper Dir	3,699	369,900	81,332	101,105	31,572		0
Swat	5,337	533,700	138,282	538,319	97,260		0
Kohistan (Upper, Lower and Palas)	7,492	749,200	216,699	838,616	36,749		0
Mansehra	4,579	457,900	332,252	376,378	80,747	2	35,243
Gilgit Baltistan							
Gilgit	4,123	412,300	25,399	106,700	4,310		0
Hunza	11,537	1,153,700	382	37,600	930	1	226,913
Nagar	3,294	329,400	4,644	33,700	2,140		0
Ghizer	11,886	1,188,600	6,314	159,700	11,090	2	239,000
Diamer	6,995	699,500	177,324	141,900	5,440		0
Astore	5,056	505,600	30,018	219,700	3,120		
Skardu	7,900	790,000	2,793	212,300	3,040		
Shigar	7,247	724,700	1,354	44,200	3,050	2	1,055,773
Kharmang	2,535	253,500	548	13,400	510		
Ghanche	9,117	911,700	429	34,400	4,600		
Total	**105,647**	**10,564,700**	**1,087,570**	**2,938,021**	**306,058**	**9**	**1,707,556**
Percent			**10.3%**	**27.8%**	**2.9%**		**16.2%**

Sources: GB FD official data (GB 10BTTAP Directorate, 2020); District wise economic profile of KP | KPEZDMC, 2020; KP Bureau of Statistics, 2019. Development Statistics of Khyber Pakhtunkhwa 2019; SDG Unit Planning & Development Department GB (2020); Agriculture, Livestock and Cooperative Department, Government of Khyber Pakhtunkhwa, 2017; Crop Statistics of Khyber Pakhtunkhwa; UNDP Pakistan (2019) Stakeholders' consultation and experience sharing workshop on management of mountain protected areas in Pakistan.

4.1.5 District wise population, literacy rate and livestock agricultural land holding

According to the 2017 Population Census the total population of the 15 project districts is 7,537,448 with 3,848,082 males (51%) and 3,689,199 females (49%). The average literacy rate in these districts is 53% with 66% in males and 40% in females. The average literacy rate in GB is higher than KP 54.58% in GB and 48.60% in KP (Table-5). Agricultural land in the target districts is scarce and people have little land mostly for subsistence uses. The average per capita agricultural land is 0.03 ha which is far less than the national average. This is compensated by the livestock holding (1.46 heads of livestock per capita) (Table-5).

Table 5: District wise population, literacy and livestock and agricultural land holding

Province/ District	Population			Literacy (%)			Livestock holding (No./ capita)	Agri. Land holding (Ha/ capita)
	Total	Male	Female	Total	Male	Female		
Khyber Pakhtunkhwa								
Chitral (Upper and Lower)	447,362	228,799	218,563	56.00	59.00	45.00	1.58	0.05
Upper Dir	946,421	466,173	480,247	36.00	52.00	21.00	0.73	0.03
Swat	2,309,570	1,172,974	1,136,596	54.00	71.00	36.00	0.31	0.04

Province/ District	Population			Literacy (%)			Livestock holding (No./ capita)	Agri. Land holding (Ha/ capita)
	Total	Male	Female	Total	Male	Female		
Kohistan (Upper, Lower and Palas)	784,711	434,956	349,746	32.00	54.00	5.00	1.54	0.05
Mansehra	1,556,460	772,123	784,181	65.00	80.00	50.00	0.53	0.05
Gilgit Baltistan								
Gilgit	285,236	150,290	134,945	67.10	77.60	57.00	1.70	0.02
Hunza	51,372	25724	25648	71.80	80.30	64.70	1.70	0.02
Nagar	71,746	36,300	35446	66.40	78.10	57.10	1.70	0.03
Ghizer	172,696	84795	87,901	64.00	75.10	54.20	1.25	0.06
Diamer	269,772	137944	131828	27.90	46.40	11.90	1.05	0.02
Astore	95,416	49463	45,953	55.10	68.80	44.10	1.05	0.03
Skardu	260,836	139424	121412	53.60	67.10	41.2	1.61	0.01
Shigar	74,540	38314	36226	46.40	58.30	36.00	1.61	0.04
Kharmang	54,613	28889	25,724	49.90	66.90	37.00	1.61	0.01
Ghanche	156,697	81914	74,783	43.60	56.40	33.50	3.97	0.03
G. Total	**7,537,448**	**3,848,082**	**3,689,199**				**1.46**	**0.03**
%		**51**	**49**	**53**	**66**	**40**		

Sources: P&D Department Government of Gilgit-Baltistan and UNICEF Pakistan, 2017.; Multiple Indicator Cluster Survey, Gilgit; Pakistan Livestock Census 2006 | Pakistan Bureau of Statistics, 2020; District wise economic profile of KP | KPEZDMC, 2020; KP Bureau of Statistics, 2019. Development Statistics of Khyber Pakhtunkhwa 2019; Agriculture, Livestock and Cooperative Department, Government of Khyber Pakhtunkhwa, 2017. Crop Statistics Of Khyber Pakhtunkhwa.

4.2 Key findings from Focus Group Discussions and Questionnaire Survey at valleys level

4.2.1 Major land uses

The average area of a valley is 754 sq. km (75,400 ha) with 2195 Ha (2.91%) of agricultural land, 3,460 Ha (4.6%) of forests and 29,724 Ha (39.4%) of pastures and rangelands. These land uses more or less follow the similar trends of pastures and rangelands being the largest ones followed by forest land and then agriculture land as shown in the district level land use statistics.

Table 6: Valley level total area and major land uses

Particulars	Average/ valley	Estimated for 24 valleys	Protected Areas
Total geographic area of valley	754 sq. km (75,400 Ha)	18084 sq. km (1,808,400 Ha)	• Almost all of the valleys have Community Controlled Hunting Areas
Agricultural land	2195 Ha (2.9%)	52676 Ha	

Forest land	3460 Ha (4.6%)	83036 Ha	• Bad Swat valley falls in Qurumber National Park
Pasture and rangeland	29724 Ha (39.4%)	713364 Ha	

4.2.2 Population and literacy

Per valley average number of households in the target areas is 3,290 with average population of 26,999 (49% males, 51% females, 18% old people, 27% children and 1.66% special people). The male and female ratio is slightly different from the district level ratio. The average figures if extrapolated to 24 valleys the total number of villages becomes 78,948, the total population becomes 647,968 with 317,504 (49%) males, 330,464 (51%) females, 116,634 (18%) old people, 27% children and 1.66% special people).

Average literacy per valley is 66% with male literacy as 49% and female literacy as 51%. The average valley level literacy is higher than the average district level literacy, which is 53%. Similarly, literacy among females is more than males (Table-8).

Table 7: Valley level population and literacy

Particulars	Average/ valley	Estimated for 24 valleys	Remarks
Number of households	3,290	78,948	
Total population	26,999	647,968	Total population is comparable with the original baseline
Male (49%)	12,229	317,504	Average male and female ratio are 49/51
Female (51%)	13,769	330,464	
Old people (18%)	4,860	116,634	
Children (27%)	7155	174951	
Special (1.66%)	449	10756	
Literacy (Total)	66%	66%	
Literacy (Male)	49%	49%	
Literacy (Female)	51%	51%	

4.2.3 Livelihoods and income

Average annual income per household is PKRs. 186,667/- (1118 US$) mainly coming from agriculture and livestock. Major livelihoods sources are agriculture, livestock, daily labour, government and other jobs,

business and tourism. On average 70% of the total households depend on agriculture and livestock for their livelihoods, 24% depend on daily labour work, 3% on government and non-government jobs and 3% on business and tourism. On average there are nine livestock heads per household (1.13 per capita) and 0.92 ha (0.12 ha per capita) of agricultural land. This is more or less comparable with the district level figures of 1.46 livestock heads per capita and 0.03 ha of agricultural land per capita.

4.2.4 GLOF Vulnerability, damage and response

As estimated during the FGDs and QBS on average there are eight glaciers per valley, nine glacial lakes per valley and four GLOF events per valley during the last 20 years. The average damage per valley due to GLOF events was estimated to be 0.878 million US$ during the last 20 years i.e. 0.044 million US$/ year. By extrapolating this situation to the 24 project valleys the total number of glaciers are 192, the total number of glacial lakes are 216 and the total number of GLOF events during the last 20 years are 96 with a total cost of damage as 21.078 million US$ (1.054 million US$/ year) (Table-8). Regarding flood protection structures on average 24 flood protection engineering structures have been constructed per valley i.e. 576 structures in 24 valleys. However, all of these structures are along the main rivers and the GLOF vulnerable sites are not covered.

Table 8: Valley level number of glaciers, glacial lakes, GLOF events, damage and flood protection structures

Particulars	Average/ valley	Estimated for 24 valleys	Vulnerability to GLOFs
No of glaciers	8	192	• 100% of the target valleys are highly vulnerable to GLOFs • No EWS installed in the valleys surveyed • No trainings to communities regarding GLOF/ Flood Early Warning System • Some DRM trainings by AKHA (FOCUS), PRCS • Gabion structures are mostly confined to areas along rivers • Mostly constructed by FD, LGRD, PWD, GBDMA and WWF • No bioengineering structures were reported in the 6 selected valleys surveyed
No of glacial lakes	9	216	
No. of GLOF Events	4	96	
No. of people died due to GLOF events	33 (2/ year)	800 (40/ year)	
Estimated cost of damage due to GLOFs (Houses, Land, Livestock, infrastructure) (US$)	0.878 million US$ (0.044 million US$/ year)	21.078 million US$ (1.054 million US$/ year)	
Gabion structures (Numbers)	24	576	

4.2.5 Community organizations and capacity

Community Based Organizations are present in 83% of the valleys while 33% of the valleys have some community funds as well. These 33% of CBOs have received trainings in financial management from AKRSP or WWF Pakistan. The CBOs are usually Local Support Organization at valley level and Village Organizations and Women Organizations at village levels. Valleys like Bad Swat and Ghulkin had also some income from trophy in Community Controlled Hunting Areas.

Table 9: Valley level Community Organizations, their funds and financial capacity.

Particulars	Average/ valley	Estimated for 24 valleys	Remarks
Community Based Organizations (valleys)	83% valleys	20 Valleys	• Established by FWD, AKRSP, WWF etc.
Community Funds (valleys)	33% valleys	8 Valleys	• Conservation Funds, Community saving accounts
Financial management trainings (valleys)	33% valleys	8 Valleys	• Conducted mostly by AKRSP

4.2.6 Infrastructure; health, education and communication

On average there are 13 boys' schools, three girls' schools, one co-education school, one BHU and one Dispensary in each valley. If we extrapolate the average figures to 24 valleys then the total number boys' schools are 312, girls' schools are 72, co-education schools are 24, BHUs are 24 and dispensaries are 24. Keeping in view the boys' and girls' education facilities the number of girls' schools is 23% less than the boys' schools. Regarding condition of linked roads 50% of the valleys have unmetalled jeep roads while 50% have metaled roads. The roads are frequently damaged by floods and GLOFs. Regarding mobile phone network Telenor and SCOM networks are present in 66% of the project valleys (Table-6).

Table 10: Valley wise education, health and communication facilities

Particulars	Average/ valley	Estimated for 24 valleys	Roads and Communication
Boys schools	13	312	• Metaled roads: 50% valleys • Dirt/ jeep road: 50% valleys • Good mobile phone network: 66% valleys (Telenor and SCOM)
Girls schools	3	72	
Co-education	1	24	

BHU	1	24	
Dispensary	1	24	

5 Logical Framework Analysis

5.1 Indicator-wise analysis of baseline values and targets

5.1.1 Fund level impact, indicators and targets

Indictor-1.1 under the fund level impact A-1.0 is well defined. However, the baselines are not matching with the statement of indicator-1.1. The indictor requires baselines regarding losses of lives (in numbers) and losses of economic assets (in US$), which are missing from the framework. Moreover, the targets though aligned with the old baseline however are not in line with the fund level impact indictor-1.1. According to the findings of the current assessment the total estimated loss of lives due to GLOF events in the project valleys were 800 deaths during the last 20 years i.e. 40 deaths per year in 24 valleys. Moreover, the total estimated loss of economic assets over the last 20 years was 21.078 million US$ (1.054 million US$/ year). Therefore, the revised updated baselines and targets should be as under (Table-11);

Recommended baseline:

- **Baseline-1**: Estimated loss of lives due to GLOFs over the last 20 years: 800 deaths (40/ year)
- **Baseline-2**: Estimated loss of economic assets over the last 20 years is 21.078 million US$ (1.054 million US$/ year)
- **Baseline-3**: Only four valleys have GLOF EWSs and three valleys have flood protection structures covering 1,800 GLOF vulnerable households (14,000 people (with 6,700 males and 7,300 females);

Recommended project end targets:

Amended final target: By the end of the project, 100% of households in KP and GB target communities are benefiting from engineering measures and early warnings in place to reduce the expected losses of lives and economic assets due to GLOF events.

5.1.2 Project/ programme outcome, indicators and targets

Baselines-1 under the Outcome Indicator-7.2 need to be corrected and updated. Baseline-1 states “GLOF early warning systems in KP and GB covering two districts”. According to our assessment a total of eight EWSs have been established by GLOF-I project, WWF, ICIMOD and AKAH/ FOCUS in Chitral, Gilgit, Hunza, Ghizer, Shigar and Ghanche districts in 2015 and 2018-19 (Terminal Evaluation Report GLOF-I, 2015; KIIs at WWF-Pakistan and GBDMA). Out of these eight EWSs four are for GLOFs, one for debris flow and three for flashfloods (KII at WWF and GBDMA). The GLOF-I project established three GLOF EWSs i.e. one each in Bindo Gol and Golain Gol valleys in Chitral district and one in Bagrot valley in Gilgit district. In addition to these WWF established a GLOF EWS in Passu valley of Hunza district. On average each EWS covers about 450 households (3500 people 48% males and 52% females) (KIIs at WWF, GBDMA, GB P&D and KIU). Details are provided in Table-3.

Baseline-2 does not need any change as the existing early warning systems are not properly functioning due to lack of proper coordination and timely sharing of information among the concerned departments and stakeholders for proper and timely response. Moreover, since the establishment of these EWSs there have been no mock drills to keep the concerned organizations and communities ready to respond in case of GLOFs (KII at P&D). Moreover, the Passu valley EWS equipment are not functioning properly (FGD at Hussaini).

Baseline-3 needs to be updated. Information collected through secondary data and Key Informants Interviews with Khyber Pakhtunkhwa Forest Department, Gilgit Baltistan Forest Department and WWF-Pakistan show that a total of 111 flood protection engineering structures have been constructed in the project districts. Similarly, the FGDs and QBS in selected valleys indicate that on average each valley has 24 flood protection engineering structures. Moreover, a total of 415 bioengineering structures have been established in the project districts; 32 structures by GLOF-I project in Chitral and Gilgit districts and 383 structures by Khyber Pakhtunkhwa Forest Department in Upper Dir, Swat and Mansehra districts (UNDP, 2015; WWF-Pakistan, 2016). However out of these 30 engineering structures and 32 bioengineering structures constructed by GLOF-I project fall in the GLOF vulnerable valleys while the rest are along the main rivers and are not covering the flood affected sites. There is no change in the target beneficiaries of the project as the total population in the target valleys was found to be about 647,968 (317,504 males and 330,464 females) which is comparable with the original figures of 696,342 people (348,171 males, 348,171 females). In the light of the above discussion the recommended baseline statements and updated figures are given as under (Table-11).

Recommended baselines:

- **Baseline-1**: GLOF early warning system covering two valleys (Bindo Gol and Golain Gol valleys) in KP and two valleys (Bagrot and Passu valleys) in GB
- **Baseline-3**: 30 engineering and 32 bioengineering structures are in place in three GLOF vulnerable valleys to mitigate the effects of GLOF events.

5.1.3 Programme/ project outputs, indicators and targets

5.1.3.1 Ouput-1

Indicators-1 and 2 under output-1 are well articulated and require no change. Baseline-1 regarding capacities of national, provincial and local disaster management institutions and development planners to design, finance and analyze GLOF risk reduction measures on the basis of reliable, comprehensive information also does not need any change. According to the KIIs with GB P&D and GB DMA there are still capacity gaps at provincial and district levels that need to filled. Baseline-2 needs to be updated as National Disaster Management Authority has developed MHVRAs guidelines-2017 making the total number of comprehensive DRM related guidelines as three (Table-11).

Updated statement for baseline-2 under output indicator-1.2

- **Baseline-2**: Only 3 comprehensive disaster management guidelines exist for national level, Khyber Pakhtunkhwa and Gilgit Baltistan.

5.1.3.2 Output-2

Baseline-2 under output indicator 2.2 regarding number of GLOF EWSs and number of physical structures need to be updated. As mentioned under section-5.1.2 there are four GLOF EWSs one each in Bindo Gol valley (Chitral district), Golain Gol valley (Chitral district), Bagrot valley (Gilgit district) and Passu valley (Hunza district) (NDP, 2015; KII at WWF and GBDMA). On average each EWS covers around 450 households (3500 people 48% males and 52% females) (KIIs at WWF, GBDMA, GB P&D and KIU). Baseline-3 also needs to be updated. There are 30 engineering and 32 bioengineering structures constructed by GLOF-I project in GLOF vulnerable valleys of Bindo Gol, Goalin Gol and Bagrot. Engineeing and bioengineering structures constructed by KPFD and GBFD are mostly outside the GLOF vulnerable sites (UNDP, 2015; WWF, 2016) (Table-3 and 11). Baseline-4 under indicator 2.4 needs to be rephrased to match with the indicator and targets regarding community driven initiatives. According to the FGDs and QBS findings 83% of the valleys have some sort of Community Based Organizations either Local Support Organizations established by AKRSP or Conservation and Development Committees established by Forest and Wildlife Departments and NOGs. Out of these only 33% of the valleys have some community funds (mostly Conservation and Development Funds). These 33% have also received some financial management trainings from AKRSP and NOGs. Similarly, under the GLOF-I project Community Based Disaster Management Committees (CBDRMC) along with Community Based Disaster Management Funds (CBDRMF) have been established in Bindo Gol and Golain Gol valleys in Chitral and Bagrot valley in Gilgit districts. The communities have also been trained and involved in community driven small-scale initiatives. With regard to GLOF preparedness there are only three Community Based Organizations and Disaster Risk Management Funds established under GLOF-I project (Table-11).

Updated statement for baseline-2, 3 and 4 under output-2

- **Basline-2**: Four GLOF early warning systems (two each in KP and GB) are in place and communities trained in O&M of EWSs.
- **Basline-3**: 30 Engineering and 32 Bioengineering structures in three GLOF vulnerable valleys are in place to withstand the effects of GLOF events.
- **Baseline-4**: Community Based Disaster Management Committees (CBDRMC) and Community Based Disaster Management Funds (CBDRMF) are established in three valleys (two in KP and one in GB)

Update targets under indicator 2.3 of ouptut-2

- **Midterm targets**: By the end of Year 3 of the project, at least 100 targeted engineering structures and 200 ha of bioengineering measures have been established to withstand the effects of GLOF events on livelihood assets
- **Project end targets**: By the end of the project, at least 250 targeted engineering structures and 700 ha of bioengineering measures have been established to withstand the effects of GLOF events on livelihood assets.

Table 11: Fund level impact, project level outcome, outputs, indicator, targets and recommend changes (revised logical framework as per original template is provided as Annex-1)

Expected Results (Impact/ Outcomes/ Outputs)	Indicators	Baseline	Target		Recommended changes and Justification
			Midterm	End of project	
Fund Level Impact-A1.0: Increased resilience and enhanced livelihoods of the most vulnerable people, communities and regions	1.1 Change in expected losses of lives and economic assets (US$) due to the impact of extreme climate-related disasters in the geographic area of the GCF intervention.	1). There are 33 potentially dangerous lakes in KP and GB. 2). 960 destructive outburst floods are in KP and GB areas in last two decades.	N/A	By the end of the project, 100% of households in KP and GB target communities are benefiting from engineering measures and early warnings in place to reduce the impact of GLOF events. (696,342 people: 348,171 men, 348,171 women)	Baselines and target need to be changed: **Recommended baseline:** 1). Estimated loss of lives due to GLOFs over the last 20 years: 800 deaths (40/ year) 2). Estimated loss of economic assets over the last 20 years is 21.078 million US$ (1.054 million US$/ year) (Source: FGD/ QBS for this assessment) 3). Only four valleys have GLOF EWSs and three valleys have flood protection structures covering 1,800 GLOF vulnerable households (14,000 people (with 6,700 males and 7,300 females). **Recommended targets:** By the end of the project, 100% of households in KP and GB target communities are benefiting from engineering measures and early warnings in place to reduce the expected losses of lives and economic assets due to GLOF events.

Expected Results (Impact/ Outcomes/ Outputs)	Indicators	Baseline	Target		Recommended changes and Justification
			Midterm	End of project	
Project/ programme outcome-7.0: Strengthened adaptive capacity and reduced exposure to climate risks	7.2: Number of males and females reached by climate related early warning systems and other risk reduction measures established/ strengthened	1). GLOF early warning system in KP and GB covering two districts 2). Vulnerable households are not able to receive and react to GLOF early warning messages in the KP and GB. 3). No physical structures in place to mitigate the effect of GLOF events.	N/A	By the end of the project, 100% of households in KP and GB target communities are able to receive and respond to early warnings and take the appropriate actions following the warning (348,171 men, 348,171 women).	Baseline-1 needs to be updated. There are four GLOF EWSs (two in GB and two in KP) covering four valleys. No change in Baseline-2. There are four GLOF EWSs (two in Chitral district and one each in Hunza and Gilgit districts). Timely relay of information and coordination is still a major issue. Baseline-3 needs to be slightly updated. GLOF-I project constructed 30 engineering and 32 bioengineering structures within GLOF vulnerable valleys/ sites. Others are mostly along rivers and outside the GLOF vulnerable valleys/ sites. No change in target beneficiaries. The total population figures are almost comparable.
Project/ programme output-1: Strengthened sub-national institutional capacities to plan and implement climate change resilient development pathways.	1.1. Strengthened institutional and regulatory systems for climate-responsive planning and development. 1.2. Number of policies introduced to address GLOF risks or adjusted to incorporate GLOF risks.	1). 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.	By the end of Year 3, 100% of the national and 90% of district and community authorities in the KP and GB regions are able to prioritize and plan measures to minimize potential losses from GLOFs.	By the end of the project, at least four policies have been adopted by Government to address or incorporate GLOF risk reduction.	No change in basline-1. Capacity gaps are still there. Baseline-2 needs to be updated. NDMA has developed MHVRAs guidelines-2017. There are district level DRR/ DRM plans for Chitral and Gilgit districts.

Expected Results (Impact/ Outcomes/ Outputs)	Indicators	Baseline	Target		Recommended changes and Justification
			Midterm	End of project	
		2). Only 2 comprehensive disaster management guidelines exist for the KP and GB regions.			
Project/ programme output-2: Community-based EWS and long-term measures are up-scaled to increase communities' adaptive capacity	2.1. Number of vulnerable households in KP and GB covered by a GLOF early warning system. 2.2. Number of Community-based organizations trained in the operation and maintenance of the EWS. 2.3. Number of physical assets constructed to withstand the effects of GLOF events. 2.4. Number of small-scale community driven initiatives for GLOF preparedness financed through CBDRM funds	1). Vulnerable households are not able to receive and react to GLOF early warning messages. 2). 2 GLOF early warning system for KP and GB in place. 3). No physical structures in place to withstand the effect of GLOF events. 4). No financial capacity of local communities to prepare for GLOF events	By the end of Year 3 of the project, 9 GLOF early warning systems are installed in KP and GB and 40% of households in target communities are able to receive and respond to early warnings and take appropriate actions following the warning (139,268 men, 139,268 women) By the end of Year 3 of the project, at least 9 CBOs are trained in the operation and maintenance of the EWS and ensure its continued functionality By the end of Year 3 of the project, at least 100 targeted engineering structures have been established to	By the end of the project, 100% of households in target communities are able to receive and respond to early warnings and take the appropriate actions following the warning. (696,342 people: 348,171 men, 348,171 women) By the end of the project, at least 24 CBOs are trained in the operation and maintenance of the EWS and ensure its continued functionality. By the end of the project, at least 250 targeted engineering structures have been established to withstand the effects of GLOF events on	Baseline-2 needs to updated. There are four GLOF EWSs (two in Chitral, and one each in Hunza and Gilgit districts) and four communities have been trained in O&M of the EWSs. Baseline regarding indicator-2.2 needs to be added. "There are four communities (two in Chitral and one each in Hunza and Gilgit districts) who received trainings on EWSs O&M. Baseline-3 also needs to be updated. There are 30 engineering structures and 32 bioengineering in GLOF vulnerable valleys constructed by GLOF-I project. The rest are mostly along the main rivers. Targets regarding bioengineering structures need to be added. Baseline-4 under indicator 2.4 needs to be rephrased to match with the

Expected Results (Impact/ Outcomes/ Outputs)	Indicators	Baseline	Target		Recommended changes and Justification
			Midterm	End of project	
			withstand the effects of GLOF events on livelihood assets By the end of Year 3 of the project, at least 12 small-scale community driven initiatives financed through CBDRM funds	livelihood assets. By the end of the project, at least 01 community driven initiative in each of the 24 target valleys, is financed through CBDRM funds	indicator and targets regarding community driven initiatives. No change in target beneficiaries. The total population figures of the assessment are almost comparable with the figures given in the original logical framework.

5.2 Data collection system (Progress Tracker)

This study presents a framework for capturing necessary information and data to monitor and evaluate outputs, outcomes and impacts of the project. Impacts, outcomes and outputs indicators are broken down in to several parameters and the required data and information to be collected. The data collection system indicates which techniques, tools and approaches are to be used to collect the required information and data. It also indicates how to analyze and extract relevant information for monitoring and evaluation of progress on impact, outcome and outputs. The framework lists a total of 33 different parameters/ sub-indicators under five main categories. These are 1). DRR/ DRM policies, strategies and plans; 2). GLOF events and damage; 3). GLOF Early Systems; 4). Flood protection structures and; 5). Community organizations and funds. Detailed framework and structure for data entry and tabulation are given in Annexure-4 and 5.

6 Recommendations

In the light of secondary and primary data collected and analysed during this assessment project logical framework needs to be updated by making minor changes in some indicators, baselines and targets. The recommended changes do not change the original scope of the project. The recommended changes have been elaborately discussed under section-5, sub-section-5.1. Revised version of the project logical framework is given as Annexure-1. A summary of overall recommendations is given as under;

- The number of districts has increased from 15 to 18 as Chitral has been split in to Upper and Lower Chitral and Kohistan in to Upper Kohistan, Lower Kohistan and Palas districts.
- No change in target beneficiaries. The total population figures found from FGDs are comparable with the original baseline.
- Under the fund level impact indicator both baselines and targets need to be changed. Recommended baselines are 1). Estimated loss of lives due to GLOFs over the last 20 years: 800 deaths (40/ year); 2). Estimated loss of economic assets over the last 20 years is 21.078 million US$ (1.054 million US$/ year) (Source: FGD/ QBS for this assessment); 3). Only four valleys have GLOF EWSs and three valleys have flood protection structures covering 1,800 GLOF vulnerable households (14,000 people (with 6,700 males and 7,300 females).Accordingly, the final target is slightly amended “By the end of the project, 100% of households in KP and GB target communities are benefiting from engineering measures and early warnings in place to reduce the expected losses of lives and economic assets due to GLOF events”.
- Under the project outcome indicator-7.2 baseline-1 and 3 need to be updated. There are four GLOF EWSs (two in GB and two in KP) covering four valleys. Moreover, GLOF-I project constructed 30 engineering and 32 bioengineering structures within GLOF vulnerable valleys/ sites.
- Baseline-2 under the output indicator-1.2 needs to be updated. NDMA has developed MHVRAs guidelines-2017. There are district level DRR/ DRM plans for Chitral and Gilgit districts.
- Following changes are recommended under output indicators-2.2 and 2.4;
    - Baseline-2 needs to updated. There are four GLOF EWSs (two in Chitral, and one each in Hunza and Gilgit districts) and four communities have been trained in O&M of the EWSs.

- Baseline regarding indicator-2.2 needs to be added. "There are four communities (two in Chitral and one each in Hunza and Gilgit districts) who received trainings on EWSs O&M.
- Baseline-3 also needs to be updated. There are 30 engineering structures and 32 bioengineering in GLOF vulnerable valleys constructed by GLOF-I project. The rest are mostly along the main rivers.
- Targets regarding bioengineering structures need to be added.
- Baseline-4 under indicator 2.4 needs to be rephrased to match with the indicator and targets regarding community driven initiatives.

- In some districts of GB MHVRAs have already been conducted and the GBDMA has copies of the reports. These can be used for quick start of urgently needed activities of the project;
- Updated data at valley levels are not available particularly in GB. A systematic process needs to be adopted to collect data through primary sources.
- GBRSP has been engaged as a Responsible Party (RP) for community mobilization. Their team is quite new and need proper orientation about the GLOF project, its requirements of community mobilization and capacity building. Clear understanding needs to be developed with GBRSP for mobilization and training of communities.

7 Annexures

Annexure-1: Revised logical framework

H.1.1. Paradigm Shift Objectives and Impacts at the Fund level[1]						
Paradigm shift objectives						
Increased climate-resilient sustainable development	The project presents a holistic model of climate-resilient development to enable Northern Pakistan to manage the risks from GLOFs and other impacts of climate change, incorporating regulatory support, community preparedness, GLOF response capacitation, and long-term planning for sustainable and climate-resilient use of natural livelihood assets.					
Expected Result	**Indicator**	**Means of Verification (MoV)**	**Baseline**	**Target**		**Assumptions**
				Mid-term (if applicable)	Final	
Fund-level impacts						
A1.0 Increased resilience and enhanced livelihoods of the most vulnerable people, communities and regions	1.1 Change in expected losses of lives and economic assets (US$) due to the impact of extreme climate-related disasters in the geographic area of the GCF intervention.	-Project reports: annual reports; mid-term and final evaluations. - Field visits to sites -Questionnaire-based surveys (QBS)/Interviews	-Estimated loss of lives due to GLOFs over the last 20 years: 800 deaths (40/ year) - Estimated loss of economic assets over the last 20 years is 21.078 million US$ (1.054 million US$/ year) -Only four valleys have GLOF EWSs and three valleys have flood protection structures covering 1,800 GLOF vulnerable households (14,000 people (with 6,700 males and 7,300 females).	n/a	By the end of the project, 100% of households in KP and GB target communities are benefiting from engineering measures and early warnings in place to reduce the expected losses of lives and economic assets due to GLOF events.	The political situation stays stable throughout the project duration. Stakeholders are able to perceive reductions in vulnerability over the time-scale determined by project duration. No flooding disasters in target communities occur throughout the project lifetime.

[1] Information on the Fund's expected results and indicators can be found in its Performance Measurement Frameworks available at the following link (Please note that some indicators are under refinement): http://www.gcfund.org/fileadmin/00_customer/documents/Operations/5.3_Initial_PMF.pdf

H.1.2. Outcomes, Outputs, Activities and Inputs at Project/Programme level						
Expected Result	**Indicator**	**Means of Verification (MoV)**	**Baseline**	**Target**		**Assumptions**
				Mid-term (if applicable)	**Final**	
Project/programme outcomes	**Outcomes that contribute to Fund-level impacts**					
7.0 Strengthened adaptive capacity and reduced exposure to climate risks	7.2: Number of males and females reached by climate related early warning systems and other risk reduction measures established/ strengthened	-Review of climate change, DRM and development policies and plans at the national, district, and community levels. -Review of Disaster Management Act, DRM policies, plans, and institutional structures. -Project reports: annual reports; mid-term and final evaluations. -Site visits before/after the project -Questionnaire-based surveys (QBS)/Interviews at the beginning, mid-term and end of the project.	- GLOF early warning system covering two valleys (Bindo Gol and Golain Gol valleys) in KP and two valleys (Bagrot and Passu valleys) in GB -Vulnerable households are not able to receive and react to GLOF early warning messages in the KP and GB. - 30 engineering and 32 bioengineering structures are in place in three GLOF vulnerable valleys to mitigate the effects of GLOF events	n/a	By the end of the project, 100% of households in KP and GB target communities are able to receive and respond to early warnings and take the appropriate actions following the warning (348,171 men, 348,171 women).	Government remains supportive to link longer-term climate change planning with current disaster risk management initiatives No tampering with early warning system installations. Community workforce available to support engineering measures.
Project/programme outputs	**Outputs that contribute to outcomes**					
1. Strengthened sub-national institutional capacities to plan and implement climate change resilient development pathways.	1.1. Strengthened institutional and regulatory systems for climate-responsive planning and development.	Questionnaire-based surveys (QBS)/ Interviews) at the beginning, mid-term and end of the project. Impact assessment at the end of the project.	-National, provincial and local disaster management institutions and development planners are unable to design, finance and analyze GLOF risk reduction measures	By the end of Year 3, 100% of the national and 90% of district and community authorities in the KP and GB regions are able to prioritize and plan measures to minimize potential losses from GLOFs.	By the end of the project, at least four policies have been adopted by Government to address or incorporate GLOF risk reduction.	The political situation stays stable throughout the project duration. Stakeholders are able to perceive reductions in vulnerability over the time-scale determined by project duration.

	1.2. Number of policies introduced to address GLOF risks or adjusted to incorporate GLOF risks.	Satellite imagery of glacier lakes and vulnerable sites before and after the project. Qualitative assessment (e.g. through a standardized scorecard) of the various strategic plans and documents that integrate GLOF risks.	on the basis of reliable, comprehensive information. -Only 3 comprehensive disaster management guidelines exist for national level, Khyber Pakhtunkhwa and Gilgit Baltistan			No flooding disasters in target communities occur throughout the project lifetime.
2. Community-based EWS and long-term measures are up-scaled to increase communities' adaptive capacity.	2.1. Number of vulnerable households in KP and GB covered by a GLOF early warning system. 2.2. Number of Community-based organizations trained in the operation and maintenance of the EWS. 2.3. No. of physical assets constructed to withstand the effects of GLOF events. 2.4. No. of small-scale community driven initiatives for GLOF preparedness financed through CBDRM funds	QBS with households. Mock drill protocols. Field visits to EWS sensor, relay and communication sites. Site visits before/after the project	-Vulnerable households are not able to receive and react to GLOF early warning messages. - Four GLOF early warning system two each in KP and GB are in place and communities trained in O&M of EWSs -30 engineering and 32 bioengineering structures in three GLOF vulnerable valleys are in place to withstand the effects of GLOF events. - CBDRM Committees and CBDRM Funds are established in three valleys (two in KP and one in GB) under GLOF-I project	By the end of Year 3 of the project, 9 GLOF early warning systems are installed in KP and GB and 40% of households in target communities are able to receive and respond to early warnings and take appropriate actions following the warning (139,268 men, 139,268 women) By the end of Year 3 of the project, at least 9 CBOs are trained in the operation and maintenance of the EWS and ensure its continued functionality By the end of Year 3 of the project, at least 100 targeted engineering structures and 200 ha of bioengineering measures have been established to withstand the effects of GLOF events on livelihood assets. By the end of Year 3 of the project, at least 12	By the end of the project, 100% of households in target communities are able to receive and respond to early warnings and take the appropriate actions following the warning. (696,342 people: 348,171 men, 348,171 women) By the end of the project, at least 24 CBOs are trained in the operation and maintenance of the EWS and ensure its continued functionality. By the end of the project, at least 250 targeted engineering structures and 750 ha of bioengineering measures have been established to withstand the effects of GLOF events on livelihood assets. By the end of the project, at least 01 community driven initiative in each of the	No tempering with the early warning system installations, Functioning backup systems in place. Communities are receptive to the adoption of mitigation measures and participate actively in construction efforts.

				small-scale community driven initiatives financed through CBDRM funds	24 target valleys, is financed through CBDRM funds	
Activities	**Description**		**Inputs**		**Description**	
1.1.Provincial line and planning departments have technical capacities to mainstream CC into development plans	Capacity building activities to integrate CC and GLOF risk into development plans and instruments.		1.1.1. Develop integrated provincial CCA action plan encompassing key sectors (mainstream CC risks into DRM, Agriculture, Livestock, and Water Sectors) in KP and GB, linked to NCCP 1.1.2. Completion of the KP Provincial CC policy which will serve as framework for the CCA action plan.		Technical training activities on developing provincial CCA action plans that address GLOF risks from a sectorial perspective, focusing primarily in Agriculture, Livestock and Water in GB and KP.	
1.2.Sub-national institutions have improved capacities to coordinate, plan, and implement CCA measures across sectors.	Strengthen sub-national institutional and coordination arrangements including financial, planning and budgeting processes and other requirements for implementing CCA action plans and CC initiatives in GB and KP		1.2.1. Establish/ strengthen provincial-level CC coordinating entities within the Planning and Development Departments (involving CBOs, NGOs, and EPA) to coordinate CC response across key sectors. 1.2.2. Raise awareness at the local level (district authorities, NGOs, and CBOs) to effectively coordinate CC initiatives and play key roles in implementing CCA action plans across key sectors.		Through multi-stakeholders' participation, coordinate response to CC and GLOF risks.	
2.1. Expanded weather surveillance and discharge measuring networks.	Increase the area coverage by hydro-meteorological instruments and equipment to address GLOF risks.		2.1.1. Installation of 22 weather monitoring stations in KP and 28 in GB. 2.1.2. Installation of 170 river discharge gauges/ sensors etc. in KP and 238 in GB. 2.1.3. GBDMA and KPDMA provide extension to PMD on installation and maintenance of equipment.		Installation of hydro-meteorological infrastructure to expand EWS in 24 valleys.	
2.2. Early warnings are effective in protecting communities from climate-induced risks.	Expansion and development of tailored warnings for GLOF risk through Pakistan Meteorological Department.		2.2.1. PMD conducts hydrological modeling to generate flood scenarios and calculate GLOF lead time. 2.2.2. Village hazard watch groups are set up (expanded) and capacitated to monitor GLOF and disseminate early warnings		The installation of 50 automatic weather stations (22 in KP and 28 in GB) and the installation of 408 river discharge gauges/sensors (170 in KP and 238 in GB) [Input 2.2.1 & 2.2.2) will provide data to conduct hydrological modelling to generate flood scenarios and to capacitate village hazard watch groups that will be part of a local-level early warning system.	

2.3. Vulnerable communities have adequate long-term measures in place to address GLOF-related risks.	GLOF response expanded, small-scale infrastructures constructed and increased natural protection through vegetative cover to protect lives and property downstream of each valley. Implement water efficient farming technologies to increase yields to promote food security to cope with GLOF events.	2.3.1. DRM Committees and emergency response cells are expanded to act as first responders and manage drills and simulations. 2.3.2. GBDMA and KPDMA train communities and DRM committees on GLOF preparedness and response. 2.3.3. Construction of 250 small infrastructure to reduce risks of floods i.e. (gabion walls, check dams, spillways) 2.3.4. Expand slope stabilization to mitigate disaster risks from debris slides (Increase vegetative cover i.e. 280 ha in KP and 420 ha in GB). 2.3.5. Installation of 240 water efficient farming technologies i.e. Micro Irrigation System, Drip Irrigation System, Sprinkle Irrigation and rehabilitation of irrigation channels in 24 targeted valleys.	Expansion of DRM Committees and emergency response cells by providing basic necessary equipment regarding communication and relief. Small-scale hard adaptation structures will be constructed, and vegetative cover expanded to reduce risks of floods and from debris slides. Increase the capacity of subsistence farmers and women to address CC impacts by installing micro-irrigation systems, and household gardening in targeted valleys
2.4. Improved financial capacity to adapt to GLOFs and CC-induced risks.	Enable communities and households to prepare for weather shocks and to build adaptive capacity.	2.4.1. Scale-up revolving community-based disaster risk management fund i.e. $ 50,000 USD per CBDRMC. 2.4.2. Relevant stakeholders (i.e. micro-credit lenders, insurance companies, SMEs, Gov agencies, etc.) trained and working in ways to improve coordination and delivery of the CBDRM Fund and DRM initiatives on the ground in GB and KP.	Expansion of a community-based disaster risk management fund for disaster risk management cells to provide support *ex ante* and *ex post* GLOF events. Workshops and trainings targeted specifically for local public and private entities to be made aware of their risks and risk management related to GLOFs.

Annexure-2: District level statistics and data obtained from secondary sources

Province/ District	Total area (Sq. Km)	Major landuses				Population			Literacy (%)			Livestock population	GLOF vulnerability				
		Forest (ha)	Range/ pastures (ha)	Agri. (ha)	National Parks (No.)	Total	Male	Female	Total	Male	Female		Valleys	No.of glaciers	No. of GLOF vulnerable glacial Lakes	GLOF Events	GLOF Vulnerability
Khyber Pakhtunkhwa																	
Chitral (Upper and Lower)	14,850	69,800	80,003	21,500	2	447,362	228,799	218,563	56.00	59.00	45.00	707,875	Arkari, Madaklasht	29	15	9	High
Upper Dir	3,699	81,332	101,105	31,572		946,421	466,173	480,247	36.00	52.00	21.00	689,218	Kumrat	28	6	1	High
Swat	5,337	138,282	538,319	97,260		2,309,570	1,172,974	1,136,596	54.00	71.00	36.00	712,854	Utror, Matiltan, Gabral	218	18	1	High
Kohistan (Upper, ower and Palas)	7,492	216,699	838,616	36,749		784,711	434,956	349,746	32.00	54.00	5.00	1,212,122					
Mansehra	4,579	332,252	376,378	80,747	2	1,556,460	772,123	784,181	65.00	80.00	50.00	826,561					
Gilgit Baltistan																	
Gilgit	4,123	25399	106,700	4,310		285,236	150,290	134,945	67.10	77.60	57.00	484,347					
Hunza	11537	382	37,600	930	1	51,372	25724	25648	71.80	80.30	64.70	87,332	Ghulkin	1	4	5	High
Nagar	3294	4644	33,700	2,140		71,746	36,300	35446	66.40	78.10	57.10	121,968					
Ghizer	11886	6314	159,700	11,090	2	172,696	84795	87,901	64.00	75.10	54.20	215,033	Darkut, Badswat	55	30	9	High
Diamer	6995	177324	141,900	5,440		269,772	137944	131828	27.90	46.40	11.90	283,261					
Astore	5056	30018	219,700	3,120	1	95,416	49463	45,953	55.10	68.80	44.10	100,187	Rupal	6	1	0	Moderate
Skardu	7,900	2793	212,300	3,040	2	260,836	139424	121412	53.6	67.1	41.2	419,946					
Shigar	7,247	1354	44,200	3,050		74,540	38314	36226	46.40	58.30	36.00	120,009					
Kharmang	2,535	548	13,400	510	1	54,613	28889	25,724	49.90	66.90	37.00	87,927	Ghundus	5	11	0	High
Ghanche	9,117	429	34,400	4,600		156,697	81914	74,783	43.60	56.40	33.50	622107	Khaplu	7	7	0	High

Sources:

1. GB FD official data (GB 10BTTAP Directorate, 2020)
2. UNDP Pakistan, MDC and CMDO, 2020. KAP Study Report (Draft), 2020
3. Agriculture, Livestock and Cooperative Department, Government of Khyber Pakhtunkhwa, 2017. Crop Statistics Of Khyber Pakhtunkhwa
4. P&D Department Government of Gilgit-Baltistan and UNICEF Pakistan, 2017. Multiple Indicator Cluster Survey. Gilgit
5. Pakistan Livestock Census 2006 | Pakistan Bureau of Statistics, 2020
6. District wise economic profile of KP | KPEZDMC, 2020
7. KP Bureau of Statistics, 2019. Development Statistics of Khyber Pakhtunkhwa 2019
8. PMD, 2020. Early Warning System Feasibility Assessment Report 2020
9. SDG Unit Planning & Development Department GB (2020)

Annexure-3: Valleys level statistics and data from the FGDs and QBS

District	Valley	Area and major landuses (Ha)						
		Number of villages	Total area (sq.km)	Total area (Ha)	Agri	Forest	Pasture/ Rangeland	PAs (No.)
Chitral (Upper and Lower)	Arkari	21	2100	210000	400	0	93,000	1
Kohistan (Upper, Lower and Palas)	Kandia	45	2088	208800	10,000	20,000	80,000	0
Hunza	Ghulkin & Hussaini	2	120	12000	895	0	3016	1
Ghizer	Bad Swat	4	150	15000	41	0	111	1
Astor	Rupal	2	28	2800	233	759	1214	1
Ghanche	Khaplu	1	37	3700	1600	0	1000	0
Average/ valley		**13**	**754**	**75383**	**2195**	**3460**	**29724**	**1**
% of total					**2.91**	**4.59**	**39.43**	

District	Valley	Number of villages	Population							Literacy (%)		
			H.Hold	Total Pop.	Male (%)	Female (%)	Old people (%)	Children (%)	Special (%)	Total	Male	Female
Chitral (Upper and Lower)	Arkari	21	1900	17000	49	51	20	30	5.23	80	50	50
Kohistan (Upper, Lower and Palas)	Kandia	45	12,000	96,000	49	51	15	25	0.26	7	7	0
Hunza	Ghulkin & Hussaini	2	350	3050	48	52	20	25	0.01	94	98	90
Ghizer	Bad Swat	4	95	760	48	52	15	30	3.40	75	45	60
Astor	Rupal	2	1150	8050	49	51	15	25	0.57	80	40	60
Ghanche	Khaplu	1	4642	37132	48	52	20	24	0.50	60	51	49
Average/ valley		**13**	**3356**	**26999**	**49**	**51**	**18**	**27**	**1.66**	**66**	**49**	**51**

District	Valley	Livelihoods assets		Livelihoods sources (% HH)				Annual HH income (PKRs.)
		No. of livestock/ HH	Land holding/ HH (Ha)	Agri. & Livestock	Labour	Govt. and other Jobs	Tourism and business	
Chitral (Upper and Lower)	Arkari	6	0.29	70	30	0	0	210,000
Kohistan (Upper, Lower and Palas)	Kandia	10	1.00	90	30	1	0	120,000
Hunza	Ghulkin & Hussaini	7	2.95	60	15	8	5	220,000
Ghizer	Bad Swat	10	0.43	74	25	1	0	80,000
Astor	Rupal	8	0.22	60	30	0	10	250,000
Ghanche	Khaplu	12	0.61	65	15	10	5	240,000
Average/ valley		**9**	**0.92**	70	24	3	3	186,667

District	Valley	Livelihoods assets		Livelihoods sources (% HH)				Annual HH income (PKRs.)
		No. of livestock/ HH	Land holding/ HH (Ha)	Agri. & Livestock	Labour	Govt. and other Jobs	Tourism and business	
Chitral (Upper and Lower)	Arkari	6	0.29	70	30	0	0	210,000
Kohistan (Upper, Lower and Palas)	Kandia	10	1.00	90	30	1	0	120,000
Hunza	Ghulkin & Hussaini	7	2.95	60	15	8	5	220,000
Ghizer	Bad Swat	10	0.43	74	25	1	0	80,000
Astor	Rupal	8	0.22	60	30	0	10	250,000
Ghanche	Khaplu	12	0.61	65	15	10	5	240,000
Average/ valley		**9**	**0.92**	70	24	3	3	186,667

District	Valley	No. of glaciers	No. of glacial Lakes	GLOF/ Floods Events	Damage by GLOFs						GLOF Vulnerability	GLOF Early Warning	
					Deaths	Houses damaged	Land damaged (ha)	Livestock killed	Water mills damaged	Total estimated value (million US$)		EWSs	Trainings
Chitral (Upper and Lower)	Arkari	3	7	3	0	25	81	0	15	0.190	High	0	0
Kohistan (Upper, Lower and Palas)	Kandia	30	36	7	200	1000	2500	1000	0	4.641	High	0	0
Hunza	Ghulkin & Hussaini	1	4	4	0	0	10	0	5	0.009	High	0	0
Ghizer	Bad Swat	7	1	4	0	42	21	0	0	0.138	High	0	0
Astor	Rupal	4	1	4	0	10	15	120	0	0.057	High	0	0
Ghanche	Khaplu	4	4	3	0	56	7	420	0	0.235	High	0	0
Average per valley		**8**	**9**	**4**	**33**	**189**	**439**	**257**	**3**	**0.878**			
% of total											**100**	**0**	**0**

Bases of estimation of damages as discussed with communities:
1. Average cost of reconstruction of damaged houses: Rs. 500,000/ House
2.Average cost of reclamation of damaged land: Rs. 200,000/ Ha
3. Average cost of livestock lost: Rs. 25,000/ Head (mostly small heads)
4. Average cost of repair of damaged water mills: Rs. 200,000/ unit

District	Valley	Girls schools			Boys schools			Co-eduation			Health facilities				Roads		Mobile network		
		Primary	Middle	High	Primary	Middle	High	Primary	Middle	High	Hospital	BHU	RHC	Disp.	Metaled	Dirt	Strong	Weak	No
Chitral (Upper and Lower)	Arkari	4	1	0	5	1	1	3	0	1	0	1	0	2		x	x		
Kohistan (Upper, Lower and Palas)	Kandia	10	0	0	40	8	1	0	0	0	0	4	0	4		x		x	
Hunza	Ghulkin & Hussaini	0	0	0	0	0	0	2	2	0	0	0	0	2	x		x		
Ghizer	Bad Swat	0	1	0	1	0	0	0	0	0	0	0	0	0		x			x
Astor	Rupal	0	0	1	0	1	0	0	0	0	0	1	0	0	x		x		
Ghanche	Khaplu	0	0	2	0	5	2	1	0	0	1	0	0	0	x		x		
Average		**2**	**0**	**1**	**8**	**3**	**1**	**1**	**0**	**0**	**0**	**1**	**0**	**1**					
% of total															**50%**	**50%**	**66%**	**17%**	**17%**

District	Valley	CBOs & small scale initiaitves			Flood protection structures		
		CBOs	Com. funds	Financial trainings	Engineering	Bioengineering	Other
Chitral (Upper and Lower)	Arkari	Yes	Yes	Yes	12	0	0
Kohistan (Upper, Lower and Palas)	Kandia	No	No	No	3	0	0
Hunza	Ghulkin & Hussaini	Yes	Yes	Yes	2	0	0
Ghizer	Bad Swat	Yes	No	No	2	0	0
Astor	Rupal	Yes	No	No	0	0	0
Ghanche	Khaplu	Yes	No	No	125	0	0
Average per valley					**24**	**0**	**0**
% of total		**0.83**	**0.33**	**0.33**	**83**	**0**	**0**

Annexure-4: Data collection system-Framework for progress tracking

Project results (Impact/ outcome/ output)	Indicators	Baseline	Target		Input data		Output data/ information				
			Midterm	End of project	Parameters for data collection	Data collection tools to be used	Total	Average	Percentage	Amount (US$)	Visuals
Fund Level Impact-A1.0: Increased resilience and enhanced livelihoods of the most vulnerable people, communities and regions	1.1 Change in expected losses of lives and economic assets (US$) due to the impact of extreme climate-related disasters in the geographic area of the GCF intervention.	1). Estimated loss of lives due to GLOFs over the last 20 years: 800 deaths (40/ year) 2). Estimated loss of economic assets over the last 20 years is 21.078 million US$ (1.054 million US$/ year) 3). -Only four valleys have GLOF EWSs and three valleys have flood protection structures covering 1,800 GLOF vulnerable households (14,000 people (with 6,700 males and	N/A	100% of households in KP and GB target communities are benefiting from engineering measures and early warnings in place to reduce the expected losses of lives and economic assets due to GLOF events	No. of GLOF events	KII/ FGDs	Total number of GLOF events since baseline date				Maps from satellite imageries
					No. of deaths due to GLOFs	KII/ FGDs	Total number of people died due to GLOFs since baseline date		% deaths of the baseline		
					Damage to assets and their cost	KII/ FGDs and GIS/ RS mapping and change analysis	Total economic losses due to GLOFs (US$) since baseline date		% economic losses of the baseline	Amount US$/ year	Data about damaged houses, infrastructure, land, crops, trees

Project results (Impact/ outcome/ output)	Indicators	Baseline	Target		Input data		Output data/ information				
			Midterm	End of project	Parameters for data collection	Data collection tools to be used	Total	Average	Percentage	Amount (US$)	Visuals
		7,300 females).									
Project/ programme outcome-7.0: Strengthened adaptive capacity and reduced exposure to climate risks	7.2: Number of males and females reached by climate related early warning systems and other risk reduction measures established/ strengthened	1). GLOF early warning system covering two valleys in KP and two valleys in GB. 2). Vulnerable households in the 24 target valleys of KP and GB are unable to receive and react to GLOF early warning messages (696,342 people: 348,171 men, 348,171 women). 3). 30 engineering and 32 bioengineering structures are	N/A	100% of households in KP and GB target communities are able to receive and respond to early warnings and take appropriate actions following the warning (696,342 people: 348,171 men, 348,171 women)	No. of GLOF EWSs established (EW equipment, O&M system, Information sharing and coordination system, community trainings and drills)	KIIs/ FGDs/Field visits	Total No. GLOF EWSs and details of their equipment installed				GPSs location and GIS map showing the EWSs; Fixed point photographs before, during and after installation.
					No. of households covered by EWSs (households, total population, male and female)	KIIs/ FGDs/Field visits/ QBSs	Total no. of HHs and population with males and males	Average no. of households covered per EWS	% of total households covered		GPSs location and map showing the households covered
					No. of engineering structures and hectares of bioengineering measures including their design	KIIs/ FGDs/Field visits/ Field measurements	Total number of engineering and volume (cubic meters); Total hectares of bioengineering measures	Average no. of engineering structures per valley; Average no. quantity bioengineering measures per valley			GPSs location and map showing location of structures and area covered; Fixed point photographs before, during and after construction.

Project results (Impact/ outcome/ output)	Indicators	Baseline	Target		Input data		Output data/ information				
			Midterm	End of project	Parameters for data collection	Data collection tools to be used	Total	Average	Percentage	Amount (US$)	Visuals
		in place in three GLOF vulnerable valleys to mitigate the effects of GLOF events.			No. of households and extent of their property and assets covered (HHs, total population, males, females, houses protected, land protected, infrastructure protected)	KIIs/ FGDs/Field visits/ QBSs			% of total households covered		GPSs location and GIS map showing houses, infrastructure and land protected by the structures
Project/ programme output-1: Strengthened sub-national institutional capacities to plan and implement climate change resilient development pathways.	1.1. Strengthened institutional and regulatory systems for climate-responsive planning and development.	1). 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.	By the end of Year 3, 100% of the national and 90% of district and community authorities in the KP and GB regions are able to prioritize and plan measures to minimize potential losses from GLOFs.	By the end of the project, at least four policies have been adopted by Government to address or incorporate GLOF risk reduction.	No. national and provincial policies reviewed and GLOF risk reduction incorporated	KIIs/ FGDs and review of reports	No. of policies reviewed and revised				

Project results (Impact/ outcome/ output)	Indicators	Baseline	Target		Input data		Output data/ information				
			Midterm	End of project	Parameters for data collection	Data collection tools to be used	Total	Average	Percentage	Amount (US$)	Visuals
	1.2. Number of policies introduced to address GLOF risks or adjusted to incorporate GLOF risks.	2). Only 3 comprehensive disaster management guidelines exist for national level, Khyber Pakhtunkhwa and Gilgit Baltistan			No. of provincial DRR strategies and plans with GLOF risk reduction incorporated	KIIs/ FGDs and review of reports	Total no. of provincial DRR strategies and plans developed				
					No. of guidelines developed/ revised at provincial and local level	KIIs/ FGDs and review of reports	Total no. of guidelines developed				
					No. of district and valley level DRR/ DRM plans with GLOF risk reduction and management incorporated	KIIs/ FGDs and review of reports	Total no. of DRR/ DRM plans developed				
					No. of trainings on effective implementation of DRR/ DRM plans conducted for provincial and local level stakeholders	KIIs/ FGDs and review of reports	Total no. of trainings and persons trained; Total no. of persons from each category of stakeholders trained	Average no. of persons trained per training	% of total no. of beneficiaries trained		

Project results (Impact/ outcome/ output)	Indicators	Baseline	Target		Input data		Output data/ information				
			Midterm	End of project	Parameters for data collection	Data collection tools to be used	Total	Average	Percentage	Amount (US$)	Visuals
Project/ programme output-2: Community-based EWS and long-term measures are up-scaled to increase communities' adaptive capacity.	2.1. Number of vulnerable households in KP and GB covered by a GLOF early warning system.	1). Vulnerable households are not able to receive and react to GLOF early warning messages.	By the end of Year 3 of the project, 9 GLOF early warning systems are installed in KP and GB and 40% of households in target communities are able to receive and respond to early warnings and take the appropriate actions following the warning (139,268 men, 139,268 women)	By the end of the project, 100% of households in target communities are able to receive and respond to early warnings and take the appropriate actions following the warning. (696,342 people: 348,171 men, 348,171 women)	No. of GLOF EWSs established (EW equipment, O&M system, Information sharing and coordination system, trainings and mock drills)	KIIs/ FGDs/Field visits	Total No. GLOF EWSs and details of their equipment installed				GPSs location and GIS map showing the EWSs; Fixed point photographs before, during and after installation.
					No. of households covered by EWSs (households, total population, male and female)	KIIs/ FGDs/Field visits/ QBSs	Total no. of HHs and population with males and males	Average no. of households covered per EWS	% of total households covered		GPSs location and map showing the households covered
	2.2. Number of Community-based organizations trained in the operation and maintenance of the EWS.	2). Four GLOF early warning system two each in KP and GB are in place and communities trained in O&M of EWSs	By the end of Year 3 of the project, at least 9 CBOs are trained in the operation and maintenance of the EWS and ensure its	By the end of the project, at least 24 CBOs are trained in the operation and maintenance of the EWS and ensure its	No. of trainings conducted and communities trained in O&M of EWSs;	KIIs/ FGDs and review of training reports	Total no. of trainings and persons trained; Total no. of persons from each category of stakeholders trained	Average no. of persons trained per training	% of total no. of beneficiaries trained		

Project results (Impact/ outcome/ output)	Indicators	Baseline	Target		Input data		Output data/ information				
			Midterm	End of project	Parameters for data collection	Data collection tools to be used	Total	Average	Percentage	Amount (US$)	Visuals
			continued functionality	continued functionality.	No. of mock drills conducted in the target areas	KIIs/ FGDs and review of reports	Total no. of mock drills conducted; Total no. of persons participated;	Average no. of persons participated per drill	% of total no. of beneficiaries participated		
					Knowledge and awareness of communities about the GLOFs, EWSs and mock drills	FGDs and QBS in selected valleys	Total no. of people aware of the EWSs, trainings and mock drills; Total no. of people participated in the trainings and mock drills	Average no. of people/ valley who are aware of the trainings and mock drills	% of total no. of beneficiaries who are aware of the trainings and mock drills		
	2.3. No. of physical assets constructed to withstand the effects of GLOF events.	3). 30 engineering and 32 bioengineering structures in three GLOF vulnerable valleys are in place to withstand the effects of GLOF events.	By the end of Year 3 of the project, at least 100 targeted engineering structures and 200 ha of bioengineering measures have been established to withstand the effects of GLOF events on livelihood assets.	By the end of the project, at least 250 targeted engineering structures and 700 ha of bioengineering measures have been established to withstand the effects of GLOF events on livelihood assets.	No. of engineering structures and hectares of bioengineering measures including their design	KIIs/ FGDs/Field visits/ Field measurements	Total number of engineering and volume (cubic meters); Total hectares of bioengineering measures	Average no. of engineering structures per valley; Average no. quantity bioengineering measures per valley			GPSs location and map showing location of structures and area covered; Fixed point photographs before, during and after construction.
					No. of households and extent of their property and assets covered (HHs, total population,	KIIs/ FGDs/Field visits/ QBSs			% of total households covered		GPSs location and GIS map showing houses, infrastructure and land

Project results (Impact/ outcome/ output)	Indicators	Baseline	Target		Input data		Output data/ information				
			Midterm	End of project	Parameters for data collection	Data collection tools to be used	Total	Average	Percentage	Amount (US$)	Visuals
					males, females, houses protected, land protected, infrastructure protected)						protected by the structures
	2.4. No. of small-scale community driven initiatives for GLOF preparedness financed through CBDRM funds	4). CBDRM Committees and CBDRM Funds are established in three valleys (two in KP and one in GB) under GLOF-I project	By the end of Year 3 of the project, at least 12 small-scale community driven initiatives financed through CBDRM funds	By the end of the project, at least 01 community driven initiative in each of the 24 target valleys, is financed through CBDRM funds	No. of CBDRMCs established	KIIs/ FGDs/Review of reports	Total no. of CBDRMCs and their membership (Male/ Female)				
					No. of CBDRM Funds established	KIIs/ FGDs/Review of reports	Total no. of CBDRM Funds				
					No. and types of community projects / initiatives sponsored from the CBDRM Funds	KIIs/ FGDs/Field visits	Total no. of schemes	Average schemes per valley Average cost per scheme		Cost of schemes	GPS location and GIS map of the schemes; Fixed point photography before and after
					No. of beneficiaries benefited the community projects/ initiatives	KIIs/ FGDs/Field visits/ QBSs	Total no. of beneficiaries/ scheme				

Annexure-5: Data entry and tabulation for progress tracking

Data parameters	Unit	Quantity	Average per valley	Average per year	% of total target
DRR/ DRM policies, strategies and plans					
No. of provincial policies reviewed/revised	Number				
No. of provincial DRR/ DRM strategies prepared/ revised	Number				
No. of provincial DRR/ DRM plans prepared/ revised	Number				
No. of provincial GLOF Risk Reduction guidelines prepared/ revised	Number				
No. of District DRR/ DRM plans prepared/ revised	Number				
No. of trainings on effective implementation of DRR/ DRM plans conducted					
GLOF events and damage					
No. of GLOF events	Number				
No. of deaths due to GLOFs and cost of damage (Pak Rupees)	Number/ PK Rs.				
Livestock killed and cost of damage (Pak Rupees)	Number/ PK Rs.				
Agri. land damaged (Ha) and cost of damage (Pak Rupees)	Hectare/ PK Rs.				
Houses damaged by GLOFs and cost of damage (Pak Rupees)	Number/ PK Rs.				
Roads damaged and cost of damage (Pak Rupees)	Kilometer/ PK Rs.				
Bridges damaged and cost of damage (Pak Rupees)	Number/ PK Rs.				
Watermills damaged and cost of damage (Pak Rupees)	Number/ PK Rs.				
Micro hydro power units and cost of damage (Pak Rupees)	Number/ PK Rs.				
Total cost of damage by GLOFs (Pak Rs.)	Million Pk. Rs.				
GLOF Early Systems					
No. of GLOF EWSs established	Number				
No. of households covered	Number				
No. of people covered	Number				
No. of trainings on O&M for EWS conducted	Number				
No. of persons trained in EWS O&M	Number				
Flood protection structures					
No. of engineering structures constructed	Number				
Quantity of bioengineering measures established	Hectare				
No. of households covered	Number				
No. of people covered	Number				

Data parameters	Unit	Quantity	Average per valley	Average per year	% of total target
Extent of land protected by flood protection structures	Hectare				
Roads protected by flood protection structures	Number				
No. of bridges protected by flood protection structures	Number				
No. of watermills protected by flood protection structures	Number				
Community organizations and funds					
No. of CBDRMCs established	Number				
No. of CBDRM Funds established	Number				
No. of community projects / initiatives sponsored from the CBDRM Funds	Number				
No. of beneficiaries benefited by the community projects/ initiatives	Number				

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