Mid-Term Evaluation of the UNDP/AF Project

Reducing Risks and Vulnerabilities from Glacier Lake Outburst Floods in Northern Pakistan

PIMS No. 4454

Government of Pakistan
United Nations Development Programme
Adaptation Fund

DRAFT Report prepared by:
Dr. Hans van Noord
Dr. Bashir H. Shah
May 2014

Table of Content

List of Tables

Acknowledgements

The evaluation team members, Dr. Hans van Noord, international consultant, and Dr. Bashir Hussain Shah, national consultant, have prepared this report. We would like to express our gratitude to all stakeholders involved in the Mid-Term Evaluation process of the GLOF project. The open and frank discussions and constructive contributions of all project stakeholders and partners interviewed are appreciated very much and have made this evaluation a valuable learning experience.

We thank UNDP Pakistan, in particular Mr. Usman Manzoor and Mr. Saleem Ullah, for their logistical support, for providing critical information about the project and for facilitating a smooth evaluation process.

The Project Management Unit (PMU), headed by Mr. Khalil Ahmed (project manager), was very helpful in setting-up a series of consultative meetings with the key stakeholders and project partners. The self-critical presentations and open discussions have contributed considerably to the evaluation process.

The evaluation team is most indebted to the teams from the project areas in Chitral and Gilgit, who made the arduous travel from their mountain areas to Islamabad, to enable very valuable focus-group discussions. All local community members, district and provincial representatives, NGO partners and project staff are thanked for their commitment and shared insights.

Additionally, Dr. Bashir Hussain Shah acknowledges the considerable support during his field visits to Chitral and Gilgit:

I am extremely thankful to Mr. Khalil Ahmad, NPM GLOF project, who travelled himself for facilitating my field visit and the hospitality he extended during my visit to both Chitral and Gilgit. I am also thankful to both Mr. Hamid and Mr. Zahid Hussain, Field Managers GLOF, for extending their cooperation and facilitation for making my field visit possible in both the valleys. I appreciate the cooperation of Assistant Commission Chitral for sparing time and briefing about the role of GLOF in strengthening DDMA and establishment of DRC in the office of the Deputy Commissioner. I am indebted to the DRMC members of both the Bindo gol and Bagrote for the time they spared for briefing and sharing their views and hospitality. I am also thankful to forest officers of both Chitral and Gilgit Baltistan for sparing time for the briefing on the role of the GLOF project in strengthening their offices.

Islamabad, Pakistan and Heteren, the Netherlands, May 2014

Dr. Hans van Noord
Dr. Bashir Hussain Shah

Executive Summary

This Mid-Term Evaluation reports on the project titled 'Reducing Risks and Vulnerabilities from Glacier Lake Outburst Floods in Northern Pakistan'[1], jointly approved by the Government of Pakistan, the Adaptation Fund and UNDP in May 2011. The initial project period was May 2011 – April 2015, but due to a delayed implementation start in November 2011, the project will presently last until December 2015.

In Chapter one, the objective of the project, its four outcome areas, the project strategy and the implementation modality is described. The total project budget is US$ 7,600,000 with US$3,600,000 from the Adaptation Fund, US$ 500,000 from UNDP and US$ 3,500,000 in-kind contribution from the Government of Pakistan. The project is implemented, as Executing Agency, by the Government of Pakistan, Climate Change Division under the Cabinet Secretariat of the Prime Minister through a Project Management Unit (PMU), and with implementation support provided by UNDP. The project is the first in Pakistan to receive a grant from the Adaptation Fund in order to adapt to adverse effects of climate change.

The objective of the project is to reduce climate change-induced risks of Glacial Lake Outburst Floods (GLOFs) in Gilgit-Baltistan and Chitral and enable national, provincial, district authorities and communities to prioritize and implement climate change adaptation measures. The project seeks to achieve **four outcomes**:
Outcome 1: Strengthened Institutional capacities to implement policies, plans and investments that prevent human and material losses from GLOF events in vulnerable areas of Northern Pakistan.
Outcome 2: Improved access of disaster management planners and policy makers to knowledge, information and research on GLOF risks.
Outcome 3: Reduced human and material losses in vulnerable communities in the Northern areas of Pakistan through GLOF early warnings and other adaptation measures, and
Outcome 4: Project experiences documented and replicated.

The project strategy focuses on two pilot areas, Bagrot Valley in Gilgit-Baltistan province and Bindogol valley in Chitral district in Khyber-Pakhtunkhwa Province. In both pilot areas hazardous glacial lakes were identified and the project aims to reduce risks and vulnerabilities from GLOFs and snow-melt flash floods for the pilot areas through its **main objectives to:**

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

The Project Management Unit in Islamabad is supported by two field offices in the pilot areas, with two field managers, who coordinate the planning, implementation and monitoring with local community based organizations, NGO's and the district and provincial authorities.

Additionally in this Chapter the purpose and approach of the MTE are presented. **The purpose** of the MTE is to provide an independent analysis of the progress of the project so far, after two years of implementation, providing a moment of stock-taking and retrospection. The MTE aims to identify potential project design problems, evaluate progress towards the achievement of the project objective, identify and document lessons learned and make recommendations regarding specific actions that should be taken to improve the project. The MTE evaluates early signs of project success

[1] In the MTE Report the term "GLOF project" is used for the full project name "Reducing Risks and Vulnerabilities from Glacier Lake Outburst Floods in Northern Pakistan".

or failure and identifies the necessary changes to be made. The project performance is measured based on the indicators of the project's logical framework.
The evaluation follows UNDP approaches for assessing project progress, including a Rating of Progress, for the criteria to be assessed. The preliminary findings of the MTE, based on stakeholder consultations in Islamabad, were presented to the key project partners on March 20th, and together with the provided feedback, form the basis of the MTE report.

Scope
The MTE looks at the entire project since its design and inception and after completing the first half of its implementation period. It provides an opportunity to look back and take stock of progress made against the set objectives and to evaluate the design of the project with its four distinct components. The evaluation offers also a moment to assess if the project objectives are still relevant and the design valid and if set indicators and targets are still realistic or need to be adjusted. The Mid-Term Evaluation is seen as an important learning opportunity for the project to self-assess its progress and discuss progress, key challenges and potential need for adjustments with all relevant stakeholders and partners. The focus of the MTE therefore is been put on learning and extracting emerging key learning and best practices.

Methodology of the evaluation
The evaluation used several data collection methods, to capture primary and secondary data, spread over three distinct phases. Primary data were collected by interviews (face-to-face), focus group discussions and key informant interviews by the evaluators. The planned direct on-site observations by the MTE team in the pilot areas could not be executed due to security restrictions. The national consultant undertook these site visits after the international left. Secondary data was collected by review of existing project documentation and relevant literature and policy documents. The three evaluation phases were:

1. A desk review phase: in this initial stage of two days, the evaluation team reviewed the documentation related to the GLOF Project. At the end of the desk review phase the MTE team compiled questionnaire formats for the interviews and focus-group discussions.

2. A field mission phase, of twelve days (March 10-21), during which the MTE team met the project team members in Islamabad, main project partners and key stakeholders at national level. For the meetings with the project team members and key stakeholders, a combination of focus group discussions and interviews were used, see Annex 4 for transcripts of these consultative meetings. At the end of the field mission period the evaluation team presented preliminary findings to the project team and key stakeholders and discussed key findings and recommendation and received additional guidance and feedback on particular areas of attention in the further development of the draft evaluation report.

As discussed above, security conditions restricted the MTE team to carry out the planned visit of the actual project sites: Bagrote Valley, Gilgit; and Bindogol Valley, Chitral. The national consultant visited Chitral from April 17-19 and Gilgit from April 22-27 (see Annex 5).

3. A reporting phase, to compile the draft evaluation report, based on the data collected during the desk phase and the field mission and guided by the feedback and comments of the project team members, key stakeholders and informants. Consolidated feedback to the draft report was used to finalize the MTE report.

The conceptual framework of the evaluation
The conceptual framework chosen for the evaluation is consistent with result-based management (RBM) as widely applied with the UN system, and addressed the five key evaluation criteria as proposed

by OECD-DAC: relevance, efficiency, effectiveness, sustainability and impact. The evaluation team assessed the logical framework of the GLOF Project, with defined development and immediate objectives and related outputs, indicators and targets of the project's Monitoring & Evaluation mechanism, as a source of information to weigh the achievements made.

For the MTE rating scales were used, as provided by UNDP, as performance standards to evaluate performance relative to the evaluation questions. The evaluation complied with evaluation norms and standards and followed ethical safeguards, all as specified in UNDP's evaluation procedures. Special reference is given to the guidance for the evaluation as presented in the UN System Evaluation Norms and Standards.

A major limitation for the MTE has been the cancellation of the initially planned site visits to the pilot areas of Bagrote and Bindogol Valleys. As alternative, comprehensive delegations, consisting of community representatives, local NGO representatives, the project field offices and district and provincial authorities from both pilot areas, travelled to Islamabad to enable an extended consultation with the MTE team (March 14 and 17). The national consultant travelled to the pilot sites in late April (17-19 to Chitral and 22-27 to Gilgit) to assess conditions and interventions in the field and to have additional consultations with local beneficiaries, stakeholders and authorities.

In Chapter 2 the project is further described with its development context. The project has as **goal**:

- To enhance adaptive capacity to prevent climate change-induced GLOF disasters in Pakistan.

The **overall (or immediate) objective** of the project is:

- To reduce climate change-induced risks of Glacial Lake Outburst Floods (GLOFs) in Gilgit-Baltistan and Chitral.

The **development objectives** of the project are**:**

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

The rationale of the project is linked to the existing scientific knowledge gap on glaciology and GLOF as a serious threat to downstream communities. At present, Pakistan faces a critical gap in baseline scientific knowledge of glaciers and glacial lakes, although the country harbours the largest volume of glaciers outside of the poles, indicated as the "third pole". This combined with a lack of glacio-hydrological flood forecasting, insufficient risk assessment and a lack of disaster risk management preparedness, results in a setting where the country is ill-prepared to assess, identify, and manage potentially catastrophic GLOF events.

The key project partners are described in this Chapter with their respective roles, including the Climate Change Division as main implementing agency, the Pakistan Meteorological Department as critical institution to update the glacial lake inventory for Northern Pakistan and establish Early Warning Systems in the pilot areas, NGO's with local knowledge and experience and skills in community outreach and training, CBO's representing local communities, provincial and district authorities in both the pilot provinces, with an emphasis on Disaster Risk Management (DRM) authorities and UNDP, providing technical and financial implementation support to the project and assisting in monitoring of project implementation.

Chapter three presents the findings of the MTE evaluating the progress of the project towards results. **The design of the project** reflects the situational analysis depicting a critical gap in scientific baseline knowledge in Pakistan regarding glacier development, hydrological forecasting and a general lack of monitoring of glacial lakes combined with an unprepared disaster management

prevention/management system without early warning systems for the exposed mountain communities, who are very vulnerable to potentially catastrophic GLOF events. This situation analysis is considered very valid and the project strategy is aimed at addressing these identified problems systematically. The strategy, with four complementary components, is considered to be **relevant, necessary and gap-filling**. It tries to address the critical knowledge gap that exists, with **very limited baseline information** on glacial development and identification of hazardous glacial lakes, while at the same time strengthening institutions and the regulatory framework related to GLOF risk. The project is community-based, through its pilot areas in Gilgit and Chitral, enabling to build experience with bottom-up awareness raising and participatory planning and implementation of interventions aimed at GLOF risk and vulnerability reduction. The project strategy is also considered **ambitious**, as a lot of knowledge needs to be build and gathered in a relatively short time span on a subject that is new and relatively unknown to the scientific community in the country and to local and regional administrations.

The chosen project strategy is considered to be effective as there is a clear focus on human resource capacity building and there are very few alternative options available due to the general lack in science base. Although the project has left open the option for mitigation at source, e.g. by lowering an existing spillway, it has chosen to focus on mitigation interventions more downstream to reduce the vulnerability of exposed communities. Considering the limited information available about the specific glacial lake and moraine conditions, this seems a sensible approach. The project strategy and design seems to be in sync with the present country priorities. The existing base line information is very limited, and most of the project intervention contribute to build a better knowledge base and fill existing gaps. The project therefore contributes to kick-starting the build-up of a credible science-base. During the evaluation mission some slight revisions or rephrasing of set targets was discussed to make some targets more realistic and attainable.

To assess to what extent the project been able to make progress towards the expected results, the logical framework has been used to mark the progress against the baseline indicators and set targets for each of the four project Components outcome areas and for the nine defined outputs areas. Based on the achieved outputs the project is making credible progress to attaining its objectives. For most of the outputs set targets are being met or are being achieved. It has to be noted that these outputs are just emerging and yet have to turn into real outcomes. Therefore, it is too early to claim any real impact after two years of project implementation. Early outputs in the fields of sensitization, awareness raising, CB DRM, linkage to local authorities and emerging climate change adaptation structures are acknowledged, but have to proof themselves over time. Attention is raised to the fact that the project needs to focus on further documentation and consolidation of the various reports commissioned by the project.

The evaluation team acknowledges the good **catalysing potential** of the project to kick start follow-up research and/or projects related to GLOF. As the project is in many ways doing ground breaking work, it is anticipated that geographic scaling-up and thematic replication could spin off after project end. Although the project has its core focus on GLOF hazard, there is a valuable contribution to broader multi-hazard DRM planning and related risk reduction and vulnerability reduction.
Based on these observations the progress of the project towards results is assessed as: Satisfactory (S)

The planning process of the project is assessed as satisfactory based on the fact that delivery rate is good (for year 1 and year 2 well over 80%, which is remarkable) and the process is participatory and inclusive. Stakeholders are included in the planning process, covering the pilot areas and the communities and local authorities and the Project Steering Committee is giving feedback and endorsing the annual work plans. Right from the start, the project has faced **a series of challenges** and logistical issues. The initially planned start of the project, April 2011, had to be postponed with six months to November 2011, caused by the devolution of the former Ministry of Environment due to

the 18th constitutional amendment of June 2011. During the first two years of implementation the project has had five different national project directors. These rapid changes have had a negative impact through loss of momentum and institutional knowledge and led to administrative delays as the NPD has to sanction any project disbursement and formal decision.

By the end of 2013, the project spent US$1,834,000 of the overall budget of US$4,100,000, which is 44.7%. The evaluation team understands that no financial issues have been flagged by the regular yearly audits of the project. The budgets for 2014 and 2015 will be higher than initially planned to compensate for the build up of balance over the first two year. The in-kind contribution of the Government of Pakistan, US$3,500,000, is considered to be ambitious for the limited project period of four year. The actual in-kind expenditure for the first two years, as estimated by the PMU, amounts to US$400,000. It is suggested to regularly update the actual in-kind contribution to keep track of the Government expenditure.

As the project is transiting into its second phase, monitoring of implemented activities becomes more critical. The best tool for monitoring for the project management is offered by the logical framework of the project. It is suggested to make better use of the Log Frame as monitoring tool and aggregated outputs should be recorded and compared with set targets. Some targets have been, as discussed, slightly adjusted or rephrased.

The risks as identified in the Pro Doc are assessed to be still valid. No new risks have been identified. The main current risk is thought to be the rapid change of NPDs and related loss of momentum and administrative delays. Considering the series of challenges and logistical issues the project has to face, the risk management is certainly adequate.

The evaluation team emphasizes the need for further consolidation of project lessons and reports in the remaining project period. There is scope for a review of key lessons and a uniform project publication series to enhance dissemination of project experiences. There is a need for a strengthened focus on documentation of best practices and key learning distilled from the project.

The project management forms a small team and is facing a considerable work load. Both at the PMU and in the field managers the evaluation team has met dedicated staff. Coordination is performing well, linking with the communities and district and provincial authorities, with exception of the frequent changes in the NPD. It is thought that the PMU is actually understaffed and needs reinforcement to assist the PM with technical backstopping documentation and monitoring. The evaluation team commends the intention to hire additional support staff.
Reporting by the management is sufficient, but has room for more descriptive narrative in its reporting to capture learning and best practices.

The quality assurance and overall guidance of outsourced activities (to a series of technical consultants), in particular the series of GLOF related studies and the activities undertaken by PMD and its sub-contractors, requires considerable time and attention of the project management team. It requires additional support, possibly by a regional or international resource person, to extract key lessons and enhance the quality of the project reporting. The unavailability of national experts on GLOF hampers the project management in reviewing adequately project outputs.
PMD as a key project partner has sound technical staff, but needs time to build additional expertise in new fields as glaciology/slope processes, which require time to build up sufficient technical expertise and a sound scientific base.

The overall coordination with UNDP is considered to be fine and effective.

With outputs starting to emerge, there is a need for targeted attention to **enhance post-project permanence** of impacts. Based on the series of consultations with the project partners and stakeholders a series of actions is suggested, with as key suggestion to draft a concise project exit-strategy, with concrete actions aimed at enhancing post-project impact. Such a strategy will support the project in developing activities that will contribute to future consolidation of impact and scaling-up and replication of activities.

Based on these observations the progress of the project in Adaptive Management & Management Arrangements is assessed as: Satisfactory (S).

In the final **Chapter Four** a series of conclusions and recommendations is presented, based on the data analysis and findings as discussed in the previous Chapters.

Conclusions:

1. Overall project progress is in sync with planning, which is a considerable achievement considering the recurrent delays, constraints and work load the project management had to face.
2. The regular change of NPDs has had a negative impact on project implementation, momentum and continuity.
3. The project team, both at PMU and in the field offices, is dedicated and efficient, but in need of additional technical support.
4. The project has produced a considerable series of publications on GLOF and GLOF related issues, with a focus on the pilot areas, to bridge the existing knowledge gap. Quality review and assurance of these outputs is needed.
5. The local stakeholders, communities exposed and district and provincial stakeholders, are clearly engaged and committed, which has resulted in essential strengthening of local institutional linkages related to GLOF/multi-hazard DRM management.
6. PMD, as key project partner, has produced a draft updated GLOF inventory, which shows an increase of lakes and a decrease of potentially hazardous lakes. These findings need to be ground truthed, finalized and documented in consolidated reports.
7. Field verification has shown that the potentially hazardous lake in Chitral is not a pro-, supra- or en-glacial lake. It represents a recurrent temporal lake, formed by snow avalanches and mass movement materials blocking a narrow gorge downstream of the glacier tongue. The research conducted is still valuable as the ephemeral downstream lake represents a real and serious recurrent hazard with GLOF–like characteristics.
8. Climate Change Adaptation Structures represent unique trials, which have to proof their function, appropriateness and robustness over time.
9. The EWS in development needs completion and testing, particularly with reference to the location of the water level sensors and thresholds values (and SOP) and eventually drills.
10. The diversion dike for diversion of the Chitral river at Shogram Payan seems to be weak. It is felt that it may be washed away during high flood stages in summer. It is suggested that the diversion dike could be strengthened by increasing its height by 4 meters and extended up to bank on the north as soon as possible, but before monsoon season.
11. Recent GLOFs and extreme flash floods in 2010 have caused considerable secondary slope instability along the flood path ways in both Gilgit and Chitral pilot areas. The landslides are still active and a cause of concern for the local communities with regards to their safety, livelihoods and access and mobility.
12. There is still limited infusion of regional GLOF experience into project activities. There is a clear scope for better exposure to lessons learned and best practices from Bhutan and Nepal.
13. The reach of the project is beyond just the single GLOF issue: it has the potential for a real contribution to more holistic flood warning/EWS, multi-hazard DRM and downstream impact reduction (including essential information for hydropower development).

14. The project lacks at present a well-defined exit strategy to enhance post-project sustainability of impacts.

4.2 Recommendations:

The project is recommended to:

1. Hire additional technical staff to strengthen the PMU with regards to documentation and monitoring and evaluation.
2. Review, edit and publish a uniformly styled series of GLOF related reports.
3. Finalize the Updated GLOF Inventory with essential ground truthing, documentation and dissemination.
4. Compile a regular detailed break-down of in-kind government contribution.
5. Screen critically the EWSs in development for the location of water level/discharge sensors (more upstream/less exposed).
6. Test after installation the EWSs and their thresholds values, tune the SOP, and eventually train local stakeholders and compile a final SOP.
7. Consider gabion spurs as a stream controlling measure, which could be useful and economical in addition to the gabion wall applied so far.
8. Explore stabilization work of mass movement areas triggered and destabilized by recent GLOF and extreme flash flood events in both the pilot areas. Communities could be supported with bio-engineering and low-tech interventions to limit the hazard of these destabilized masses.
9. Consider alternative livelihood support to the communities through rehabilitation of damaged irrigation channel intakes and critical access points, such as suspension bridges.
10. Initiate swiftly a study visit to Bhutan to observe a functional EWS and CB-DRM and related guidelines and procedures to learn from regional best practices.
11. Formulate an exit strategy to enhance post-project sustainability: suggested elements for the strategy could include: PC-1, community maintenance, scaling-up initiatives, proposal formulation and GLOF-EWS entity creation.

Key learning / Best Practices

The evaluation teams considers the following points as key leaning generated by the project and as emerging best practices:

1. The development of Community-Based multi-hazard Disaster Risk Management approaches in an integrated combination of indigenous and high-tech Early Warning Systems.
2. The piloting with downstream mitigation structures to reduce the vulnerability of exposed mountain communities to GLOF hazard.
3. The catalysing effect on multi-hazard DRM development, connecting communities groups with district and provincial authorities.
4. Although increasing scientific attention is geared towards RS-based research of glaciers and GLOF, there is still very limited field-based knowledge of potentially hazardous lakes needed for prioritization.

List of Acronyms and Abbreviations

AF	Adaptation Fund
AWS	Automatic Weather Station
CBO	Community-Based Organization
DDMA	District Disaster Management Authority
DDO	Dubani Development Organisation
DMA	Disaster Management Authority
DRMC	Disaster Risk Management Committee
EWS	Early Warning System
GB	Gilgit-Baltistan Province
GLOF	Glacial Lake Outburst Flood
KP	Khyber Pakhtunkhwa
MTE	Mid-Term Evaluation
NPD	National Project Director
NPM	National Project Manager
PMD	Pakistan Meteorological Department
PMU	Project Management Unit
PSC	Project Steering Committee
UNDP	United Nations Development Fund

1. Introduction

1.1 Brief description of project

The project titled 'Reducing Risks and Vulnerabilities from Glacier Lake Outburst Floods in Northern Pakistan'[2] was jointly approved by the Government of Pakistan, the Adaptation Fund and UNDP in May 2011. The initial project period was May 2011 – April 2015, but due to a delayed implementation start in November 2011, the project will presently last until December 2015.

The total project budget is US$ 7,600,000 with US$3,600,000 from the Adaptation Fund, US$ 500,000 from UNDP and US$ 3,500,000 in-kind contribution from the Government of Pakistan. The project is implemented, as Executing Agency, by the Government of Pakistan, Climate Change Division under the Cabinet Secretariat of the Prime Minister through a Project Management Unit (PMU), and with implementation support provided by UNDP. The project is the first in Pakistan to receive a grant from the Adaptation Fund in order to adapt to adverse effects of climate change.

The objective of the project is to reduce climate change-induced risks of Glacial Lake Outburst Floods (GLOFs) in Gilgit-Baltistan and Chitral and enable national, provincial, district authorities and communities to prioritize and implement climate change adaptation measures. The project seeks to achieve **four outcomes**:
Outcome 1: Strengthened Institutional capacities to implement policies, plans and investments that prevent human and material losses from GLOF events in vulnerable areas of Northern Pakistan.
Outcome 2: Improved access of disaster management planners and policy makers to knowledge, information and research on GLOF risks.
Outcome 3: Reduced human and material losses in vulnerable communities in the Northern areas of Pakistan through GLOF early warnings and other adaptation measures, and
Outcome 4: Project experiences documented and replicated.

The project strategy focuses on two pilot areas, Bagrot Valley in Gilgit-Baltistan province and Bindogol valley in Chitral district in Khyber-Pakhtunkhwa Province. In both pilot areas hazardous glacial lakes were identified and the project aims to reduce risks and vulnerabilities from GLOFs and snow-melt flash floods for the pilot areas through its **main objectives to:**

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

The Project Management Unit in Islamabad is supported by two field offices in the pilot areas, with two field managers, who coordinate the planning, implementation and monitoring with local community based organizations, NGO's and the district and provincial authorities.

1.2 Context and Purpose of the evaluation

The purpose of the MTE is to provide an independent analysis of the progress of the project so far, after two years of implementation, providing a moment of stock-taking and retrospection. The MTE aims to identify potential project design problems, evaluate progress towards the achievement of the project objective, identify and document lessons learned and make recommendations regarding specific actions that should be taken to improve the project. The MTE evaluates early signs of project success or failure and identifies the necessary changes to be made. The project performance is measured based on the indicators of the project's logical framework.

[2] In the MTE Report the term "GLOF project" is used for the full project name "Reducing Risks and Vulnerabilities from Glacier Lake Outburst Floods in Northern Pakistan".

The evaluation follows UNDP approaches for assessing project progress, including a Rating of Progress, for the criteria to be assessed.

The preliminary findings of the MTE, based on stakeholder consultations in Islamabad, were presented to the key project partners on March 20th, and together with the provided feedback, form the basis of the MTE report.

1.3 Scope of the Mid-Term Evaluation

The MTE looks at the entire project since its design and inception and after completing the first half of its implementation period. It provides an opportunity to look back and take stock of progress made against the set objectives and to evaluate the design of the project with its four distinct components. The evaluation offers also a moment to assess if the project objectives are still relevant and the design valid and if set indicators and targets are still realistic or need to be adjusted. The Mid-Term Evaluation is seen as an important learning opportunity for the project to self-assess its progress and discuss progress, key challenges and potential need for adjustments with all relevant stakeholders and partners. The focus of the MTE therefore is been put on learning and extracting emerging key learning and best practices.

The evaluation team has focused on the following key tasks, as defined in the ToR and the methodological approached defined, to:

i. critically **examine** the project objectives and arrangements for its implementation;
ii. **assess and report** an account of the **progress** achieved to date towards the production of project outputs, emergent achievements of the project's stated objectives and its contribution toward achieving the corporate objective of UNDP and AF;
iii. **identify and analyze** major technical, management and operational **issues and impediments** encountered in project implementation, if any;
iv. **assess** the **monitoring and evaluation system** in place;
v. **formulate** a set of specific **recommendations** for actions necessary to ensure resolution of the issues and impediments identified so that the project has a greater prospect of achieving its objectives (these actions should however remain within the framework of AF guidelines); and
vi. **present the recommendations** to the key project stakeholders to be convened as a concluding event for the mission.

1.4 Methodology of the evaluation

The evaluation used several data collection methods, to capture primary and secondary data, spread over three distinct phases. Primary data were collected by interviews (face-to-face), focus group discussions and key informant interviews by the evaluators. The planned direct on-site observations by the MTE team in the pilot areas could not be executed due to security restrictions. The national consultant undertook these site visits after the international left. Secondary data was collected by review of existing project documentation and relevant literature and policy documents. The three evaluation phases were:

1. A desk review phase: in this initial stage of two days, the evaluation team reviewed the documentation related to the GLOF Project, including the background literature of relevant policy documents, the project document, the inception report, project monitoring and evaluation reports (quarterly and financial reports), technical reports and various additional reports made available by UNDP and the project management team. At the end of the desk review phase the MTE team compiled questionnaire formats for the interviews and focus-group discussions.

A field mission phase, of twelve days (March 10-21), during which the MTE team met the project team members in Islamabad, main project partners and key stakeholders at national level. For the meetings with the project team members and key stakeholders, a combination of focus group discussions and interviews were used, see Annex 4 for transcripts of these consultative meetings. At the end of the field mission period the evaluation team presented preliminary findings to the project team and key stakeholders and discussed key findings and recommendation and received additional guidance and feedback on particular areas of attention in the further development of the draft evaluation report.
As discussed above, security conditions restricted the MTE team to carry out the planned visit of the actual project sites: Bagrote Valley, Gilgit; and Bindogol Valley, Chitral. He visited Chitral from April 17-19 and Gilgit from April 22-27 (see Annex 5).

3. Reporting phase, to compile the draft evaluation report, based on the data collected during the desk phase and the field mission and guided by the feedback and comments of the project team members, key stakeholders and informants. Consolidated feedback to the draft report were used to finalize the MTE report.

The conceptual framework of the evaluation
The conceptual framework chosen for the evaluation is consistent with result-based management (RBM) as widely applied with the UN system, and addressed the five key evaluation criteria as proposed by OECD-DAC: relevance, efficiency, effectiveness, sustainability and impact. The evaluation team assessed the logical framework of the GLOF Project, with defined development and immediate objectives and related outputs, indicators and targets of the project's Monitoring & Evaluation mechanism, as a source of information to weigh the achievements made. Additional attention was given to the cross-cutting criteria/themes of gender equality promotion, monitoring and evaluation, and knowledge sharing and learning environment. The evaluation followed a participatory and consultative approach with the intention to have meetings with all key national and local stakeholders.

For the MTE rating scales were used, as provided by UNDP, as performance standards to evaluate performance relative to the evaluation questions. The evaluation complied with evaluation norms and standards and followed ethical safeguards, all as specified in UNDP's evaluation procedures. Special reference is given to the guidance for the evaluation as presented in the UN System Evaluation Norms and Standards.

A major limitation for the MTE has been the cancellation of the initially planned site visits to the pilot areas of Bagrote and Bindogol Valleys. As alternative, comprehensive delegations, consisting of community representatives, local NGO representatives, the project field offices and district and provincial authorities from both pilot areas, travelled to Islamabad to enable an extended consultation with the MTE team (March 14 and 17). The national consultant travelled to the pilot sites in late April (17-19 to Chitral and 22-27 to Gilgit) to assess conditions and interventions in the field and to have additional consultations with local beneficiaries, stakeholders and authorities. The evaluation team therefore has not had the opportunity to assess field conditions jointly, discuss field interventions such as the adaptation structures and to have broader community meetings.

1.5 Structure of the evaluation

The structure of the evaluation follows the MTE format as provided to the evaluation team by UNDP. It presents and evaluates, after this introduction Chapter, in Chapter 2 the project design, its rationale and development context, the problems that the project sought to address, the objectives and established baseline, the key stakeholders and expected results. In Chapter 3 the results of the project so far are discussed after two years of implementation and compared with the targets as set. Finally,

in Chapter 4 conclusions are presented and combined with a series of recommendations for follow-up action by the project.

2. Project description and development context

Project start and duration
The initial project start was planned for April 2011, but was delayed until November 2011 as a result of the devolution of the former Ministry of Environment resulting from the 18th constitutional amendment during June 2011. These six months of delay will mean the initial project end date of April 2015 is expected to change to December 2015.

The total project budget is US$ 7,600,000 with US$3,600,000 from the Adaptation Fund, US$ 500,000 from UNDP and US$ 3,500,000 in-kind contribution from the Government of Pakistan.

Problems that the project sought to address
The GLOF project intends to address the vulnerability of mountain communities exposed to catastrophic glacial lake outburst floods (GLOFs) and snow-melt induced flash floods in Northern-Pakistan. Projected climate change is expected to exacerbate these natural hazards as a trend in rising temperatures and increased precipitation is expected to raise the likelihood of occurrence of catastrophic GLOF events linked to outbreak floods of potentially hazardous lakes. Mountain communities, living close to the glacial lakes, as source area of the hazard and along the exposed rived beds, are extremely vulnerable and therefore at risk. In the past 200 years at least 35 destructive outburst floods have been recorded (ProDoc, 2011) and a study (ICIMOD, 2007) identified 52 potentially hazardous lakes in Northern Pakistan.

At present, Pakistan faces a critical gap in baseline scientific knowledge of glaciers and glacial lakes, although the country harbours the largest volume of glaciers outside of the poles, indicated as the "third pole". This combined with a lack of glacio-hydrological flood forecasting, insufficient risk assessment and a lack of disaster risk management preparedness, results in a setting where the country is ill-prepared to assess, identify, and manage potentially catastrophic GLOF events. No explicit early warning systems are in place to alert downstream vulnerable communities and these communities are in need of better levels of awareness of the inherent risk of glacial lakes.

The project has as **goal**:

- To enhance adaptive capacity to prevent climate change-induced GLOF disasters in Pakistan.

The **overall (or immediate) objective** of the project is:

- To reduce climate change-induced risks of Glacial Lake Outburst Floods (GLOFs) in Gilgit-Baltistan and Chitral.

The **development objectives** of the project are**:**

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

Baseline indicators
The baseline indicators have been framed in the logical framework of the project document (2011) and these were slightly revised and amended in the inception report of November 2011. In general, the baseline indicators are very straight forward, as for most indicators information is absent, is lacking, is not available, is not existent or very limited. This is consistent with the rationale of the project that there is a considerable knowledge gap, which the project intends to fill, or at least tries to contribute to the build-up of a science-based knowledge system.

Main stakeholders and their roles

Climate Change Division: Initially the Ministry of Environment of the Government of Pakistan was the lead implementing agency, but after its devolution in 2011, this task has been taken over by the present Climate Change Division under the Cabinet Secretariat of the Prime Minister. The National Project Director is also directly affiliated with the Climate Change Division. The Climate Change Division Secretary is Chair of the Project Steering Committee (PSC) and the Division has the clear technical mandate related to climate change and adaptation strategies, including knowledge of the international developments and networks related to climate change.

Pakistan Meteorological Department (PMD)
The Pakistan Meteorological Department is a key partner of the project as it is in charge of a double research agenda with two activities:

1. Updating the GLOF Inventory of Northern Pakistan, and
2. The Establishment of community-based Early Warning Systems in Bagrot and Bindogol Valleys.

PMD is collaborating with a series of sub-contractors to carry out these two distinct tasks, amongst others: FOCUS Humanitarian Assistance for Hazard, Vulnerability and Risk assessments, the University of Peshawar (NCEG) for specialized geological and geophysical investigations, and the National Agricultural Research Council (NARC) for specific Remote Sensing and GIS tasks.

University of Peshawar (NCEG)
The National Center of Excellence of Geology of the University of Peshawar is assisting PMD in carrying out specific geological and geophysical investigations in the pilot areas to establish mass balances of glaciers and to locate potential hazardous en-glacial lakes with ground penetrating radar (GPR).

FOCUS Humanitarian Assistance
FOCUS Humanitarian Assistance is a local NGO in Northern-Pakistan with a broad experience with community-based development activities. As a sub-contractor for PMD, FOCUS is carrying out for Hazard, Vulnerability and Risk assessments of the pilot areas. These participatory assessments result in hazard and vulnerability maps of Bagrot and Bindogol Valleys, essential for the identification of preferred locations of adaptation structures along the river beds.

CBOs
Community-based organizations, such as the Dubani Development Organization in Gilgit-Baltistan, are key partners for the project, as they represent the local communities and facilitate the planning and implementation of project activities in the pilot areas. In Gilgit, the Dubani Development Organization (DDO), forms an existing grassroots group and a logical local project partner. In Chitral a new CBO was formed, representing all local household, and functioning as the community-based disaster management committee.

District authorities
The district authorities of the pilot area are closely involved with project activities through the district administration (District Deputy Commissioner and District Coordination Officer) and the district disaster management authority (DDMA). The district authorities are key partners in the consultation process to incorporate GLOF hazard as a critical element into multi-hazard DRM planning. In the communication flow for the EWSs they are essential for a smooth flow of command. District C&W Department engineers are involved in the quality assurance and monitoring of the ongoing construction activities of the climate change adaptation structures.

Provincial authorities

The provincial authorities of Gilgit-Baltistan and Khyber-Pakhtunkhwa provinces are together with the district authorities in these provinces active partners of the project. The incorporation of the provincial administration is essential for the development of the multi-hazard DRM set-up, with an effective information flow from communities via districts to provincial authorities. The provincial authorities show a keen interest in the project as GLOF as a serious hazard is not only limited to the present project sites and districts, but a threat to various districts in the provinces. The Provincial Disaster Management Authorities (PDMAs) are logical partners in further development, planning and testing of a multi-hazard approach, incorporating GLOF and EWSs.

UNDP

UNDP Pakistan Office provides technical and financial implementation support to the project and assists in monitoring of project implementation. Through its global network it is able to mobilize and coordinate support from other regional partners. UNDP is responsible for reporting to the Adaptation Fund and has been proactive in the project formulation and project inception phases. UNDP has also facilitated cost-effective procurement of technical hydro-meteorological equipment through its global base of preferred suppliers.

Expected Results

The expected **outcomes** of the GLOF project are:

1. Strengthened Institutional capacities to implement policies, plans and investments that prevent human and material losses from GLOF events in vulnerable areas of Northern Pakistan.
2. Improved access of disaster management planners and policy makers to knowledge, information and research on GLOF risks.
3. Reduced human and material losses in vulnerable communities in the Northern areas of Pakistan through GLOF early warnings and other adaptation measures.
4. Project experiences documented and replicated.

To realize these four expected outcomes the project has formulated nine **outputs** linked to these four outcome areas:

1.1. Policy framework and guidelines to address GLOF risks in northern Pakistan in recommended.
1.2. Indicators and criteria for GLOF vulnerability developed and systematically applied to enable priority allocation of risk reduction efforts and investments.
2.1. Systematic engagement with global and regional research networks and centers working on GLOF issues.
2.2. Risk and hazard maps for mountain valleys with the highest GLOF risk and exposure of lives, livelihoods and infrastructure.
3.1. Preparedness actions for vulnerable communities conducted to reduce risks from GLOF events.
3.2. A community based system for GLOF risk monitoring & early warning established in priority communities.
3.3. Targeted GLOF risk reduction measures such as check dams, spill-ways, slope stabilization or controlled drainage established in Bagrot and Drongagh valleys.
4.1. Technical knowledge and project lessons documented for use in future initiatives.
4.2. Project experiences disseminated to policy makers and disaster management planners in Pakistan and the wider HKH region.

3. Findings

In this Chapter the project status is assessed, based on the information gathered from the review of project documentation and direct interaction with the key stakeholders of at national, provincial, distract and community level. The status assessment is carried out by making use of the OECD-DAC evaluation criteria and appraises the following:

- To what extent has the project been able to make progress towards the expected result?
- How relevant and effective is the project design and the formulated strategy?
- Has the project been able to effectively plan its activities, monitor and report implementation progress and signal and adapt to emerging issues and challenges?
- How effective have been the management arrangements?

3.1 Progress towards Results

3.1.1 Project design

A valid situation analysis

The project design is based on a situation analysis in which global climate change trends are reflected regionally in a rise in temperatures and an increase in precipitation resulting in generally receding glaciers and higher melting rates. The occurrence of numerous potentially hazardous lakes coincides with a historic record of various GLOF events in Northern Pakistan over the last centuries. Another important factor that builds the rationale of the project design is the critical gap in scientific baseline knowledge in Pakistan regarding glacier development, hydrological forecasting and a general lack of monitoring of glacial lakes combined with an unprepared disaster management prevention/management system without early warning systems for the exposed mountain communities, who are very vulnerable to potentially catastrophic GLOF events. This situation analysis is considered very valid and the project strategy is aimed at addressing these identified problems systematically.

Some new assumptions

Some recent scientific publications, such as Hewitt (2005), Bolch et al. (2012), Gardelle (2012), Kääb et al. (2012), discuss the so-called "Karakoram Anomaly", which reflects a positive mass balance for (some of) the glacier in Northern Pakistan. This expansion of the ice mass is deviating from the trends in the Central and Eastern Himalayas with more outspoken negative mass balances. The "Karakoram Anomaly" is possibly explained by the effect of the "Westerlies", bringing increased precipitation to the Western Himalayas, which even with higher trending temperatures result in net mass gains. These studies however are mostly based on remote sensing analysis and require additional field verification and further research. All in all, a heterogeneous and complex picture emerges with higher temperatures and higher precipitation coupled with more glacial lakes and apparently partly positive mass balances. These new assumptions are important to incorporate in the scientific research the project supports, especially the updated inventory of glacial lakes in Northern Pakistan. Thisreemphasizes how little is known about the glaciology of Northern Pakistan and the need to fill this knowledge gap.

A unique project

It is acknowledged that the GLOF project is a unique project for Pakistan as it is the first project funded by the Adaptation Fund and also the first project that tackles the issue of GLOF. As the project therefore

ventures into new territories piloting and trial and error is needed to build up knowledge and awareness.

3.1.2 Project Strategy and Relevance

The project strategy is aimed at reducing climate change induced risks and vulnerabilities from GLOFs in the Northern Areas of Pakistan by encouraging community based adaptation measure from climate-induced GLOFs. The project is consisting of four complementary Components:

1. Policy recommendations and institutional strengthening to prevent climate change induced GLOF events in Northern Pakistan.
2. Strengthening Knowledge and Information about GLOF risk in Northern Pakistan
3. Demonstration of Community-Based GLOF risk management in vulnerable mountain valleys of Northern Pakistan, and
4. Documentation, analysis and continued application of lessons learnt

The strategy is considered to be **relevant, necessary and gap-filling**. It tries to address the critical knowledge gap that exists, with **very limited baseline information** on glacial development and identification of hazardous glacial lakes, while at the same time strengthening institutions and the regulatory framework related to GLOF risk. The project is community-based, through its pilot areas in Gilgit and Chitral, enabling to build experience with bottom-up awareness raising and participatory planning and implementation of interventions aimed at GLOF risk and vulnerability reduction. The project strategy is also considered **ambitious**, as a lot of knowledge needs to be build and gathered in a relatively short time span on a subject that is new and relatively unknown to the scientific community in the country and to local and regional administrations. The focus on two selected pilot areas is considered to be justified as this limits the geographic scope and reduces the ambition level, but offers ample opportunity to pilot and learn from pilot sites with specific characteristics. The selection of these two pilot areas has caused some debate, as other areas could have been considered or chosen. In the context of piloting and gaining knowledge, the selection , as made in the design phase, can be understood, although a proper documentation of selection criteria of these sites is not known to the evaluation team.

The chosen project strategy is considered to be effective as there is a clear focus on human resource capacity building and there are very few alternative options available due to the general lack in science base. Comparable GLOF projects in Nepal and Bhutan could benefit from a considerable research history into specific conditions of hazardous lakes and related glaciers, e.g. the Tsho Rolpa mitigation case from Rolwaling Himal, Nepal and the Lunana mitigation cases (Rapstreng Tsho and Thorthormi Thso) from Bhutan. These projects could focus on mitigation efforts at source, trying to lower the glacial lake levels, making use of extensive scientific investigations into moraine stability and weighing of effective mitigation options. Although the project has left open the option for mitigation at source, e.g. by lowering an existing spillway, it has chosen to focus on mitigation interventions more downstream to reduce the vulnerability of exposed communities. Considering the limited information available about the specific glacial lake and moraine conditions, this seems a sensible approach.

The project strategy and design seems to be in sync with the present country priorities. The mandate of the Climate Change Division is to focus on interventions to limit the negative impacts of projected climate change by adaptation measures of local vulnerable communities. The recent extreme flood events in Pakistan in 2010, originating from the Upper Indus Basin and causing extensive damage in the mountain valleys and catastrophic floods in the downstream alluvial plains, has reaffirmed the pressing need to be prepared for extreme flood events, and to build awareness and local and regional capacities in the field of disaster management and early warning to limit loss of human lives and damage to infrastructure. In a broader context, it is also widely accepted that the project strategy to

invest in awareness building and preparedness combined with adaptation and mitigation interventions, is more cost-effective than to fund post-disaster rehabilitation efforts.

3.1.3 Base line data evaluation

As stated before, the existing base line information is very limited, and most of the project intervention contribute to build a better knowledge base and fill existing gaps. The project therefore contributes to kick-starting the build-up of a credible science-base. During the evaluation mission some slight revisions or rephrasing of set targets was discussed to make some targets more realistic and attainable. These minor revisions are included in the following overview of progress divided over the various outputs.

3.1.4 Progress Overview per Output

To assess to what extent the project been able to make progress towards the expected results, the logical framework has been used to mark the progress against the baseline indicators and set targets. For each of the project Components outcome areas have been defined with specific expected outputs, as presented in Chapter 2. In the following sections progress is evaluated for each of the defined outputs.

GOAL	BASELINE	TARGET	VERIFICATION SOURCE

A Disaster Reduction Management plan is compiled for Chitral and is being drafted for Gilgit. At District level multi-hazard DRM plans are being developed. For the project year 2014 a review of the national Disaster Management Act is planned. The ambition level for this output has been

Output 1.1: Policy recommendations and guidelines to address GLOF risks in northern Pakistan institutionalized	• Climate change risks are mentioned in the current Task Force on Climate Change (TFCC) report • No comprehensive disaster management guidelines addressing GLOF exist for the Gilgit-Baltistan and Chitral regions	• By the end of the project, a Disaster Management Act is formulated that incorporates GLOF and other climate risk issues **Review planned in 2014** • By the end of the project, existing DRM guidelines integrate longer-term climate change risk planning **Chitral DRM plan exists** **Gilgit DRM plan being drafted** **Valley DRM plan being drafted**	• Review of Disaster Management Act, DRM policies, plans, and institutional structures

reduced during the inception phase, as it was deemed too ambitious for the project to be able to effectively influence and formulate a new policy and/or act. The project now focuses on recommending the government on changes in the existing regulatory framework, based on the pilot area experiences.

GOAL	BASELINE	TARGET	VERIFICATION SOURCE
Output 1.2 Indicators and criteria for GLOF vulnerability developed and systematically applied to enable priority allocation of risk reduction efforts and investments	• No comprehensive database and action plans exist for addressing GLOF risk in Pakistan	• By year 1 of the project, all GLOF risk sites in Pakistan are identified and inventoried in a central, web-based GLOF risk database **PMD Inventory drafted** **Ground truthing in 2014** • By the end of the project, a comprehensive disaster risk reduction plan is available to address the biggest GLOF threats in the most vulnerable communities **Action plan to be developed**	• GLOF risk database, • Satellite imagery • Action plan document

PMD has drafted an Updated Inventory of Glacial Lakes for Northern Pakistan, based on Landsat RS imagery of 2010. The preliminary results indicate an increase of the number of lakes from 2420 in 2001 to 3044 in 2010. The number of potentially hazardous lakes has reduced from 52 in 2001 to 36 in 2010. The final reports of this inventory need to be finalized and published accordingly. PMD indicates that for the updated inventory a comparable methodology has been followed as applied for the ICIMOD report on the 2001 imagery. This assures in principle a sound and transparent base for comparison of the inventory results. Essentially, these RS-based results should be ground truthed in the field, which is planned for the summer season of 2014. Focus should be put on those sites, indicated as potentially hazardous lakes, with larger pro-glacial lakes.

Based on the final inventory and the related ground trothing campaign, an action plan needs to be developed, mapping out those lakes that are considered to have the highest priority for further research and potential mitigation interventions.

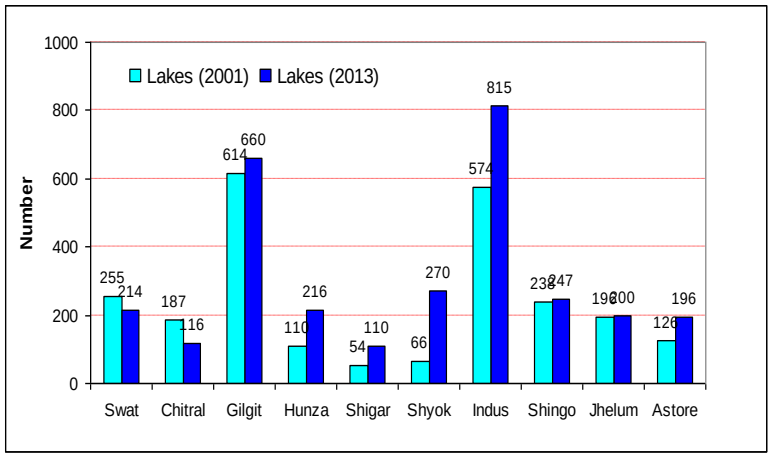


Figure 1 Overview of number of glacial lakes in the surveys of the imagery of 2001 and 2010,

Source, PMD (2013)

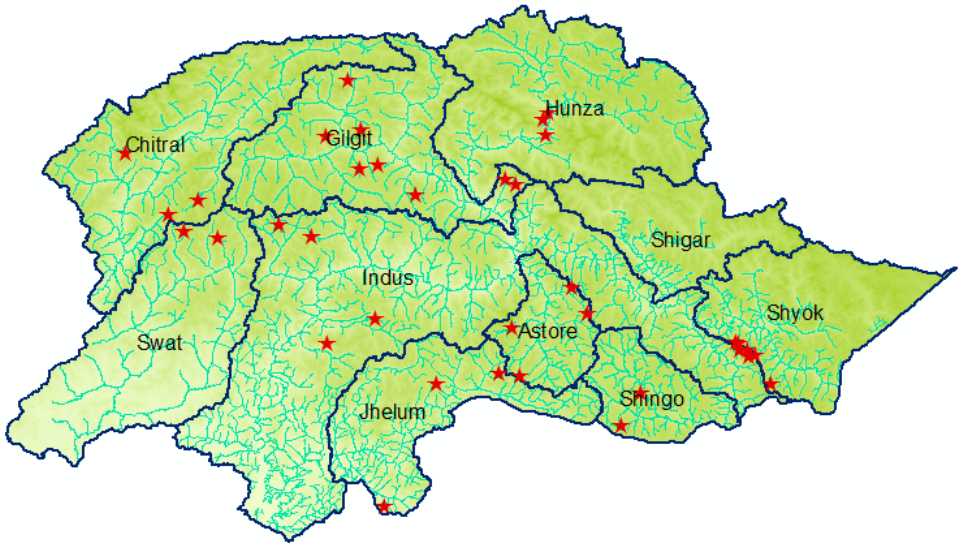


Figure 2 Overview map of Northern Pakistan with location of potentially hazardous lakes, based on the 2010 imagery, Source: PMD (2013).

GOAL	BASELINE	TARGET	VERIFICATION SOURCE
Output 2.1 Systematic engagement of the project with global and regional research networks and centres working on GLOF issues	• Regional platform established by the regional GLOF risk reduction project, with punctual interaction until the project has ended	• By the end of year 2, **at least 10** other GLOF risk reduction initiatives from other countries are analyzed to inform risk assessment and –planning under the proposed project **Too ambitious: 3 initiatives analyzed** • Regional platform established by the regional GLOF risk reduction project, with punctual interaction **No actual platform created** **International Conference in Nepal visited**	• Comparative analysis report • MoUs / agreements • Website linkages • International conference

The project has analyzed 3 GLOF risk reduction initiatives to learn from and infuse practices in the project activities. The set target of 10 initiatives is considered too ambitious and reduced to 3. The regional platform referred to of the former regional UNDP-BCRP GLOF project has actually not been created and can therefore not be linked to. The website of the project will have a link to the Updated Inventory of PMD. One international GLOF conference was visited in Nepal, but there remains ample scope for more regional knowledge exchange, in particular for these project partners that are actively implementing project interventions.

GOAL	BASELINE	TARGET	VERIFICATION SOURCE
Output 2.2 Risk and hazard maps for mountain valleys with the highest GLOF risk and exposure of lives, livelihoods and infrastructure	• No comprehensive risk and vulnerability maps for mountain valleys with highest GLOF risks available	• By year 1, all GLOF risk areas in Pakistan are covered by remote sensing information **Updated Inventory of GLOF risk areas Draft** • By year 2, GLOF specific simulation models for at least 2 GLOF prone mountain valleys are developed **Simulation models to be tested in 2014** • By year 2, at least 2 GLOF-prone mountain valleys are analyzed by a detailed hazard zonation and vulnerability assessment **HRVA maps for 2 valleys**	• Hazard maps √ • Vulnerability maps **1/2** • Risk maps **X**

The Updated Glacial Lake Inventory is discussed under Output 1.2. The Inventory needs to be finalized after ground trothing and published accordingly. The simulation models, to test flood wave propagation through the GLOF prone mountain valleys is scheduled for 2014. The project is advised to consult the Bhutan GLOF project on their experiences with flood wave modelling. The simulation models need to be compared with the hazard and vulnerability maps of the participatory mapping exercise for the pilot areas to validate these maps and verify the model run results. Hazard maps for the pilot areas are drafted, but need to be finalized and published with a complimentary full methodological report. There is still scope for improvement of the draft hazard maps with regards to readability and uniformity (e.g., hazard classes are different and not uniform and hatching used should preferably be transparent for better map readability). The project is also advised to look at regional best practices for hazard mapping, e.g., the detailed hazard maps produced for Punakha and Bumthang Valleys by the Bhutan UNDP GLOF project.

The hazard maps are partly combined with indication of vulnerable areas and suggested mitigation intervention/structures. Individual hazard maps have been compiled and on these maps vulnerable areas have been indicated, but not reflected in separate vulnerability maps. Risk maps have not been prepared and can only be produced as a result of the combination of the hazard and vulnerability inventories.

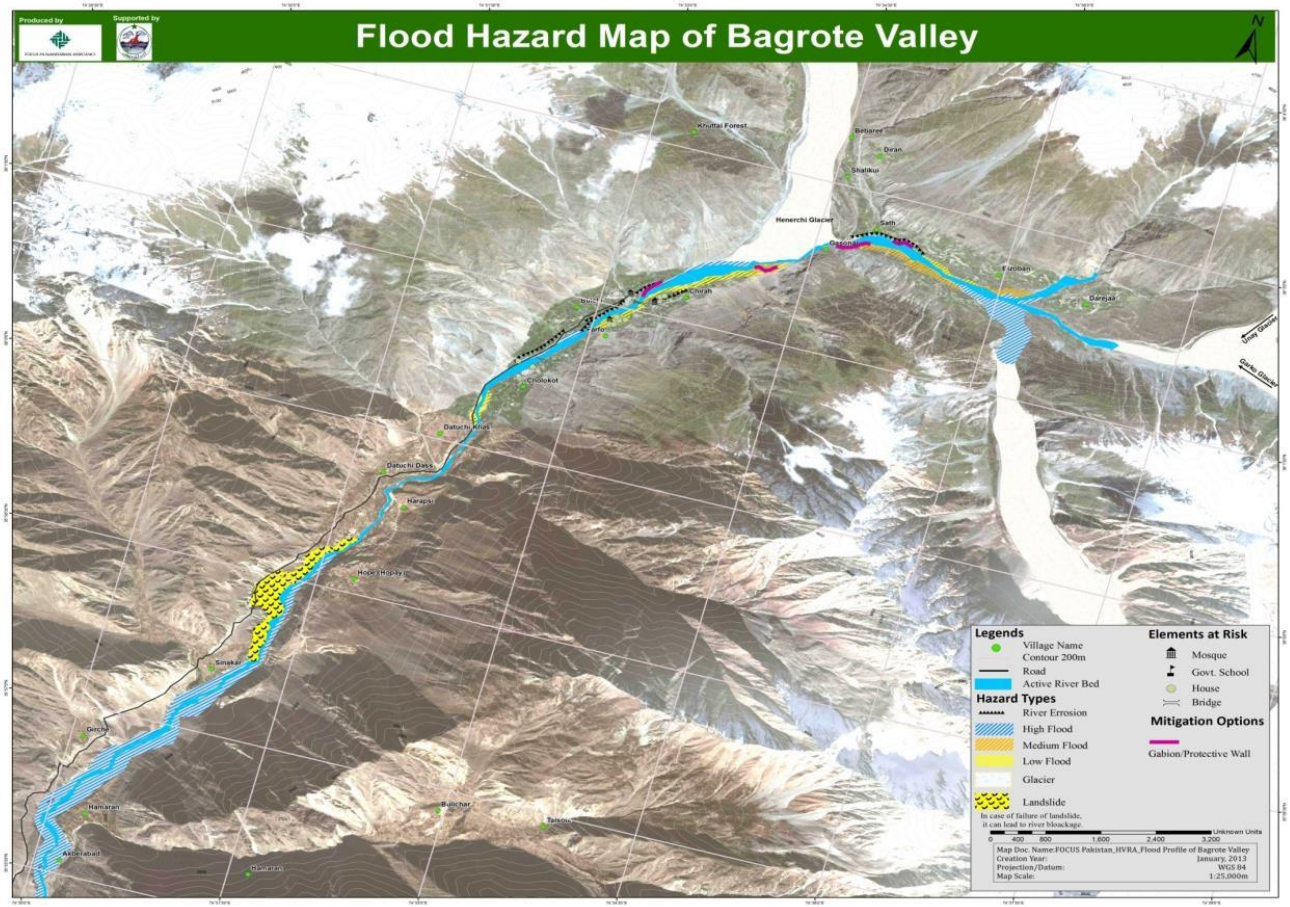


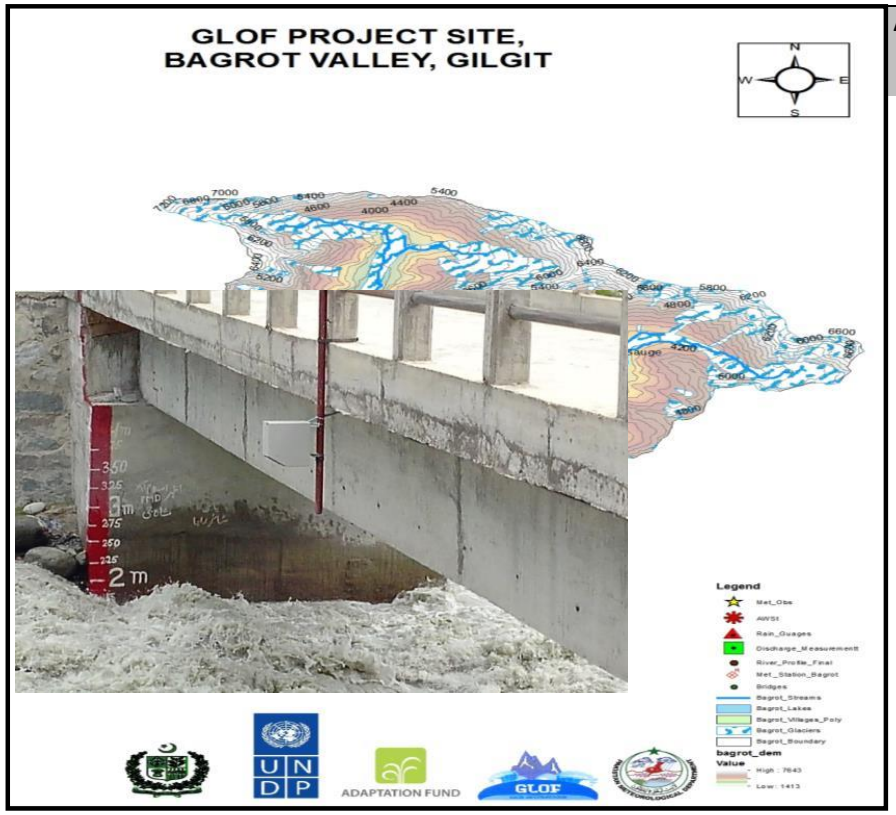
Figure 3 Draft (GLOF) Flood Hazard map of Bagrote Valley as produced by FOCUS, 2013

GOAL	BASELINE	TARGET	VERIFICATION SOURCE
Output 3.1 Preparedness actions for vulnerable communities conducted to reduce risks from GLOF events	• Limited awareness by vulnerable communities in the Gilgit-Baltistan and Chitral valleys on GLOF risks and risk reduction measures	• By the end of the project, at least 90% of households **in the target area** are aware of the functionality of the GLOF EWS and able to respond to warning signals **"vulnerable areas of the target sites"** **90% sensitized, awareness raised, consulted and trained** • By the end of the project, at least 2 full-scale GLOF early warning drills have been conducted, involving all households in the target communities **Drills scheduled after completion of EWS**	• QBS • Video of mock drills, simulation protocol • Debriefing notes **CB-DRM Plan** **Indigenous EWS** **SOPs:** • **IEWS** • **EWS** • **DRM plan**

For output 3.1 it is suggested, after discussions with the PMU team, to rephrase the target indicator from "By the end of the project, at least 90% of households **in the target area**…" to "By the end of the project, at least 90% of households in **the vulnerable areas of the target sites**….".
The project has reached the target level through a series of awareness and sensitization campaigns and trainings on GLOF and multi-hazards/DRM, combined with the formation of the community-based DRM Committee. These committees have been actively consulted and engaged in the drafting of the CB-DRM plans for the pilot areas, combined with the formation of hazard watch groups and support to the indigenous Early Warning System. The EWS is being installed and SOPs for both EWSs and the DRM plan need to be finalized.

GOAL	BASELINE	TARGET	VERIFICATION SOURCE
Output 3.2 A community based system for GLOF risk monitoring & early warning in priority communities	• No GLOF early warning system for Bagrot and Drongagh valleys in place • Vulnerable households are not able to receive and react to GLOF early warning messages	• By the end of the project, 90% of households **in each target valley** are able to receive and respond to GLOF early warning signals and take the appropriate actions following the warning. **After EWS completion** • By the end of the project , at least 2 CBOs are trained in the operation and maintenance of the EWS and ensure its continued functionality **Ongoing** • A special watch group for each GLOF prone valley will be formed to establish a new or to strengthen an existing EWS **9 Gilgit + 4 Chitral** **CB hazard watch groups**	• QBS with households • Mock drill protocols • Field visits to EWS sensor, relay and communication sites • GLOF watch group meeting attendance and note for records **Strengthened** **Equipped** **Trained**

As indicated for Output 3.1, the wordings for the target indicator are rephrased from **"in each target valley"** to **"in the vulnerable areas of the target sites"**.
The EWS for both pilot valleys is being installed, but is awaiting the installation of the communication equipment and additional water level sensors. The system needs to be tested in 2014 and threshold values for alert and alarm levels need to be set and fine-tuned. It is discussed with the staff of PMD to critically reassess the location of the water level sensor to a more upstream location, in order to pick up as early as possible any abrupt change in water level (drop or rise) to maximize the lead time for evacuation in the downstream communities. The present sonar based discharge measurement equipment (see Figure 5)are relatively vulnerable to flood waves: it is suggested to consider a constellation with a bubbler connected by tube to the data logger/communication equipment, located in a relatively high and safe location.
Multi-hazard watch groups have been formed (9 in Gilgit and 4 in Chitral) and trained and equipped with essential communication equipment.
Mock drills of the EWS have to be conducted as soon as the EWS is functional and threshold levels have been set and tested.



ARGET	VERIFICATION SOURCE

Figure 4 The EWS set-up for Bagrot Valley. It is suggested to reassess the location of an additional water level sensor more upstream (the red oval indicates a possible site near the upstream confluence) to pick up any flood signal as early a possible to maximixe lead time for action downstream. Source: PMD 2013.

Figure 5 The water level sensor (discharge measurement) attached to a low bridge. It is suggested to reassess the robustness of such equipment for GLOF EWS purposes. In case of a GLOF the sensor will be destroyed: an alternative might be considered, such as a conventional bubbler with a tube connection to the data logger/communication equipment, located in a safe location. Source: PMD presentation to the MTE team, 2014.

The project has started the construction of what is named Climate Change Adaptation Structures in both pilot areas. These engineering structures are aimed at reduction of the vulnerabilities of the exposed communities, based on a participatory consultation process in which the communities have indicated, based on local knowledge, the most vulnerable locations along the river alignment for flash floods. The project has therefore chosen to target mitigation of flood hazard downstream, close to the communities, instead of mitigation at source through drainage of the hazardous glacial lakes. From an initial long list of potential structure sites a limited number of sites was prioritized and designs were made by a consultant. These designs were discussed

Output 3.3 Targeted GLOF risk reduction measures such as check dams, spill-ways, slope stabilization or controlled drainage established in Bagrot and Drongagh valleys	• No risk reduction measures for GLOF in place in the target sites	• By the end of the project, concrete engineering measures are in place to reduce the impact of GLOF events on vulnerable communities in each target valley (as appropriate: effective drainage systems, check dams, mini dams, ponds, spill ways, slope stabilization, tree plantation, controlled drainage) **Gilgit:** **4 gabion walls** **1 path clearance** **Chitral:** **4 gabion walls** **1 river diversion**	• Field visits to engineering structures • Structural designs • Completion drawings **Draft design** **Feedback of experts** **Monitoring by Exec. Engineer**

and amended after feedback of experts and the PSC. District engineers are involved in oversight and monitoring of the merging structures. The appropriateness (dimensioning, location, effectiveness) of the structures has to proof itself over time. The communities express that they feel now safer with the structures in place and that their vulnerability to extreme food levels is now reduced. A catastrophic GLOF event is often capable of enormous erosive action and mobilization of enormous volumes of loose deposits. This might cause undercutting of the steep alluvial incisions and damage the structures. Additionally, the project is testing path clearance (river bed clearance) and river diversion works as alternatives to restore the river path to its original thread and reduce future negative impact of peak flood levels. The effect of these interventions has to proof itself over time and potential negative impacts downstream and to the other river side have to be monitored.

Figure 6 Climate Change Adaptation structures as constructed to reduce the vulnerability of the exposed communities. Note the construction of gabion walls both at the foot slope, aimed at resisting

erosive power and undercutting, and at the top of the incision to withstand peak flood water levels. Source: PMU presentation, Chitral, 2014.

GOAL	BASELINE	TARGET	VERIFICATION SOURCE
Output 4.1 Technical knowledge and project lessons documented for use in future initiatives	• Inadequate technical papers capturing project knowledge available • Inaccessibility to maps, reports, remote imagery and case studies	• By the end of the project, all technical decisions and lessons are captured in dedicated reports **IN PROCESS** • By the end of the project, a GLOF risk reduction manual is available and disseminated both nationally and internationally **Published** • By year 2 of the project, a project website is established and linked to the GLOF risk database developed under Outcome 1 www.glof.pk http://www.drmc.pk/ www.dubanibagrote.org	• Technical briefs prepared by the project **1/2** • Manual **1/2** • Project website / minus link to GIS data base

Field Code Changed

Field Code Changed

The project has commissioned and published a relatively large number of studies (22 reports as listed in Annex 6) on subjects directly or indirectly related to GLOF. Many of these studies contain valuable information and help to build the knowledge base on GLOF hazard in Pakistan. It is suggested to assure the quality of these project outputs by additional reviewing and editing. The present lack of manpower of the PMU limits the ability to critically review the studies, added by the absence of experts with specific GLOF knowledge in the country. It has been discussed with the PM to publish a series of reports with a uniform layout and format to enhance the visibility and outreach of the project. The MTE commends the planned addition to PMU of an officer for documentation and monitoring, who could assist in this quality control and dissemination task. This will become an important area of interest for the project in the remaining 2 years of implementation.

The project has a functional website, which can serve as a knowledge repository on GLOF related information for Pakistan. As soon as the Updated Glacial Lake Inventory is finalized, it should be inked to the website. It is commendable that both pilot areas have a functional website with information on the activities in the pilot areas.

GOAL	BASELINE	TARGET	VERIFICATION SOURCE
Output 4.2 Project experiences disseminated to policy makers and disaster management planners in Pakistan and the wider HKH region.	• No systematic knowledge transfer on GLOF risks from Pakistan to other countries	• By the end of the project, at least 1 international exchange visit between GLOF risk reduction projects has taken place **To be planned urgently** • By the end of the project, DRM planning authorities of at least 3 GLOF-prone districts in Pakistan visit the target sites with a view on replication of the project approach in other vulnerable sites **GLOF School: 2014-2015** • By the end of the project, at least 2 project dissemination workshops have been conducted in Pakistan, with attendance by stakeholders from all GLOF-prone districts **7 WS on awareness raising organized** **2 provincial WS planned +** **1 national WS planned** **1 international GLOF WS planned**	• Study visit report • Site visits, consultation protocols • Workshop proceedings

Output 4.2 will become more central in the last phase of the project as project experiences and best practices are documented and can be shared. The MTE team recommends the project to urgently organize a visit of the PMD staff involved with the set-up of the EWS to the Bhutan GLOF project to see a high-tech functional GLOF EWS, visit the CB DRM approach and GLOF hazard mapping examples. This will be very valuable for the PMD staff presently involved with the EWS set-up and drafting and fine-tuning of the SOP. Another exchange visit should be targeting a broader selection of the main stakeholders with representatives from PMU, CBOs, district and provincial authorities and national stakeholders. The inception report details plans for a so-called GLOF school. This is seen as a good format to demonstrate the GLOF project interventions to interested stakeholders and the two pilot sites could thus start functioning as demonstration sites and help to illustrate the scaling-up potential of the various project interventions. As the project advances in documenting its experiences, key learning
and best practices dissemination of these findings can be the topic of the various planned workshops.

Based on the achieved outputs the project is making credible progress to attaining its objectives. For most of the outputs set targets are being met or are being achieved. It has to be noted that these outputs are just emerging and yet have to turn into real outcomes. Therefore, it is too early to claim any real impact after two years of project implementation. Early outputs in the fields of sensitization, awareness raising, CB DRM, linkage to local authorities and emerging climate change adaptation structures are acknowledged, but have to proof themselves over time. Attention is raised to the fact that the project needs to focus on further documentation and consolidation of the various reports commissioned by the project.

3.1.5 Cross-cutting issues: gender and livelihoods / social impact

The project has an outspoken focus on building the GLOF knowledge base and building awareness and capacity to manage GLOF hazard and risk. It has only a very limited scope for specific interventions for livelihood support and the first two annual work plans do not contain livelihood support activities. During the consultative meetings there was a call for broader livelihood support for the communities in the pilot areas, e.g., support to the critical irrigation system. The project document does not describe such targeted livelihood interventions, but the project and its stakeholders might consider limited irrigation rehabilitation works if these can fit in with the climate change adaptation structures construction effort. The labour compensation paid for the construction of the structures provides a cash contribution to the households involved and will be beneficial for their livelihood, considering that cash generating opportunities will be relative limited in these rural communities. Some communities reported that the skills learned through the project training and construction facilitates them in getting construction work outside of the community. The community representatives expressed that the project has paid attention and invested in including women in the consultation process for the CB DRM plans with targeted training and sensitization of women. Also in the following compilation women have been included purposely and they are represented in the village DRM committees.

The community representatives expressed their increased sense of safety after the construction of the adaptation structures. They also indicated an increase in social bonding and empowerment through the participatory DRM planning and establishment of the DRM committee and related hazard watch groups. The recognition of local indigenous technical knowledge through the hazard watch groups and the participatory consultation process is also appreciated.

Catalyzing potential of the project

The evaluation team acknowledges the good catalysing potential of the project to kick start through its activities follow-up research and/or projects related to GLOF. As the project is in many ways doing ground breaking work, it is anticipated that geographic scaling-up and thematic replication could spin off after project end.

Although the project has its core focus on GLOF hazard, there is a valuable contribution to broader multi-hazard DRM planning and related risk reduction and vulnerability reduction. Even if GLOF events were not to happen in the near future, flash floods will occur in the highly dynamic mountain environment of Northern Pakistan and the communities and local communities will be better prepared for these potentially catastrophic events. The experience being built with the multi-hazard DRM planning process at district level could generate best practices with good replication potential to other districts and provinces in Pakistan.

The current knowledge building on GLOF hazard will be critical in view of future downstream hydropower development. Any larger hydropower facility development will have to consider in its design and operation the real risk of being confronted with catastrophic floods. With a very high percentage of its river discharge originating from melt (over 80%) any better understanding of GLOF events and related risk reduction will be valuable. The Bhutan GLOF project is a good example where

ongoing construction of large hydropower facilities in GLOF prone basins needs to take GLOF hazard very seriously, including critical linkage to a state-of-the-art EWS.

Adverse environmental/social impacts
Without site confirmation, it is difficult to assess any negative environmental or social impact of the project interventions. The path clearing and river diversion works need to be carefully monitored for any adverse impact downstream. As the project is not working on mitigation of the glacial lakes at source, there is less concern for the potential of a man-induced GLOF event.

Inclusiveness
The consultation meetings with the representatives from the pilot areas made clear that the project makes use of a grassroots bottom-up participatory approach with committed CBOs and local NGOs and engaged district and provincial authorities. It is suggested that the project keeps track of the participation of men and women in trainings and the consultation process and records, where possible, participation of vulnerable groups (poorest, single-headed households etc.).

The choice of national-level partners is understood as logic, as there is limited choice of institutions with experience and technical skills related to GLOF, in line with the existing knowledge gap. The partners are however not comprehensive, but the evaluation team understands that in the project setting one cannot include all possible partners.

Based on these observations the progress of the project towards results is assessed as: Satisfactory (S)

3.2 Adaptive Management

3.2.1 Work Planning
The planning process of the project is assessed as satisfactory based on the fact that delivery rate is good (for year 1 and year 2 well over 80%, which is remarkable) and the process is participatory and inclusive. Stakeholders are included in the planning process, covering the pilot areas and the communities and local authorities and the Project Steering Committee is giving feedback and endorsing the annual work plans. It is suggested to consolidate the results of the annual work plans into the log frame to take stock of a total compilation of progress, not limited to single planning year cycles. This will ensure a better result-based planning process and help to better identify existing gaps.

Challenges
Right from the start, the project has faced a series of challenges and logistical issues. The initially planned start of the project, April 2011, had to be postponed with six months to November 2011, caused by the devolution of the former Ministry of Environment due to the 18th constitutional amendment of June 2011. During the first two years of implementation the project has had five different national project directors. These rapid changes have had a negative impact through loss of momentum and institutional knowledge and led to administrative delays as the NPD has to sanction any project disbursement and formal decision.

The limited working season in the high-altitude mountain pilot areas is another constraining factor, forcing the project to plan a number of activities in a short time period with limited flexibility. The remoteness of the pilot areas, with relatively poor access, especially in winter with snow cover and in summer with landslides and floods, forms another logistical challenge. In practice, the project can work in the field from April to October/November. Access to high-altitude sites is even more limited from

late June to September. The poor security conditions limit the accessibility of the pilot areas as access is restricted over certain periods, as witnessed by the evaluation team.

3.2.2 Finance and co-finance

The budget consumption over the first two years is reflected in Table 1, as provided by the PMU. The delivery rate of the project, well over 80% for both years, is remarkable, certainly considering the series of constrains the project had to face.

Table 1 Overall Budget Consumption (Source: PMU, 2014)

Pakistan GLOF Project Overall Budget Consumption Report (USD)				
Financial Year	**Planned Budget**	**Budget Consumed**	**Balance**	**Delivery %**
2011	**n.a**	**34,385**	**4,065,615**	**n.a.**
2012	**1,111,582**	**1,014,328**	**3,051,287**	**91**
2013	**890,828**	**785,353**	**2,265,934**	**88,2**
2014	**1,423,186**			

By the end of 2013, the project spent US$1,834,000 of the overall budget of US$4,100,000, which is 44.7%. The evaluation team understands that no financial issues have been flagged by the regular yearly audits of the project.

The budgets for 2014 and 2015 will be higher than initially planned to compensate for the build up of balance over the first two year. The planned budget for 2014, US$1.423,186, is relatively ambitious, certainly considering the present delay of expenditure, in absence of an acting NPD. As experience has been gathered in the learning curve of the project and the communities trained, it is still considered as realistic.

The in-kind contribution of the Government of Pakistan, US$3,500,000, is considered to be ambitious for the limited project period of four year. The actual in-kind expenditure for the first two years, as estimated by the PMU, amounts to US$400,000. It is suggested to regularly update the actual in-kind contribution to keep track of the Government expenditure.

UNDP has facilitated the procurement of hydro-meteorological equipment for PMD through its global network of preferred suppliers, reducing procurement prices and time and contributes to the projects cost-effectiveness. As stated earlier, the investment in prevention and mitigation of hazard and risks is considered very cost-effective as compared to post-disaster relief efforts, and therefore assessed as sound.

The co-financing monitoring table is reflected in Annex 7.

3.2.3 Monitoring

As the project is transiting into its second phase, monitoring of implemented activities becomes more critical. The best tool for monitoring for the project management is offered by the logical framework of the project. It is suggested to make better use of the Log Frame as monitoring tool and aggregated outputs should be recorded and compared with set targets. Some targets have been, as discussed, slightly adjusted or rephrased.

The stakeholders are involved in monitoring, as illustrated by the climate change adaptation structures, which are monitored by district/provincial engineers as an example of participatory monitoring. Also the PSC acts as a monitoring body, giving essential guidance and feedback to the PMU and acting as a check-and-balance body. The budget is monitored adequately with regular external audits.

It is suggested to intensify participatory monitoring and evaluation as interventions within the communities are being completed. Targeted monitoring questionnaires will be instrumental to capture feedback of beneficiaries and to extract learning, good practices and scope for improvement of adjustments. Wherever possible, the project should try to record participation of beneficiaries in trainings and interventions according to gender.

3.2.4 Risk Management

The risks as identified in the Pro Doc are assessed to be still valid. No new risks have been identified. The main current risk is thought to be the rapid change of NPDs and related loss of momentum and administrative delays. Although this risk is real and moderate to high, its mitigation is beyond the direct scope and influence of the project management. Considering the series of challenges and logistical issues the project has to face, the risk management is certainly adequate.

3.2.5 Reporting

Project reporting is taking place through a series of reporting platforms:

- Quarterly and annual reports
- PPR to AF
- Study or technical reports on commissioned assignments
- Regular PSC meetings and proceedings
- Sensitization and awareness raising workshops of the communities in the pilot areas

The evaluation team emphasizes the need for further consolidation of project lessons and reports in the remaining project period. There is scope for a review of key lessons and a uniform project publication series to enhance dissemination of project experiences. There is a need for a strengthened focus on documentation of best practices and key learning distilled from the project.

3.3 Management arrangements

The project management forms a small team and is facing a considerable work load. Both at the PMU and in the field managers the evaluation team has met dedicated staff. Coordination is performing well, linking with the communities and district and provincial authorities, with exception of the frequent changes in the NPD. It is thought that the PMU is actually understaffed and needs reinforcement to assist the PM with technical backstopping documentation and monitoring. The evaluation team commends the intention to hire additional support staff.

Reporting by the management is sufficient, but has room for more descriptive narrative in its reporting to capture learning and best practices.

The quality assurance and overall guidance of outsourced activities (to a series of technical consultants), in particular the series of GLOF related studies and the activities undertaken by PMD and its sub-contractors, requires considerable time and attention of the project management team. It requires additional support, possibly by a regional or international resource person, to extract key lessons and enhance the quality of the project reporting. The unavailability of national experts on GLOF hampers the project management in reviewing adequately project outputs.

PMD as a key project partner has sound technical staff, but needs time to build additional expertise in new fields as glaciology/slope processes, which require time to build up sufficient technical expertise and a sound scientific base.

The overall coordination with UNDP is considered to be fine and effective.

3.4 Sustainability

With outputs starting to emerge, there is a need for targeted attention to enhance post-project permanence of impacts. Based on the series of consultations with the project partners and stakeholders the following actions are suggested:

- To draft a concise project exit-strategy, with concrete actions aimed at enhancing post-project impact. Such a strategy will support the project in developing activities that will contribute to future consolidation of impact and scaling-up and replication of activities.
- The development of a so-called PC-1, a government funded project, to build upon the project's activities, and to facilitate a more permanent funding of a government entity with a mandate for GLOF related activities.
- Targeted support to the present CBOs to enhance their post-project sustainability, e.g., through support to their funds (revolving fund establishment?).
- The creation within the government of a targeted entity for GLOF-flood EWS, to ensure long-lasting support and absorption of technical know-how within the government system.
- Other project proposals aimed at replication/duplication/scaling-up of GLOF related activities in Northern Pakistan.
- Retaining of human resource capacity built by the project.

Based on these observations the progress of the project in Adaptive Management & Management Arrangements is assessed as: Satisfactory (S)

4. Conclusions, Recommendations & Lessons

In this final Chapter a series of conclusions and recommendations is presented, based on the data analysis and findings as discussed in the previous Chapters.

4.1 Conclusions:

1. Overall project progress is in sync with planning, which is a considerable achievement considering the recurrent delays, constraints and work load the project management had to face.
2. The regular change of NPDs has had a negative impact on project implementation, momentum and continuity.
3. The project team, both at PMU and in the field offices, is dedicated and efficient, but in need of additional technical support.
4. The project has produced a considerable series of publications on GLOF and GLOF related issues, with a focus on the pilot areas, to bridge the existing knowledge gap. Quality review and assurance of these outputs is needed.
5. The local stakeholders, communities exposed and district and provincial stakeholders, are clearly engaged and committed, which has resulted in essential strengthening of local institutional linkages related to GLOF/multi-hazard DRM management.
6. PMD, as key project partner, has produced a draft updated GLOF inventory, which shows an increase of lakes and a decrease of potentially hazardous lakes. These findings need to be ground truthed, finalized and documented in consolidated reports.
7. Field verification has shown that the potentially hazardous lake in Chitral is not a pro-, supra- or en-glacial lake. It represents a recurrent temporal lake, formed by snow avalanches and mass movement materials blocking a narrow gorge downstream of the glacier tongue. The research conducted is still valuable as the ephemeral downstream lake represents a real and serious recurrent hazard with GLOF–like characteristics.
8. Climate Change Adaptation Structures represent unique trials, which have to proof their function, appropriateness and robustness over time.
9. The EWS in development needs completion and testing, particularly with reference to the location of the water level sensors and thresholds values (and SOP) and eventually drills.
10. The diversion dike for diversion of the Chitral river at Shogram Payan seems to be weak. It is felt that it may be washed away during high flood stages in summer. It is suggested that the diversion dike could be strengthened by increasing its height by 4 meters and extended up to bank on the north as soon as possible, but before monsoon season.
11. Recent GLOFs and extreme flash floods in 2010 have caused considerable secondary slope instability along the flood path ways in both Gilgit and Chitral pilot areas. The landslides are still active and a cause of concern for the local communities with regards to their safety, livelihoods and access and mobility.
12. There is still limited infusion of regional GLOF experience into project activities. There is a clear scope for better exposure to lessons learned and best practices from Bhutan and Nepal.
13. The reach of the project is beyond just the single GLOF issue: it has the potential for a real contribution to more holistic flood warning/EWS, multi-hazard DRM and downstream impact reduction (including essential information for hydropower development).
14. The project lacks at present a well-defined exit strategy to enhance post-project sustainability of impacts.

4.2 Recommendations:

The project is recommended to:

1. Hire additional technical staff to strengthen the PMU with regards to documentation and monitoring and evaluation.

2. Review, edit and publish a uniformly styled series of GLOF related reports.
3. Finalize the Updated GLOF Inventory with essential ground truthing, documentation and dissemination.
4. Compile a regular detailed break-down of in-kind government contribution.
5. Screen critically the EWSs in development for the location of water level/discharge sensors (more upstream/less exposed).
6. Test after installation the EWSs and their thresholds values, tune the SOP, and eventually train local stakeholders and compile a final SOP.
7. Consider gabion spurs as a stream controlling measure, which could be useful and economical in addition to the gabion wall applied so far.
8. Explore stabilization work of mass movement areas triggered and destabilized by recent GLOF and extreme flash flood events in both the pilot areas. Communities could be supported with bio-engineering and low-tech interventions to limit the hazard of these destabilized masses.
9. Consider alternative livelihood support to the communities through rehabilitation of damaged irrigation channel intakes and critical access points, such as suspension bridges.
10. Initiate swiftly a study visit to Bhutan to observe a functional EWS and CB-DRM and related guidelines and procedures to learn from regional best practices.
11. Formulate an exit strategy to enhance post-project sustainability: suggested elements for the strategy could include: PC-1, community maintenance, scaling-up initiatives, proposal formulation and GLOF-EWS entity creation.

4.3 Key learning / Best Practices

The evaluation teams considers the following points as key leaning generated by the project and as emerging best practices:

1. The development of Community-Based multi-hazard Disaster Risk Management approaches in an integrated combination of indigenous and high-tech Early Warning Systems.
2. The piloting with downstream mitigation structures to reduce the vulnerability of exposed mountain communities to GLOF hazard.
3. The catalysing effect on multi-hazard DRM development, connecting communities groups with district and provincial authorities.
4. Although increasing scientific attention is geared towards RS-based research of glaciers and GLOF, there is still very limited field-based knowledge of potentially hazardous lakes needed for prioritization.

Annex 1 TERMS OF REFERENCE

Mid-term Evaluation of the UNDP/AF Project

Reducing Risks and Vulnerabilities from Glacier Lake Outburst Floods in Northern Pakistan

(July 2011 – June 2015)

(GLOF - PAK/00077650)

1. INTRODUCTION

In accordance with the UNDP and AF M&E policies and procedures, a mid-term evaluation of the full size project "Reducing Risks and Vulnerabilities from Glacier Lake Outburst Floods in Northern Pakistan" implemented through the United Nations Development Programme (UNDP) is to be undertaken in 2013. The project started on July 2011 and is to end on June 2015. The project is on its 3rd year of implementation. This Terms of Reference (TOR) sets out the expectations for this mid-term review.

The essentials of the project to be evaluated are as follows:

Project Title:	**"Reducing Risks and Vulnerabilities from Glacier Lake Outburst Floods in Northern Pakistan"**			
UNDP Project ID:	4454	**Project financing**		*at MTE (Million US$)*
ATLAS Project ID:	61318	GEF financing:	$ 3,600,000	$ 3,600,000
Country:	Pakistan	IA/EA own:	$ 500,000	$ 500,000
Region:	Asia	Government:	$ 3,500,000	$ 3,500,000 (in kind)
Focal Area:	Climate Change Adaptation	Other:		
		Total co-financing:	$ 4,000,000	$ 4,000,000
Executing Agency:	Ministry of Environment, Government of Pakistan	Total Project Cost **in cash:**	$ 7,600,000	$ 7,600,000
Other Partners involved:	• Pakistan Metrological Department. • District Management • Disaster Management Authorities • Local communities	ProDoc Signature (date project began):		
			Planned closing date: May 2011	Revised closing date: Nov 2015

2. PROJECT BACKGROUND INFORMATION AND OBJECTIVES

Country Programme Action Plan

In its Country Programme Action Plan (CPAP), UNDP amongst other targets pledges to support the management of the environment and natural resources. UNDP tackles environment at two levels, one at the local level and second to respond to the global environmental challenges. UNDP-Pakistan's environment programme supports upstream policy advice at the federal and provincial levels and also keeping in view the devolved nature of development issues, on-ground activities are carried out through local institutions and communities.

Pakistan GLOF Project is a joint collaboration of the Government of Pakistan, UNDP and Adaptation Fund. The main objective of the project is to develop the human and technical capacity of public institutions and communities to understand and address immediate GLOF risks in Northern Pakistan.

As part of the result oriented monitoring & evaluation activity, UNDP Pakistan is planning to undertake an in-depth mid-term evaluation of "Reducing Risks and Vulnerabilities from Glacier Lake Outburst Floods in Northern Pakistan (GLOF)" which is under implementation since 2011. The purpose of the evaluation is to provide impartially derived first hand information on the status of the project and its effectiveness in attaining the project objectives as listed in Project Document. The findings of the evaluation allow for mid-course adjustment and will be useful for understanding the management and technical issues of the project and will specify the need for re-orientation and re-prioritizing of project activities.

To conduct the evaluation process the Mission Members will perform, but not limited to, the activities summarized for individual Members in the following sections.

Introduction to Monitoring and Evaluation Policy in UNDP/AF

The Monitoring and Evaluation (M&E) policy at the project level in UNDP/AF has four objectives:

i. to monitor and evaluate results and impacts;
ii. to provide a basis for decision making on necessary amendments and improvements;
iii. to promote accountability for resource use; and
iv. to document, provide feedback on, and disseminate lessons learned.

A mix of tools is used to ensure effective project M&E. These might be applied continuously throughout the lifetime of the project – e.g. periodic monitoring of indicators - or as specific time-bound exercises such as mid-term evaluations, audit reports and independent evaluations.

Mid-term evaluations are intended to identify potential project design problems, assess progress towards the achievement of objectives, and to make recommendations regarding

specific actions that might be taken to improve the project. It is expected to serve as a means of validating or filling the gaps in the initial assessment of relevance, effectiveness and efficiency obtained from monitoring.

PAK/00077650 – Reducing Risks and Vulnerabilities from Glacier Lake Outburst Floods in Northern Pakistan:

The project aims at reducing risks and vulnerabilities from Glacier Lake Outburst Floods and snow-melt flash floods in Northern Pakistan. The main objectives of the project are to develop the human and technical capacity of public institutions to understand and address immediate GLOF risks for vulnerable communities in Northern Pakistan and to enable vulnerable local communities in northern areas of Pakistan to better understand and respond to GLOF risks and thereby adapt to growing climate change pressures. The main objectives of the project are as follows:

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

The project components and associated outputs/outcomes are follows:

PROJECT COMPONENTS	**EXPECTED CONCRETE OUTPUTS**	**EXPECTED OUTCOMES**
1. Policy recommendations & institutional strengthening to prevent climate change induced GLOF events in northern Pakistan	1.1. Policy framework and guidelines to Address GLOF risks in northern Pakistan institutionalized 1.2. Indicators and criteria for GLOF vulnerability developed and systematically applied to enable priority allocation of risk reduction efforts and Investments	1. Strengthened Institutional capacities to implement policies, plans and investments that prevent human and material losses from GLOF events in vulnerable areas of Northern Pakistan
2. Strengthening Knowledge and Information about GLOF risks in northern Pakistan	2.1. Systematic engagement with global and regional research networks and centers working on GLOF issues 2.2. Risk and hazard maps for mountain valleys with the highest GLOF risk and exposure of lives, livelihoods and infrastructure	2. Improved access of Disaster management planners and policy makers to knowledge, information and research on GLOF risks
3. Demonstration of community-based GLOF risk management in	3.1. Preparedness actions for vulnerable communities conducted to reduce risks from GLOF events	3. Reduced human and material losses in vulnerable communities in the Northern areas of

Vulnerable mountain valleys of northern Pakistan	3.2. A community based system for GLOF risk monitoring & early warning established in priority communities 3.3. Targeted GLOF risk reduction measures such as check dams, spill-ways, slope stabilization or controlled drainage established in Bagrot and Drongagh valleys	Pakistan through GLOF early warnings and other adaptation measures
4.Documentation, analysis and continued application of lessons learned	4.1. Technical knowledge and project lessons documented for use in future initiatives 4.2. Project experiences disseminated to policy makers and disaster management planners in Pakistan and the wider HKH region	4. Project experiences documented

3. PURPOSE OF PROJECT MID-TERM EVALUATION

The objective of the MTE is to provide an independent analysis of the progress of the project so far. The MTE will identify potential project design problems, evaluate progress towards the achievement of the project objective, identify and document lessons learned (including lessons that might improve design and implementation of other UNDP-GEF supported AF projects), and make recommendations regarding specific actions that should be taken to improve the project. The MTE will evaluate early signs of project success or failure and identify the necessary changes to be made. The project performance will be measured based on the indicators of the project's logical framework (see Annex A).

The MTE must provide evidence based information that is credible, reliable and useful. The evaluation team is expected to follow a participatory and consultative approach ensuring close engagement with government counterparts, UNDP Country Office, project team, UNDP-GEF Technical Adviser based in the region and key stakeholders. The evaluation team is expected to conduct field missions to (location), including the following project sites:

1. Bagrote Valley, Gilgit; and
2. Bindogol Valley, Chitral.

Interviews will be held with the following organizations and individuals at a minimum:

3. UNDP staff who have project responsibilities;
4. Executing agencies
5. The Chair of Project Board
6. National Programme Director and National Programme Coordinator
7. Project stakeholders, to be determined at the inception meeting; including academia, local government and CBOs

The team will evaluate all relevant sources of information, such as the project document, project reports – including Annual PPRs, AF Tracking Tools, project budget revisions, progress reports, project files, national strategic and legal documents, and any other materials that the team considers useful for this evidence-based evaluation. A list of

documents that the project team and UNDP Country Office will provide to the team for review is included in Annex-B of this Terms of Reference.

This Mid-term Evaluation will be coordinated by the UNDP Pakistan Country Office. Mid-term evaluations (MTEs) are a monitoring tool to assess project status and challenges and to identify corrective actions to ensure that projects are on track to achieve planned outcomes since the start of the project i.e. November 2011. MTEs are required for full-sized UNDP supported projects with AF financing. MTEs are submitted to the AF Secretariat.

The purpose of undertaking an in-depth independent review of the Project is to provide all stakeholders with impartially derived first hand information on the status of the Project and its effectiveness towards achieving the objectives as listed in the Project Document. The findings of the evaluation mission will be useful for understanding the progress achieved to date and the management and technical issues of the Project.

Given the above background, the evaluation mission through consultation with all key stakeholders will undertake the following:

vii. critically examine the project objectives and arrangements for its implementation;
viii. assess and report an account of the progress achieved to date towards the production of project outputs, emergent achievements of the project's stated objectives and its contribution toward achieving the corporate objective of UNDP and AF;
ix. identify and analyze major technical, management and operational issues and impediments encountered in project implementation, if any;
x. assess the monitoring and evaluation system in place;
xi. formulate a set of specific recommendations for actions necessary to ensure resolution of the issues and impediments identified so that the project has a greater prospect of achieving its objectives (these actions should however remain within the framework of AF guidelines); and
xii. Present the recommendations to the Project Steering Committee to be convened as a concluding event for the mission.

The Mid-Term Evaluation of GLOF will determine project progress being made towards the achievement of outcomes and will identify further course of action. Findings of this evaluation will be incorporated as recommendations for enhanced implementation towards the end of the project.

A. SCOPE OF WORK

The scope of the MTE covers the entire UNDP/AF-funded GLOF project and its components including the actions/activities being undertaken by the project. The MTR will review the project implementation taking into account the status of the project activities and outputs and the resource disbursements made up to date.

The evaluation team will evaluate the following three categories of project progress. For each category, the evaluation team is required to rate overall progress using a six-point rating scale outlined in Annex C.

A.1 Progress towards Results

Project design:

- Evaluate the problem addressed by the project and the underlying assumptions. Evaluate the effect of any incorrect assumptions made by the project. Identify new assumptions.
- Evaluate the relevance of the project strategy (and theory of change) and whether it provides the most effective route towards expected/intended results.
- Evaluate how the project addresses country priorities.
- Evaluate the baseline data included in the project results framework and suggest revisions as necessary.

Progress:

- Evaluate the outputs and progress toward outcomes achieved so far and the contribution to attaining the overall objective of the project.
- Examine if progress so far has led to, or could in the future catalyze, beneficial development effects (i.e. income generation, gender equality and women's empowerment, improved governance etc...) that should be included in the project results framework and monitored on an annual basis. Suggest measures to improve the project's development impact, including gender equality and women's empowerment.
- Examine whether progress so far has led to, or could in the future lead to, potentially adverse environmental and/or social impacts/risks that could threaten the sustainability of the project outcomes. Are these risks being managed, mitigated, minimized or offset? Suggest mitigation measures as needed.
- Evaluate the extent to which the implementation of the project has been inclusive of relevant stakeholders and to which it has been able to create collaboration between different partners, and how the different needs of male and female stakeholders has been considered. Identify opportunities for stronger substantive partnerships.

A.2 Adaptive management

Work Planning

- Are work-planning processes result-based? If not, suggest ways to re-orientate work planning to focus on results.

- Examine the use of the project document logical/results framework as a management tool and evaluate any changes made to it since project start. Ensure any revisions meet UNDP-GEF requirements and evaluate the impact of the revised approach on project management.

Finance and co-finance

- Consider the financial management of the project, with specific reference to the cost-effectiveness of interventions.

- Complete the co-financing monitoring table (see Section B on page 13).

- Evaluate the changes to fund allocations as a result of budget revisions and the appropriateness and relevance of such revisions.

Monitoring Systems

- Evaluate the monitoring tools currently being used: Do they provide the necessary information? Do they involve key partners? Do they use existing information? Are they efficient? Are they cost-effective? Are additional tools required?

- Ensure that the monitoring system, including performance indicators meet UNDP-GEF minimum requirements. Develop SMART indicators as necessary.

- Ensure broader development and gender aspects of the project are being monitored effectively. Develop and recommend SMART indicators, including sex-disaggregated indicators as necessary.

- Examine the financial management of the project monitoring and evaluation budget. Are sufficient resources being allocated to M&E? Are these resources being allocated effectively?

Risk Management

- Validate whether the risks identified in the project document, PPRs and the ATLAS Risk Management Module are the most important and whether the risk ratings applied are appropriate and up to date. If not, explain why. Give particular attention to critical risks.

- Describe any additional risks identified and suggest risk ratings and possible risk management strategies to be adopted.

Reporting

- Evaluate how adaptive management changes have been reported by the project management, and shared with the Project Board.

- Evaluate how lessons derived from the adaptive management process have been documented, shared with key partners and internalized by partners.

A.3 Management arrangements

- Evaluate overall effectiveness of project management as outlined in the project document. Have changes been made and are they effective? Are responsibilities and reporting lines clear? Is decision-making transparent and undertaken in a timely manner? Recommend areas for improvement.

- Evaluate the quality of execution of the project Implementing Partners and recommend areas for improvement.

- Evaluate the quality of support provided by UNDP and recommend areas for improvement.

B. Project Finance/Co-finance

The evaluation will assess the key financial aspects of the project, including the extent of co-financing planned and realized. Project cost and funding data will be required, including annual expenditures. Variances between planned and actual expenditures will need to be assessed and explained. Results from recent financial audits, as available, should be taken into consideration. The evaluator(s) will receive assistance from the Country Office (CO) and Project Team to obtain financial data in order to complete the co-financing table below, which will be included in the mid-term evaluation.

Co-financing (type/source)	UNDP own financing (mill. US$)		Government (mill. US$)		Partner Agency (mill. US$)		Total (mill. US$)	
	Planned	Actual	Planned	Actual	Planned	Actual	Actual	Actual
Grants								
Loans/Concessions								
• In-kind support								
• Other								

Totals								

C. Evaluation Methodology

The evaluation will be based on an analysis of various documents and consultations with key stakeholders. The key documents to be reviewed are: AF Operational Strategy, GLOF Project Document, UNDP/AF guidelines for monitoring and evaluation, studies conducted for the Project, progress reports related to the project, Annual Work Plan 2011 - 2013, budget and financial reports and agreements for sub-contract. The mission will also hold meetings with key beneficiaries/stakeholders, representing the government officials of concerned departments and private sector parties directly or indirectly have or to be benefitted by the project outcomes.

The MTE Team is expected to become familiar to the project objectives, historical developments, institutional and management mechanisms, activities and updated status of accomplishments, the MTE is expected collect and analyze relevant information through:

- Review project documents and other documents relevant to the environment, climate change adaptation and Glacier Lake Outburst Floods work in Pakistan
- Group and individual interviews with project stakeholders, and at the least representatives of the project partners and beneficiaries, and
- Site visits pertaining to project work.
- The analysis of the information should enable the MTE Team to make evidence-based assessment of the all aspects defined in the Scope.

D. Overall quality requirement of the MTE

Some key quality criteria that the MTE report must meet are:

- The MTE report is consistent; the evidence presented is complete and convincing.
- The MTE report provides rating for all major aspects to be evaluated, using the rating guidelines defined in the UNDP/AF M & E manual and
- MTE report is timely submitted.

E. MTE team composition and requirements

The MTE Team will be composed of one International Consultant/Team Leader and one National Consultant. The team is expected to combine international standards of evaluation expertise; in-depth knowledge of Glacier Lake Outburst Floods projects in the context of Climate Change Adaptation programs and projects implementation around the world in general.

All relevant staff of the Environment and Climate Change Unit UNDP-Pakistan as well as the "UNDP-GEF Regional Technical Adviser" will make themselves available and shall actively participate in the evaluation, as requested by the MTE reviewer. Environment and Climate Change Unit Chief, UNDP-Pakistan or designated Programme Officer will be the focal point for the evaluation mission.

F. Implementation Arrangements

The principal responsibility for managing this evaluation resides with the UNDP Country Office (UNDP CO) in Islamabad, Pakistan. The UNDP CO will contract the consultants and ensure the timely provision of per diems and travel arrangements within the country for the evaluation team. The project team will be responsible for liaising with the evaluation team to set up stakeholder interviews, arrange field visits with missions to Chitral and Gilgit-Baltistan.

G. Payment modalities

%	Milestone
50	Upon approval of 1st draft mid-term evaluation report
50	Upon approval of final mid-term evaluation report

H. MTE DELIVERABLES

Tentative timeline for the deliverables for the evaluation starting mid November 2012 (for 15 days) is as follows:

Deliverable	**Timeline**
Completion of stakeholder consultations and submission of Evaluation Inception report	26th November 2013
Submission of first draft	1st Dec 2013
Submission of final report	9th Dec 2013

I. Evaluation Ethics:

a. In line with the UN Universal Declaration of Human Rights and other human rights conventions, evaluators should operate in accordance with international values.

b. Evaluators should be aware of differences in culture, local customs, religious beliefs and practices, personal interaction and gender roles, disability, age and ethnicity, and be mindful of the potential implications of these differences when planning, carrying out and reporting on evaluations.

c. Evaluators must ensure the honesty and integrity of the entire evaluation process. Evaluations also have an overriding responsibility to ensure that evaluation activities are independent, impartial and accurate.

The evaluation will be undertaken in-line with following Adaptation Fund principles:

- Independence
- Impartiality
- Transparency
- Disclosure
- Ethical
- Partnership
- Competencies and Capacities
- Credibility
- Utility

Annex 2 Itinerary

Date	Subject	Location
March 3-7	Desk review of project document, preparation	The Netherlands
March 9-10	Travel of IC from home base via Amsterdam-Dubai to Islamabad	Heteren, The Netherlands, Amsterdam-Dubai-Islamabad
March 10	Briefing at UNDP: UNDSS security briefing and UNDP guidance for MTE	Islamabad
March 11	Meeting with Secretary Climate Change Division, Chair of PSC Meeting with GLOF PMU team Meeting with Mr. Khalid Siddique, Ex-NPD, Ministry of Science and Technology	Islamabad
March 12	Meeting at Pakistan Meteorology Department (PMD) Meeting with GLOF project consultants	Islamabad
March 13	Review of project documents	Islamabad
March 14	Meeting with Gilgit Project Site team	Islamabad
March 15-16	Review of project documents; drafting of report	Islamabad
March 17	Meeting with Chitral Project Site team	Islamabad
March 18-19	Drafting of report; preparation of presentation	Islamabad
March 20	Debriefing presentation	Islamabad
March 21	Home travel of IC from Islamabad via Dubai to Amsterdam and home base	Islamabad-Dubai-Amsterdam-Heteren, The Netherlands
April 17-19 and 22-27	Field visit to project pilot sites in Chitral and Gilgit by national consultant	Islamabad-Chitral v.v. Islamabad-Gilgit v.v.

Annex 3 List of persons interviewed/met

Date	People met / interviewed
March 10	UNDP: UNDSS security briefing (Mr. Faizal) UNDP guidance for MTE (Mr. Usman Manzoor)
March 11	Meeting with Secretary Climate Change Division, Chair of PSC: Mr. Raja Hasan Abbas and the Joint Secretary International Cooperation, Mr. Iftikhar-ul-Hasan Shah Gillani. Meeting with GLOF PMU team: Mr. Khalil Khan, National Project Manager Mr. Khursid Khan, Administrative and financial Officer, Mr. Atta- ur- Rahman, Office Assistant, support staff, Mr. Dost Mohammed Intern, general support, Mr. Naweed, Intern, general support Meeting with Mr. Khalid Siddique, Ex-NPD, Ministry of Science and Technology
March 12	Meeting at Pakistan Meteorology Department (PMD): Dr. Ghulam Rasul, Chief Meteorologist, Pakistan Meteorological Department (PMD), PMD Headquarters Office, Islamabad, and his staff working for the GLOF project (about 15 staff members present). Meeting with GLOF project consultants: • Dr. Ali Gohar, researcher on Indigenous Technical Knowledge and Best Practices on GLOF • Mr. Abdul Latif Rao, researcher on GLOF Risk Management • Dr. Bashir Ahmed Wani, researcher on the impact of GLOF on biodiversity and the ecosystem • Prof. Muhammad Iqbal Khan, researcher on GLOF Risk Reduction Guidelines • Mr. Shadab Fariduddin, researcher on GLOF Communication and Awareness Raising Strategy
March 14	Meeting with Gilgit Project Site team: 1. Mr. Mazhar Hussain, Chairman Dobani Development Organization Bagrote, District Gilgit 2. Mr. Adil Shah, V/C Dobani Development Organization, Bagrote, District Gilgit 3. Mr. Asif Hussain, Chairman PRCS 4. S. kamal ud-din, Met. Officer PDM, Gilgit office 5. Syed Zahid Hussain, Field Manager Pakistan GLOF project, Gilgit 6. Mir Mazeen Khan, research Officer Planning & development officer, GB 7. Mr. Rashid –ud-Din, Deputy Director / member DDMC, DDMA Gilgit 8. Mr. Zahir-ud-Din Baber, Assistant Director GB DMA, Gilgit 9. Syed Ikramudin Shah, Provincial Coordinator, GB DMA 10. Mr. Mohammad Ismail Zafar, Conservator of Forest Department, GB 11. Mr.Kamran Hussain, Provincial Focal Point REDD+, GB 12. Mr. Iqbal Ahmad, DFO Forest Department, GB

March 17	Meeting with Chitral Project Site team: 1. Mr. Ibrahim Khan Chair man DRM DRMC Bindo Gol Valley 2. Mr. Hameedur-Reman General Secretary DRMC Bindo Gol Valley 3. Mr. Dinar khan Member DRMC Bindo Gol Valley 4. Mr. Rizwan Member DRMC Bindo Gol Valley 5. Mr. Jamal Khan Member DRMC Bindo Gol Valley 6. Mr. Hameed Ahmad Mir , Field manager Bindo Gol valley GLOF project Chitral 7. Mr. Naveed Ahmad Office Assistant Bindo Gol valley GLOF project Chitral 8. Mr. Shoab Jadoon Deputy Commissioner Chitral 9. Mr. Saad Qaisrani Assistant Commissioner Chitral (District Administration) 10. Mr Saleh AAC Mastuj (District Administration) 11. Mr. Basharat Ahmad AAC (District Administration) 12. Mr. Dost Mohammad GLOF project 13. Mr. Abdullah Met. Assiatant PMD officer Chitral 14. Mr. Shafiqullah Field Biologist WWF Pakistan 15. Mr. Ejaz Ahmad Community Development Officer (CDO) Forest department KP 16. Mr. Waqar Zafar Chief Environment Planning & Development Department Govt. Of KPK
March, 19	UNDP: Mr. Saleem Ullah, former UNDP project officer for the GLOF project
March 20	Debriefing presentation UNDP: Assistant Country Director a.i. Mr. Abduvakkos Abdurahmanov

ANNEX 4 Transcripts of interviews/focus-group discussions

Date: Tuesday March 11th
Time: 09.00-10.00
Meeting with: The Chair of the Project Steering Committee (PSC), **Mr. Raja Hasan Abbas**, **Secretary Climate Change Division,** and the **Joint Secretary International Cooperation, Mr. Iftikhar-ul-Hasan Shah Gillani.**

After an introduction round the MTE team set out the objectives of their mission and asked the Secretary and Joint Secretary about their experiences and impressions of the progress of the GLOF project. As Chair of the PSC of the project the Secretary has 8 months experience with the project.

- Up to now, no real issues have been flagged or emerged, except for routine and minor matters.
- The project is helping in building a better understanding of the important glacier network in the HKH and is helping us to develop mechanisms of coping with the adverse effects of climate change and related GLOF for local communities.
- The project is contributing to gain enhance our knowledge of the processes involved in GLOF and downstream risk management.
- Local communities, living close to the outbreak sources are very vulnerable as the events are so sudden and hard to predict.
- Therefore, early warning mechanisms to inform and warn communities at risk are essential, combined with the related capacity building effort of entities involved.
- There has been some apprehension about the climate change adaptation structures. Initially, some stakeholders thought that they would not withstand a GLOF and needed to be adjusted. The Engineering Designed were reviewed by Chief Engineer National Flood Commission and the designs have been adjusted and time will tell if they are of appropriate dimension and strength to offer actual risk reduction.
- Some hydropower projects are in the pipeline (Korean investment in Chitral?) and require serious attention and mitigation effort related to flash floods and GLOF.
- About 10,000 people live about 20 minutes of the glacier source and Chitral has a history of frequent outburst and floods. In 2010 a larger GLOF occurred.
- As the adaptation funds spent are the first for such interventions in Pakistan, one has to carefully review the appropriateness of the investment
- The equipment purchased for the EWS has to be sturdy and robust. One has to see if they will withstand the elements the coming years.
- The Division has the clear intention to safeguard the investments made in equipment and capacity building though the creation of a targeted cell with permanent staff.
- Therefore, a project proposal(PC-1) is being developed to be submitted to the Government, for funding and creation of a designated government entity to focus on GLOF and EWS, in order to enhance the sustainability of project investment and impact.
- The PSC is functional and convenes about twice a year to review project progress and endorse the AWPs.
- About 80% of the discharge of the Pakistani rivers is of glacial origin. Recent studies indicate a present positive mass balance, although general temperatures are rising. This “Karakoram Anomaly” is contributed the Westerlies, bringing considerable precipitation to high-altitude areas.
- The project team is working hard and well and the beneficiary communities are very collaborative and happy. The local stakeholders at provincial and local level are also working in a good collaborative setting.
- The Post-Project sustainability can be enhanced through the PC-1 being developed and hopefully this initiative can build on the ground breaking efforts being made by the project.

Date: Tuesday March 11th

Time: 10.15-13.00
Meeting with: the **Project Management Team** (PMT) at the Project Management Unit (PMU):

Mr. Khursid Khan,	Administrative and financial Officer
Mr. Atta- ur- Rahman	Office Assistant, support staff
Mr. Dost Mohammed	Intern, general support
Mr. Naweed	Intern, general support

The PMT members introduced themselves and the MTE team set out the objectives of the mission and stressed that the MTE is intended as a learning experience to:

- Take stock of progress and emerging issues and challenges,
- Document outputs for the various outcome areas,
- Identify and document emerging good practices and learning, and
- Look ahead and discuss if design adjustments are needed compared to the initial project design.

1. The PMT showed a short documentary, named "*Lurking Mountain Tsunami*", which introduces to a general audience the objectives of the project and the need to mitigate the existing risk posed by GLOF to remote mountain communities. It depicts the two project pilot sites in Chitral, KP Province and Gilgit Baltistan Province, and captures some opinions of local community members about GLOF and the risk it poses to their livelihoods.

2. The Project Manager, Mr. Khalil Ahmed, gave a presentation about the GLOF project, its objectives, set-up, outcome areas and progress so far. The presentation served as a starting point for a discussion about a series of issues related to project implementation, progress and emerging challenges.

- The PMT expects to be able to complete the project by December 2015, taking into consideration the delayed start of the project with 6 months in November 2011 and present implementation progress and budget expenditure rate.
- The MTE team notes that the Government in-kind share of the project budget, $3.5 million seems rather high. This in-kind contribution is expressed in staff time/salaries (NDP, Secretary, PSC members, PMD staff, national technical expertise), two provincial offices with related infrastructure etc.
- A series of studies have been commissioned by the project to national consultants to build a knowledge base related to GLOF and the pilot sites. These studies were carried out in both Bindogol and Bagrote Valleys.
- Literacy rates in the pilot areas is relatively elevated with about 80% in Bagrote Valley and about 50% in Bindogol.
- One of the consultancies is aimed at preparing IEC materials: Information, Education and Communication materials related to GLOF, DRM and based on the studies undertaken in the pilot areas. Brochures, leaflets and flyers are produced and distributed to community members and stakeholders at local, provincial and national level.
- Two District Emergency Response Cells (DERCs) are strengthened, both in Gilgit and in Chitral. The staff of these Cells have been trained and the communication facilities improved, so that cooperation and coordination with the project sites has been enhanced.
- Over the last two years of implementation the project has had 5 different National Project Directors, which can induce a certain loss of momentum, loss of institutional memory and delays in budget releases and administrative approvals. Staff changes are a regular phenomenon within the government service and beyond the influence sphere of the project management.

Date: Tuesday March 11th
Time: 14.45-16.00
Meeting with: the Ex-National Project Director, Mr. Khalid Siddique, Joint Secretary, Ministry of Science and Technology Government of Pakistan

- Mr. Khalid Siddique acted as NPD for about 9 months from June 2013 up to February 2014. He states that any NPD should:
  - Be able to understand the technical language and details of the concerned project, and
  - Have a good understanding of development issues.
  - Should visit the project site frequently
- Only some activities have not been implemented as planned for, mainly due to changes in NPDs, causing minor disruptions in the management system.
- The Project Management Unit is certainly overloaded with work, considering the amount of activities to be undertaken and managed and the limited staff available.
- There is only a limited seasonal opportunity to work in the high-altitude mountain valleys of the pilot sites and this requires specific planning, and forms in itself a logistical constraint.
- The site chosen in Chitral Valley is probably sub-optimal (no glacial lake, but a recurrent secondary snow/landslide-dammed lake) and an alternative site is being considered.
- The PMU is committed and doing a fine job, but requires extra technical staff for support, which is presently being procured.
- The Government is offering best possible support, but GLOF is also a new subject to them, for which they need guidance.
- Through the interventions of the last two years, there is now a better understanding and assessment of the existing risk at the project sites. This is combined and translated in the installation of an EWS, the formation of Disaster Risk Management Cells in the communities and the improvement of the facilities of the DRM organisations at provincial and local level.
- In hind-sight it might have been better to have put more emphasis on site selections and to verify the appropriateness of the chosen glacial lake and the risk it poses.
- The Inventory of glaciers lakes has been completed through RS and ground verification will be completed in 2014
- The project has only a limited budget to make real impact on the communities: the awareness of only a few is raised, but it is not yet wide-spread.
- The project needs to ensure that it can demonstrate good working models/mechanisms, which can be show cased as best practices to initiate and facilitate replication and scaling-up of GLOF related interventions in the broader HKH region.

Good practices/Emerging successes:

- Starting awareness of natural hazard and risk contained in the lakes, instead of traditional “will of god”. The communities are now clearly aware of the hazard and are knowledgeable of the nature of the risk.
- The physical structures erected will help the local communities and contribute to vulnerability reduction.
- The local communities and local authorities have established a good working relation and are very committed to the project execution, partly facilitated by the equipment made available through the project.

Need for chance?

- No need for major adjustments, just fine-tuning.
- There is a need for additional technical staff for PMU, which is already set in process.
- The present AWP/B is relatively ambitious and challenging for the PMU to execute.

Date: Wednesday March 12th
Time: 10.45-14.00
Meeting with: Dr. Ghulam Rasul, Chief Meteorologist, Pakistan Meteorological Department (PMD), PMD Headquarters Office, Islamabad, and his staff working for the GLOF project (about 15 staff members present).

After an introduction round Dr. Rasul gave a PPT presentation highlighting the activities that have been carried out by PMD under the LoA with the GLOF project.

- The presentation was titled: "Updating GLOF Lake Inventory of Northern-Pakistan, and Establishment of Community-Based EWS in Bagrote and Bindogol Valleys".
- The initial Glacial Lake Inventory was carried out by ICIMOD and PARC in 2005, based on imagery of 2001 (Landsat TM-7).
- The total budget under the LoA is $810,325 with additional in-kind contribution of PMD of $199,984.
- PMD has sub-contracted a series of institutions to carry out assignments:
    - Isotope Application Division of Pakistan Atomic Energy Commission
    - FOCUS Humanitarian Assistance
    - University of Peshawar (NCEG)
    - National Agriculture Research Council (NARC)
    - Star Technologies (for EWS communication equipment)
- Northern-Pakistan shows a clear trend with an accelerated increase in temperatures over the last decades as driving factor for retreat and melt of glaciers and causal factor for glacial lake formation.
- Interesting is the observation that various glaciers in Pakistan exhibited clear signs of deposition of aerosols through air pollution (soot or carbon deposition), which will have a marked effect on ablation and albedo.

Bagrote Valley

- Bagrote Valley has been visited five times in the last two years to:
    - Survey the glaciers and glacial lakes and study of the river system of the Valley,
    - Install meteorological observatory and hydro-meteorological equipment in the valley.
    - Carry out bathymetric mapping survey of the supra-glacial lakes; studying its depth, radius and recharge/discharge mechanism
    - GPR profiling over glaciers and HVRA of the villages in the vicinity, in collaboration with NCEG Peshawar and FOCUS Pakistan respectively.
    - To sensitize the residents about the GLOF Project, its objectives and purpose.
- Garko and Hinarche Glaciers and lakes were researched in more detail, resulting in quantification of volumes, dimension and depth.
- Downstream, hydrological profiles were collected at regular intervals (wet perimeter) in order to predict flood wave propagation and facilitate hazard and risk mapping.
- Detailed flood hazard maps (scale 1:50,000 approximately) have been compiled with hazard typology and classification into specific hazard zones. Also potential sites for mitigation works have been indicated.
- Standard meteorological stations have been installed in the communities and local community members trained to monitor and maintain the equipment.
- Two Automatic Weather Stations (AWS), two automatic rain gauges and two automatic discharge gauges have been installed
- There is a minimum lead time for the communities in the NE of the Valley.
- Land degradation caused or triggered by GLOF events will have serious socio-economic impact for the communities.
- The EWS thresholds values will have to be set and tested in the coming year: T, P and water level as critical indicators.

Bindogol Valley, Chitral

- Activities carried out in Bindogol Valley:
  - Survey of glaciers and glacial Lakes and study of the rivers system of the Valley
  - Installation of meteorological observatory and hydro-meteorological equipment in the Valley.
  - Bathymetric survey of the supra-glacier lakes; studying its depth, radius and recharge/discharge mechanism
  - GPR profiling over glaciers and HVRA of the villages in the vicinity, in collaboration with NCEG Peshawar and FOCUS Pakistan respectively.
  - To sensitize the residents about the GLOF Project, its objectives and purpose
- Similar activities as in Gilgit were carried out: lake and glacier research, river profiling and hazard and vulnerability mapping, followed by installation of meteorological and hydrological equipment.
- Conditions at Bindogol are very specific: there seems to be no permanent lake, not pro- or supra-glacial, and also not quantifiable endo-glacial. Summer melt and increased fluvio-glacial discharge seems to be trapped near a narrow gorge downstream, where mass movement material and snow avalanche accumulations cause regular formation of a secondary lake, which apparently is able to cause considerable outburst floods, with characteristics very similar to a "normal" GLOF event.
- Lead time to the community is only 15-20 minutes. Outbreak floods seem to be occurring with regular intervals (4-8 years).
- An EWS is thought to be of less urgency, but it was discussed that the existing discharge measurements might be used as threshold value for an EWS.
- Meteorological- and hydrological equipment needs still to be installed.
- A community-based hazard watch groups will be formed.
- A Standard Operation Procedure (SOP) is drafted and needs to be developed and tested for both sites.
- The EWS needs to be completed with communication equipment (either GSM/GSPR or satellite-based) to link sensor and data observation with a control room. Threshold values need to be set and tested and procedures tested with all stakeholders involved.

Glacial Lake Inventory Update

- The Inventory follows in principle the same methodology as the 2005 ICIMOD-PARC inventory and makes use of Landsat ETM-8 imagery (30m resolution) of 2010?.
- The Inventory shows a total of 3,044 lakes, versus 2,420 in the 2005 inventory.
- Of these 36 are classified as potentially dangerous, versus 52 in 2005.
- Possible reasons of increase in number of lakes are:
  - higher precipitation,
  - rapid melting of source glaciers due to warming, and
  - better quality of the image data used.
- For 2014 and 2015 PMD has a range of activities scheduled to finalize the emerging research products as EWSs, hazard maps, inventory, SOP finalization and training of stakeholders, developing a flood propagation simulation model to compare with the HRV maps etc.

Looking Ahead:

- The equipment needs to be tested and proof is robustness the coming years.
- The emerging PC-1 project proposal will support sustainability of the project impact.
- The climate scenarios indicate sharply higher temperature ranges and initially higher precipitation in the higher-altitude areas, which might exacerbate the risk of potential GLOFs.
- HRV mapping needs to be scaled-up to other vulnerable areas.

- Compilation and documentation needs to be taken up the remaining years to consolidate the research results and disseminate the findings and recommendations with a wide audience within the country and regions.
- PMD considers the establishment of an operational division for maintenance and supervision of the EWSs.
- Two recent GLOF events in Chitral (Booni, 2010, and Reshun, 2013) are indicative that GLOF is a real hazard.

Recommendations:

- Melt rate has significantly increased and rainfall reaches higher elevations, which might trigger GLOF events.
- An extensive survey of existing lakes, their risk assessment of outburst and vulnerability needs to be addressed.
- Community Based Early Warning Systems on sub-basin or district scale may be established with a single control.
- A national institution on regular basis must take this responsibility.

Date: Wednesday March 12th
Time: 14.45-17.00
Meeting with: Team of consultants, who carried out a series of GLOF related consultancies for the project:

- Dr. Ali Gohar, researcher on Indigenous Technical Knowledge and Best Practices on GLOF
- Mr. Abdul Latif Rao, researcher on GLOF Risk Management
- Dr. Bashir Ahmed Wani, researcher on the impact of GLOF on biodiversity and the ecosystem
- Prof. Muhammad Iqbal Khan, researcher on GLOF Risk Reduction Guidelines
- Mr. Aftab Iqbal, consultant developing GLOF digital Knowledge Repository for GLOF Project,

After an introduction round, highlighting for every consultant their technical background and study subject for the GLOF project, the MTE team set out the objectives of the mission and the focus on learning and stock taking.

Dr. Ali Gohar published**:**

- **Gohar, A. (2013a).** Study on the Best Practices and Indigenous Knowledge of GLOF and other Climate Change Induced Disasters in Chitral District, KP Province, 50 pages.
- **Gohar, A. (2013b).** Study on the Best Practices and Indigenous Knowledge of GLOF and other Climate Change Induced Disasters in Gilgit District (Gilgit-Baltistan), 51 pages.

Dr. Ali emphasized that:

- The landscape setting in Pakistan is very dynamic and fragile, reminiscent of the young Himalayas uplift.
- People do not look at lakes in isolation, but see it as a holistic natural hazard (so not caused by local deities or supra-natural forces).
- Causes of GLOF are, and recognized by the communities, linked to higher temperatures, increase in precipitation, forest depletion and pasture degradation.
- There already exists a strong bond within the exposed communities, which is utilized for a form of an indigenous Early Warning System. People recognize signs as alerts for an imminent flood: e.g. a sudden drop in discharge, or sudden increase in water flow.
- One should prioritize high risk areas based on a proper survey.
- One should evaluate if we should go in depth into GLOF research for a particular site (including mitigation options and interventions) or approach GLOF broader from a pilot village approach, tackling issues broader than just GLOF, thus following a more integrated development approach.

- The current apparent retreat of glaciers is eventually a more serious issue, considering impact on water availability and long-term downstream effects on irrigation, drinking water, power generation etc.
- One has to incorporate sustainability issues:
    - Social sustainability, matching the needs of the communities
    - Technical needs, creating links with technical institutions as the Karakoram University
    - Financial needs, linked to post-project maintenance costs and responsibilities, and
    - Institutional sustainability, ensuring a timely and coordinated handing-over of institutional mandates
    - Project sustainability, requiring a management set-up with sufficient technical expertise that can be absorbed and retained within the government system post-project.

Mr. Aftab Iqbal,published:

Iqbal, A. (2013). Developing a GLOF Knowledge Repository for Pakistan.

Mr. Shadab stated that:

- The GLOF project is unique and first of its kind in many ways.
- It fills in an existing knowledge gap in Pakistan, as there is very limited scientific base in the fields of glaciology, climate change and disaster risk management, and in particular regarding knowledge related to GLOF and GLOF risk management.
- The communication products of the project have sounded alarm bells within society and have raised more awareness of the character and inherent risk of GLOF.
- As a result GLOF has been put on the agenda of policy and decision makers, and has become a subject for public discussion and participation.
- Mr. Shadab has tried to produce, based on the diverse publications of the project, digestible products for the general public, such as brochures, flyers, leaflets and posters in English and Urdu.
- He also assists in creating a catalogue of knowledge products in a digital repository focused on GLOF and with the GLOF project website.
- The study on Indigenous Technical Knowledge (ITK) is valuable as it captures and documents “old” local knowledge on GLOF and flash floods.
- As a part of a broader communication platform he suggests to contemplate the establishment of a “Community of Practice” or CoP on GLOF in Pakistan.

Mr. Abdul Latif Rao, published:

- **Rao, A.L. (2013a).** GLOF Risk Management Report, Part-I, for the Pakistan GLOF Project, 58 pages.
- **Rao, A.L. (2013b).** GLOF Risk Management Manual, for the Pakistan GLOF Project, 37 pages.

Mr. Abdul Latif commented that:

- He has published a study report on GLOF Risk Management, based on the work and the conditions in the two project site valleys.
- Additionally, he has written a more generic manual on GLOF Risk Management in English and Urdu.
- He feels the project is performing well and efficiently.
- The project has not been too ambitious, which is good, by covering only two pilot areas.
- There is a good focus on community participation and strengthening linkages between DRM institutions (local, district and provincial).
- The project therefore aims at both social mobilization, as well as strengthening the institutional basis.

- This process should be scaled-up and replicated to many more vulnerable areas, at risk of GLOF hazard.
- The Chitral lake is not a real glacial lake, but causes hazards and risk very comparable to a GLOF, by the repeated formation of a dammed lake in a narrow gorge, seasonally blocked by avalanche deposits and mass movement material. The outburst of this lake causes dangerous flash floods and merits the assistance of the project in managing this risk.
- The engineering structures being developed are test cases. There is a need for capacity to identify and assess appropriate and prioritized sites and monitor the engineering works.
- The project has just a very small team and is therefore resource efficient, but there is also a lack of manpower and a clear need to strengthen the team with technically skilled staff.

Dr. Bashir Ahmed Wani published:

- **Wani, B.A. (2013a).** Impact of Glacial Lake Outburst Floods (GLOFs) on Biodiversity & Ecosystem in Bagrote Valley, Gilgit-Baltistan, 79 pages.
- **Wani, B.A. (2013b).** Impact of Glacial Lake Outburst Floods (GLOFs) on Biodiversity & Ecosystem in Bindo Gol Valley, District Chitral, Khyber-Pakhtunkhwa, 66 pages.

Dr. Bashir discussed that:

- Substantial damage can be observed caused by GLOF events to alluvial river beds and causing, amongst other, the cut off of various heads (inlets) of irrigation channels.
- Communities attribute this to fast-melting glaciers and forest depletion. According to the communities, the Hinarche glacier has retreated 2-3km over the last 20 years.
- Overall, there is a compound damage due to the combination of GLOF/ flash floods and landslides. This calls for an integrated, holistic approach to manage these hazards at landscape scale.
- The shepherds and wood cutters are the watch men, out in the landscape, best fit to recognize hazards and risks and to pass on alerts or alarms.
- The damage done by repeated floods aggravates the vulnerability of the communities exposed and their poverty status.
- There are very few studies undertaken related to loss of plant species due to climate change effects in Pakistan.
- Overall, the increase of precipitation and temperature affects the high-alpine pastures, which are most sensitive to change.
- Crops are reportedly harvested much earlier than before, which has some positive impacts for the communities, but there is also a higher incidence of pests and invasive species.
- The bird population is decreasing.
- There is no real extension service support from the Government to the communities (agriculture, livestock, forestry etc.). Only post-disaster support in very minimal form.
- There is a high livelihood asset dependency on the land and natural resources, and safeguarding and enhancing livelihoods is therefore essential (repair of basic infrastructure, irrigation support, subsidized fuel, land management, EWS and afforestation).

Recommendations:

- Long-term engagement is required.
- Watershed-level planning, following an integrated, multi-sectoral approach is required, to be reflected in integrated NRM plans.
- This should reflect an ecosystem-based adaptation approach.
- Diversification of livelihoods is needed for the mountain communities to reduce their vulnerability.
- Effective policies should be designed for flood plain management.
- Stabilization of mass movement areas is needed to safeguard infrastructure and communities.
- This all requires a collaborative research efforts from various scientific disciplines.
- Afforestation campaigns are needed to reduce vulnerabilities in the mountain valleys.

Prof. Muhammad Iqbal Khan published:

- **Khan, M.I. (2012).** Climate Change and Glacial Retreat. Lambert Academic Publishing, 325 pages
- **Khan, M.I. (2013).** GLOF Risk Reduction Guidelines for Chitral, Khyber, Pakhtunkhwa, Pakistan, 43 pages.

Professor Khan is one of the very few scientists in Pakistan to have studied and published on glaciology and climate change. He has drafted GLOF reduction guidelines for Chitral with a back analysis of GLOF events for two Chitrali glaciers and implication for risk reduction downstream.

Overall recommendations

In a group discussion it was recommended to:

- To clearly communicate the EWS functioning and discuss alarm and alert levels with the public.
- Engage other stakeholders in society in knowledge sharing, e.g. through the portal or website.
- Think of a potential linkage with scientists studying "other" lakes to capture their specific knowledge for GLOF research.
- There is a need to think of the implications of land use zoning/planning for those land holders with land close to the rivers (need for compensation/land swapping etc.).
- The mainstreaming of GLOF into policy level: the subject requires multi-sectoral support.
- As it is early in the project and in general in the research phase on GLOF, one has to focus on outputs before broader outcomes and impacts can be registered.

Date: Friday March 14th
Time: 10.45-16.00
Meeting with: Representatives of the Bagrote Valley area in Gilgit-Baltistan Province:

1. Mr. Mazhar Hussain, Chairman Dobani Development Organization Bagrote, District Gilgit
2. Mr. Adil Shah, V/C Dobani Development Organization, Bagrote, District Gilgit
3. Mr. Asif Hussain, Chairman PRCS
4. S. kamal ud-din, Met. Officer PDM, Gilgit office
5. Syed Zahid Hussain, Field Manager Pakistan GLOF project, Gilgit
6. Mir Nazeen Khan, research Officer Planning & Development officer, GB
7. Mr. Rashid –ud-Din, Deputy Director / member DDMC, DDMA Gilgit
8. Mr. Zahir-ud-Din Baber, Assistant Director GB DMA, Gilgit
9. Syed Ikramudin Shah, Provincial Coordinator, GB DMA
10. Mr. Mohammad Ismail Zafar, Conservator of Forest Department, GB
11. Mr.Kamran Hussain, Provincial Focal Point REDD+, GB
12. Mr. Ijlal Ahmad, DFO Forest Department, GB

This meeting was organized as an alternative for the original intention of the MTE team to travel to Bagrote Valley and meet the local stakeholders on site. As security conditions did not allow for the team to travel, it was most appreciated that all local stakeholders took the effort to travel to Islamabad to have the opportunity for a lengthy and in-depth discussion of project progress, emerging issues and lessons.

After an introduction round, the MTE team explained the broad objectives of the evaluation and pressed the representatives to be outspoken about their positive and negative experiences with the project to maximize learning.

Mr. Syed Zahid Hussain, Field Manager Gilgit for the GLOF project, gave a detailed presentation about the progress and issues in Bagrote Valley. After his presentation the MTE team asked a series of questions for clarification and further discussion. Some of the points discussed:

- Community elders were the first to be consulted when the project entered first into the area.
- The project makes use of an existing grassroots organization, the Dubani Development Organisation (DDO). A multi-purpose CB DRM fund is started, supported with an endowment funding of PKR110,000.
- A multi-hazard CB DRM Committee has been installed, with hazard watch groups in 9 villages. This structure makes use of local knowledge: each group has six members, who have area-based local knowledge, often herders/local foresters and ex-army personnel.
- A series of awareness raising and sensitization meetings and dialogues were organised, aiming at different target groups and making use of various communication tools, such as trainings/discussions and radio broadcasts in local languages.
- The radio campaign is broadcast in 4 local dialects and Urdu.
- Mass awareness campaigns were organized centred around International Risk Reduction Day and World Water Day.
- The CB DRM Committee works closely together with the district DRM Authority and has now a stockpile of emergency relief goods, school kits and access to proper communication equipment.
- During a participatory community consultation vulnerable areas were identified for GLOF and other hazards, and safe havens were identified, making use of sketch and Google maps, as potential evacuation sites in case of a GLOF.
- The Bagrote CB DRM Committee acts as the Emergency Response Cell and connects with the District DMA, which is linking to the GB DMA.
- The climate change adaptation structures are planned in a participatory approach, with prioritization by the communities of the most vulnerable sites (9-10 on a long-list, 5 prioritized). Communities provide labour as in-kind contribution, up to 10% of the actual costs. Dimensions of the structures are based on historical peak flow levels (up to 9ft above the present alluvial valley floor).
- A committee was formed to cross-check the design of the climate change adaptation structures, including representatives of the PWD of the Province (executive engineer) and the chief engineer of the flood commission.
- Bagrote has now in process 3 protective walls (gabions) of about 12 feet width at base and 12 feet height and 2 path clearances (clearing of huge alluvial boulders that might obstruct floods and deviate the river thread.
- Strengths:
    - Last decade has seen increase of GLOF in GB and the project is therefore much needed.
    - There is a strong community commitment and support.
    - There is a strong coordination between the local government and local NGOs.
- Challenges:
    - There is a short working season, April-October/November, and even only July-September for the high-altitude areas.
    - Series of delays, due change and absence of NPDs (signature/approval/budget releases).
    - Security situation: frequent closing of Karakorum Highway and related hazards.

CBO representatives:

- Express full satisfaction with the project, up to now.
- Through the project, they feel to be really organized for the first time.
- The CCA structures being built have the highest local priority, but there are more weak/vulnerable sites.

- Awareness levels about GLOF have risen considerably.
- The hazard watch groups are active and members are trained.
- There is a good linkage with different government institutions, facilitated by the project.
- With 7 glaciers upstream the villagers still feel unsafe, although the projects helps, but they feel to need more permanent support.

Mr. Mir Mazeen Khan, research Officer Planning & Development:

- Expressed to see an enormous progress for Bagrote Valley communities, with raised awareness and improved local organisations and linkage with the government.
- But, we have to identify more hazard sites/areas for the whole GB province, as many areas are exposed to potential GLOF hazard.
- Essential to have the communities together with all key stakeholders involved in DRM.
- FOCUS has done a lot of CB DRM studies in GB: 106 vulnerable sites have been identified in Gilgit District alone.
- Sees the project as a success story: before we did not know the vulnerable areas, also because many men are mostly going outside for business. Now, through the project, women are represented and consulted and they are the most vulnerable and the first responders. Now they are leading for the community and much more vocal.
- Livelihoods of the people are connected to glaciers: they even sell ice on the local markets for medical value and as drinking water (blocks up to 40kg!).
- There is a clear need to extend GLOF hazard activities to other areas
- The GB regions is very much prone to earthquakes (1972/1982/1992/2002/2005 and 2008) and this high seismicity poses a real threat, as potential trigger of GLOFs.

Forest department staff:

- Project supported DoF office conference hall.
- Many communities in GB exposed to and affected by floods
- Work of the project is exemplary.
- But, we need to expand the geographic scope of the activities.
- The lessons and experiences need to be shown as demo sites to other exposed , vulnerable communities.

DRMA staff:

- The GB DM Authority has 7 Districts with 4 DDMAs functional
- The Bagrote DRM Committee serves as the Emergency response Cell (ERC).
- Satellite phones were provided and walky talkies for improved communication.
- Search- and rescue kits and first response kits were supported by the project.
- The project has facilitated the gathering of information on hazards and vulnerability from different organisations.

PMD staff:

- Most hazardous events in GB are climate change induced.
- There is a need for better measurement and monitoring of glacio-hydrological processes with an extension of the meteorological network. For example, in every district there is presently only one meteorological station.

Are we doing enough?:

- At the moment, we are mainly learning lessons.
- There is a clear focus on the set targets.

- People are hopeful, as in GB there are well organized communities, that take interest and that are committed.
- There is a good level of coordination and the project makes use of appropriately participatory approaches, bottom-up, banking on local knowledge.

Recommendations:

- Suggestions for insurance coverage for natural hazards. Now communities have no insurance at all and have to bear substantial material losses due to natural disasters.
- Most of the support by the project is "soft", but there is need for "hard" help downstream: river training works etc.
- Many local irrigation channel inlets have been washed away or damaged by peak floods: there is a need for rehabilitation.
- A clear livelihood component is missing in the project design, including possible enterprise development. Also capacity building in the field of glaciology is much needed to build a better science base. Livestock is a crucial livelihood component, therefore livelihood activities should consider breed improvement etc.
- Robust coordination between the communities and the local authorities is critical, combined with a strong EWS.

Date: Monday March 17th
Time: 10.45-16.00
Meeting with: Representatives of the Chitral Valley area in KP Province:

1. Mr. Ibrahim Khan Chairman DRM DRMC Bindo Gol Valley
2. Mr. Hameedur-Reman General Secretary DRMC Bindo Gol Valley
3. Mr. Dinar khan Member DRMC Bindo Gol Valley
4. Mr. Rizwan Member DRMC Bindo Gol Valley
5. Mr. Jamal Khan Member DRMC Bindo Gol Valley
6. Mr. Hameed Ahmad Mir , Field manager Bindo Gol valley GLOF project Chitral
7. Mr. Naveed Ahmad Office Assistant Bindo Gol valley GLOF project Chitral
8. Mr. Shoab Jadoon Deputy Commissioner Chitral
9. Mr. Saad Qaisrani Assistant Commissioner Chitral (District Administration)
10. Mr Saleh AAC Mastuj (District Administration)
11. Mr. Basharat Ahmad AAC (District Administration)
12. Mr. Dost Mohammad GLOF project
13. Mr. Abdullah Met. Assistant PMD officer Chitral
14. Mr. Shafiqullah Field Biologist WWF Pakistan
15. Mr. Ejaz Ahmad Community Development Officer (CDO) Forest department KP
16. Mr. Waqar Zafar Chief Environment Planning & Development Department Govt. Of KPK
17. Mr. Khalil Ahmad NPM , Pakistan GLOF Project

This meeting was organized as an alternative for the original intention of the MTE team to travel to Chital Valley and meet the local stakeholders on site. As security conditions did not allow for the team to travel it was most appreciated that all local stakeholders took the effort to travel to Islamabad to have the opportunity for a lengthy and in-depth discussion of project progress, emerging issues and lessons.

The MTE team presented the objectives of the evaluation and stressed the importance of an open and frank discussion to learn from the challenges and successes of the project in Chitral Valley.

Mr. Hameed Ahmad Mir , Field manager GLOF project Chitral, gave a detailed presentation on the project progress so far and this kick started a general discussion:

- Project activities have led to markedly higher levels of awareness of GLOF hazard. A series of CB DRMC activities, involving all local stakeholders, has resulted in a better exposure to the nature of the hazard, risk and vulnerability of the communities to GOF. The community representatives express their satisfaction with what the progress has been able to achieve so far.
- The CCA structures are lower than the 2010 extreme flood levels, but the communities express to be certain that the structures will still protect them and limit damage and reduce their vulnerability.
- The community representatives also express that “they feel safe now”.
- The community gets also indirect benefits though skills training involved with the construction of the structures, such as gabion wiring.
- The initial expectations of the communities are met and most set targets are achieved.
- An indigenous early warning system is formed, existing of 4 youth-based hazard watch groups.
- A new CB DRM committee is formed and registered as a CBO, with all households participating. The CBO has also an endowment fund and a monthly contribution of all households. The committee has six safe havens identified for evacuation purposes.
- Up to now, 16 CCA structures were identified by the communities and eventually 5 were prioritized, mainly gabion walls and one river diversion (to limit land loss). The assistant district engineer was involved in the design and construction monitoring.
- The 2010 GLOF event caused the river to change course and this resulted in the loss of 45 acres of arable land.
- Up to 80% of the construction work is done by the local communities.
- Based on community reports, there are many potentially hazardous lakes. PMD will follow up this year by visiting these sites and assess if additional interventions can still be taken up by the project.
- The initial GLOF site appeared to be a complex site with no real pro- or supra-glacial lakes, but a recurrent ephemeral lake formation downstream of the glacier tongue in a narrow gorge by snow avalanches and mass movement materials, leading to catastrophic outbreak floods.
- It was found to be a challenge to find female trainers to organize targeted training sessions for the women of Chitral.

Mr. Shoab Jadoon Deputy Commissioner Chitral:

- Chairs the District DRMC.
- Stressed the lengthy community consultation process.
- Expressed to be glad the project is there and reported a well-coordinated effort.
- He hopes the people feel more safe now, although they continue to live in a multi-hazard environment.
- The project has raised the local confidence of the communities in their own capabilities (empowerment).
- The quality of the construction works is ensured by support and monitoring by district engineers.
- At KP level, other districts as Mansheera, are also prone to GLOF and would need assistance.
- He sees as key learning the fact that GLOF is now well understood as phenomenon and that awareness levels have been clearly raised and DRM improved.
- There is still limited knowledge of the upper stretches of Chitral Valley, very remote and sparsely populated.

- Some feasibility studies have been carried out for potential hydropower projects for which GLOF is a critical hazard.
- In hard terms, the CCA structures are appreciated as they contribute to a sense of safety of the communities.
- In soft terms, the improved knowledge and raised awareness of GLOF as a hazard, are seen as clearly beneficial.
- The EWS is not yet installed and the district authorities are curious to see it functioning.

Mr. Abdullah PMD officer Chitral:

- Sees a need to train community members on basic meteorological phenomena.
- The present observatory should be improved and a lightning detector could be added to the present set of equipment.
- He suggested a wage-based employment of community members for meteorological monitoring at various sites in Chitral.
- The proposed PC-1 initiative could support a better sustainability of the meteorological network.

Forest staff:

- Chitral has a vast glaciated area, of which Bindo Gol has been used as a pilot area, but now activities need to be replicated to other areas. Overall, there is a lack of information on lakes and glaciers, and what is available is mostly Remote Sensing-based.
- Fuel wood consumption per household is very high (up to 80kg per hh/day in winter) and this leads to considerable stress on the forest ecosystem.
- There is a need for more focus on ground cover, such as improved pasture management and rangeland management to reduce land degradation and therewith downstream flooding.
- Now there is a general lack of afforestation, as needed to limit runoff.

Others points raised:

- There is a need to pursue the idea of a GLOF School, to bring other communities, exposed to GLOF, to the pilot sites to be exposed to the pilot activities and to learn from the demonstration of interventions.
- This should also be extended to other district authorities to bring them to the pilot sites.
- The CBO members express their satisfaction, but find it difficult to engage women in all project activities and that there are limited options to support women's skills development.
- They also express the need to have access to more machinery to help with reconstruction and rehabilitation works of the 2010 floods.
- Their livelihoods depend heavily on irrigation channels and therefore they feel the need to strengthen the channel inlets.
- A critical bridge has been washed away, separating two now isolated communities. Support for rehabilitation would be very welcome.

Annex 5 SITE VISIT REPORT OF BINDOGOL VALLEY, CHITRAL KPK AND BAGROTE VALLEY GILGIT DISTRICT, GILGIT BALTISTAN PROVINCE

Compiled by Dr. Bashir Hussain Shah

Dr. Hans the international consultant could not get NOC for field visit of Chitral and Gilgit Baltistan because of security reasons. Therefore the national consultant was asked to visit both the Bindogol and Bagrote valleys and meet the communities and other stakeholders of the GLOF project, as well as visit and check the adaptation / mitigation structures for their

appropriateness, design and effectiveness for protecting the life and properties of the local communities during GLOF events. Because continuous rains and bad weather in late March and the first two weeks of April 2014, the visit was delayed and it was made possible in the middle of April 2014 (17-19 April to Gilgit and 22-27 April to Chitral).

1. Visit of Bindogol Valley Chitral district KP

1.1 Strengthening of Public Sector Department

1.1.1 Visit of Deputy Commissioner Office, Chitral

Visited the office of the Deputy Commissioner Chitral along with Mr. Khalil Ahmad NPM and Mr. Hamid Field Manager GLOF Chitral. DC was out of station and Assistant Commissioner, Chitral chaired the meeting. After an introductory session, the District Disaster Management Officer gave a briefing on the activities of the District Disaster Management Authority and about the establishment of District Emergency Response Cell (DERC) with help of GLOF project in the office of the Deputy Commissioner Chitral. It was told that GLOF project provided all the necessary furniture, computers, communication system and other necessary equipment required for DERC. The tents sleeping bags, survey equipment and other relief equipment was provided by the project. As line telephone system does exist in the remote valleys including Bindogol and even mobile phones work only in Chitral city and few km distance of the city, towers for wireless system are being installed to use sets for communication in case of disaster or emergency.

It was also briefed that DC heads the District Disaster Management Authority (DDMA).

It was briefed that GLOF project arranged awareness workshops in Chitral and in Bindogol valley. GLOF project had arranged trainings in DRM which was attended by 65 participant from different line departments and NGOs and communities in Chitral. LEADS Pakistan conducted the disaster risk management trainings.

DERC was visited and all the equipments were seen and DDO explained the system.

It was told that when the wireless communication system is in place and EWS being established by PMD is place the DERC will be fully functional.

1.1.2 Visit of Forest Department

The office of the Community Development Officer of the Forest Department Chitral was visited along with GLOF staff. Mr. Ejaz Ahmad Community Development Officer (CDO) Chitral briefed about the responsibilities and activities of the CDO. It was told that his office is responsible for formulation Village Organization and social mobilization in the district. The community development section of the Forest Department is involving the communities in natural resource management of Chitral. They established Joint Forest Management Committees in different parts of the district and managing the natural resources by involving the communities. As forests does not exist in major part of the district their job is to promote Non Timber Forest Produce (NTFP) and promote community forestry by providing seedlings to the farmers for planting on the farm lands. They are promoting medicinal plants.

GLOF project strengthened the office of the CDO by providing the laptops and desk tops and necessary furniture and communication system. CDO is now using internet and using GIS for mapping. The Community Development Office has established their website" http://www.ntfpchitral.pk " They have uploaded on the website information

about natural resources and NTFP of Chitral and wild life species, natural vegetation etc.

They have established a nursery for forest tree species for community forestry and medicinal plants. They have also established seed production areas of Artimisia, Kaveer (Capparis spnosa) and seebuck thorn which are drought resistant species and medicinal and economic value.

CDO is helping GLOF in promoting natural resources in Bindo Gol. Community Development Officer and WWF Pakistan are providing seedlings for farm forestry to the farmers of Bindo Gol valley.

The CDO and the Field Manager are broadcasting regular programme on local Radio Pakistan Chitral and FM radio about the expected disaster of GLOF risks in local language for awareness of the local communities. The radio programme is quite effective as radio is only source of communication in the rural areas of Chitral district. They are also having GLOF awareness programme on the local TV channel

1.1.3 Visit of Field Manager GLOF, Chitral

Visited the office of the Field Manager GLOF, Chitral in evening. The office has been established in the Pakistan Meteorological Department Chitral near the Airport. Mr. Hamid Field Manager explained the facilities provided in the office and his activities.

1.2 Visit of Bindo Gol valley

The Bindo Gole valley was visited two times on the first day up Ozogh village located in the middle of the valley and second time up to the upper limit of valley. There are glaciers in the upper reaches of the valley which are the main source of water for small scale irrigation system in the valley. Being dry zone area having less than 250 mm average annual precipitation mostly in the form of snow, rain fed agriculture is impossible. The natural forests in the valley are non-existing. Only a small patch of juniper forests trees were seen at one place. The natural bushes are *Artimisia*, seebuck thorn and *Capparis sipnosa* locally called Capper or Kaveer. Its flower buds are used as vegetable and making soup and used as cure for many diseases.

Around Ozagh village there are many landslides mainly triggered because of stream bank cutting, irrigation channels and avalanches. The soil is loess and clayee and prone to mud flow when wet. The landslides are creating problems as they damage agriculture lands, roads and irrigation channels.

1.3 Meeting with DRMC Bindo Gol at their Office village Ozagh

Meeting was held at the office of the DRMC Bindo Gol at village Ozagh. The communities welcomed the MTE team at their office. After introduction of the community members objective of the visit was explained to them. Mr. Hameed-ur-Rrehman, Secretary General briefed about formulation process of the DRMC. I was informed that DRMC is now registered with District Disaster Management Authority (DDMA) Chitral and they are in touch with DDMA. He also briefed about the activities of the GLOF project in Bindo Gol. The awareness workshops held in the valley at different places and schools. He also briefed about the DRM training programme in the Bindo Gol.

The office building was provided by the communities and GLOF provided the furniture, lab tops, desk tops, generator, fax machine, scanner and photocopier etc. for strengthening the DRMC office. As there no PTCL line, DRMC with the help of Field

Manager arranged a wireless telephone. Now they are using internet and connected with outside world through internet and e-mails. They have now established a website of their own. All the information about the activities are available on their website.

The General Secretary can operate the computer and DRMC have hired a local post graduate young man Mr. Abdul Basit as Office Coordinator who is operating the computers and internet and website. Mr. Hamid Field Manager GLOF Chitral also helps them in IT matters at their office. It was beyond my expectation that IT facilitated office is being maintained in a remote area like Bindo Gol, where there is no telephone line or mobile telephone. The road is fair weather road and area is not accessible during rains or snow fall periods.

It was informed an endowment fund has been established in name DRMC Bindo Gol in which Rs. 10,00000 has donated by GLOF from adaptation fund and Rs.100,000 has been donated by DRMC for using its profit for maintenance of the office of the DRMC Bindo Gol. DRMC Bindogol is paying Rs. 10,000 /month to Mr. Abdul Basit Office Coordinator.

It was informed that DRMC has formulated Hazard Watch Groups in each village. The selection criteria of the members of the hazard watch groups was that they were either herder or ex-army personals. The herders do visit the upper pastures near the glaciers and do observe the formation of temporary lakes due to blockage of channels and can inform the communities about the outburst of such lakes. The ex-army personals have training in first aid etc. The members of the hazard watch groups were trained in DRM by the GLOF project through LEADS Pakistan.

The hazard watch groups were provided with uniforms, sleeping bags, tents, generators, microphones, wireless sets and instruments like pick axes, shovels, ropes etc. All the material was exhibited in front of their office.

It was informed that PMD has established an automatic weather station up in the higher place near village Bindo Rathani (Drongagh). Early warning system (EWS) has not been installed. It is planned to be in place by 2014. The indigenous EWS is being used by the communities. Although there is no glacier lake but there is gorge in the Bindo Gole stream and some time it blocked by the large pieces of broken glaciers and a temporary lake is created. After its bursting, flood occurs.

After briefing, questions were asked from the community members about the performance of GLOF project in awareness programme, DRM trainings and adaptation / mitigation measures. They showed their satisfaction about awareness and DRM training programme and protection gabion walls where constructed. In response to the question whether the protection structures will resist the flood event of magnitude of 2010 flood? They were of the view that they hope that structures will protect our houses from normal and high level floods but they were not sure whether the structures can resist the flood of 2010 magnitude but the protection walls will help in protecting our land and habitation.

They were happy over the adaptation/ flood mitigation structures but said there are still some places which need the protection walls such as two sites in Qaziabad village where many houses were endangered.

They showed their satisfaction about the role of the GLOF project that although the project is unable to address their many problems, but it is because of the project that for the first time in the history of Pakistan many Government officials like Deputy Commissioner visited the valley and have seen our problems. Other NGOs and line

department like WWF and Forest department are cooperating with us by providing seedlings for planting on the farmlands. Ten thousand seedlings of forest tree species were distributed through DRMC to the farmers for planting on their farmlands with irrigation. There are now no forests in the valley and the inhabitants are depending on the trees growing on the farmlands and natural bushes for meeting their demand for fuel wood. They said that GLOF project has organized us and now we can approach government line agencies and NGOs working in the Chitral district.

The main problem created by the 2010 flood identified by them was damage of the intakes of the channels and cutting of channels by landslide triggered due to river bank cuttings. The intakes of some channels were rehabilitated, but still there are many channels which could not be rehabilitated. Their request was that GLOF project should help in the rehabilitation of the channels. The other need highlighted was reconstruction of suspension bridges which were washed away by the 2010 flood and the communities are cutoff from the link road.

Both the demands of the communities are justified because the damage was done by the flood and project is working for disaster risk reduction of GLOF floods.

1.4 Visit of the Adaptation Structures at different villages in Bindogol valley

In the afternoon of April, 17 visited the Shogram village which is located at the outlet of Bindo Gol Valley. The Bindo Gol stream joins Chitral River near the Village. During 2010 flood there was cutting of bank along the village and agriculture land was eroded by Bindo Gol stream and the main Chtral river. Three gabion protection walls have been constructed and Chitral River has been diverted by excavating a new channel and constructing a diversion dike on its old path. At present the river is flowing along a new path. One gabion protection wall has been constructed along the bank of the Bindo Gol stream by the Disaster Risk Management Committee (DRMC) Bindo Gol through GLOF project funds. The length of wall is 200 ft. with 15 feet height having five steps. A 5 ft. wide apron has been added along the foundation of the protection wall. At the time of the visit back filling of the gabion protection was in progress.

The design of the protection walls was prepared by PEPACK engineers and C&W Engineers supervised the construction work on the instruction of Deputy Commissioner Chitral.

Along the main Chitral River two gabion protection walls have been constructed having 200 ft. and 150 ft length along the river bank below the houses. The protection wall having 150 feet wall is located at the point below the diversion dike. The second gabion protection wall is at the curvature of the river below the houses.

As the whole village is endangered by the river bank erosion, river diversion was considered and carried out. For excavating the new path of river and constructing the diversion dike at the upstream end an excavator was hired. The excavator worked for 262 hours to complete the job. At present the river is flowing through the new excavated path. The diversion dike is not strong enough to resist the high flow during snow melt period (May & June) and monsoon floods.

The GLOF project has to take quick action to strengthen the diversion dike by increasing its height by 4 meters along with increasing its width accordingly. It will be better to give stone pitching treatment on the upstream side of the dike. The dike has to

be extended to the river bank on the north. The pictures of the river diversion trough excavation in the river bed and diversion dike are attached below

Excavated river channel on the left side and diversion dike on right side for Chitral River at Shogram Payen village Bindo Gole

The alternative was to install gabion spurs along the curvature of the river below the Shogram village where river bank erosion was active instead of river diversion and gabion protection walls.

After looking at the river diversion and protection, a meeting was held with the communities of Shogram village. The meeting was attended by the community member of the Shogram village and DRMC Bindo Gol office bearers. The community members showed their satisfaction about the gabion protection walls and river diversion. When talked about weakness of the diversion, they were confused about it.

Next day on 18th April after completing the discussions in the meeting with communities visited different adaptation /mitigation structures constructed in different villages. The protection walls are located in the villages Pongodur (Drongagh), Ozagh (Gokhir), Bindo Rathani (Drongagh) and Gobashedeh (Drongagh).

There are three gabion protection walls at Pongodur village. The lengths of the three walls is 70 , 80 and 120 feet. Each wall is 12 feet high having 4 steps provided with 5 feet wide apron. The width of the first, second, third and fourth steps is 12, 9, 6, and 4 feet respectively.

At Bindo Rathani there are two stepped wall one along the bank of the stream and other is at the top of the bank for stopping the overflow. The length of the gabion protection walls is 60 feet and 100 respectively. The width, height and apron are the same as for the protection wall of Pongodur village stated above.

The length of the protection wall at Gobashedeh village is 100 feet with height and width of 10 feet each.

The gabion protection wall at Ozagh (Gokhir) is 300 feet long with height of 12 having 4 steps and 5 feet wide apron. The path of the original stream has been blocked with gabion walls and a new path has been excavated through the debris of a landslide, which had extended into the main stream and had diverted it towards the opposite bank on the right side.

The gabion protection walls are properly designed and constructed with proper foundation. The provision of 4 feet wide apron will make the protection walls more safe if any under cutting by river occurs. The galvanized no. 8 wire has been used for the gabion crates having 6x6 inch mesh.

At Bindo Rathani (Drongagh) village the two step wall constructed is properly designed and constructed but upper step was not needed. The upper gabion protection wall was constructed on demand of communities based on over flow of flood water during 2010 flood.

There are two sites in Qaziabad where houses are in danger by river cutting which need gabion protection walls or gabion spurs.

The communities are feeling safe where the protection walls have been constructed and happy with the GLOF project.

Pictures of some gabion protection walls in different villages are attached below;

Gabion protection walls at Pongodur (Drongagh)

Gabion Protection walls at Gobashedeh (Drongagh).

Gabion protection walls at Shogram village

Gabion protection wall and excavated diversion at Ozagh (Gokhir) village

Two stepped gabion protection walls at Bindo Rathani (Drongagh) viallage

Gabion protection walls at Bindo Rathani (Drongagh)

2. Visit of Bagrote Valley Gilgit Baltistan

Travelled from Islamabad to Gilgit by road, along with Mr. Khalil NPM GLOF and Prof. Iqbal Khan consultant in glacier studies and reached Gilgit in 16 hours at 10:30 pm.

Bagrot Valley is considered at high risk of GLOF from the five large glaciers. There are 1,690 households in the valley with a population of 16,000 people and it lies at a distance of 40 KMs from Gilgit City. The famous Bilchar Dubani peak subdivides the valley into Bari Bar (Big valley) and Chunni Bar (small valley). Bagrote is rich for its natural resources and surrounded by 5 glaciers with lakes with high risk of sudden outburst and flash floods.

There are six villages in Bari Bar Bagrote and three villages in Chuni Bar Bagrote. The names of the villages Bari Bar Bagrote are Sinakir, Datuchi, Bulchi, Chira, Farfooh, and Hoppa. The names of the villages in Chuni Bar Bagrote are Hamaran, Massingote and Taisote. The villages are connected with fair weather road and is closed during rains snow fall.

There are four major glaciers and many small glaciers in upper reaches of the Bari bar Bagrote valley. The major glaciers are Hinarchi, Unna, Garro and Gotoni. While in Chuni Bar Bagrote there is one Cotor glacier. According to the local communities Gotoni glacier is increasing with the increase in accumulation of its mass The glacier is located on the northern aspect while other three glaciers being on southern, eastern and western aspects are retreating but according to communities all the three glaciers are advanced and then retreated after every 10-12 years.

Irrigated agriculture is practiced in the valley by taking small channels from the stream fed by glacier melt. There is single crop as winter is covered by snow. The summer crop is wheat cultivated after snowmelt. The farmers are now shifting to potato cultivation which gives them 5-6 time higher production than the traditional wheat and maize crops.

Fruit orchards of apricot, plums, peaches, apples and cherry are common but not on large scale. Women of the area are hardworking and are helping the male members in agriculture fields.

There is no primary school or dispensary in Chuni Bar but in Bari there is school and dispensary in the center of the valley. Livestock farming is also common in both the valleys.

The main hazards are GLOF and flash floods .

2.1 Strengthening of Public Sector Departments

2.1.1 Visit of Forest Department

The first meeting was with forest department in the new Forest Complex. Conservator of Forest Gilgit and staff attended the meeting. After introduction the objective of MTE mission was explained to them. Mr. Ismail Zafar Conservator of forest gave briefing on the role of Forest Department in Gilgit Baltistan and Gilgit Circle. He said that for last 60 years the role of forest Department was conservation, but now the they have changed laws and now communities are being involved in the management of forest and natural resources. The forests are being exploited only in Diamir district. He explained since 1998 the department is facing law and order problem. He added that it is difficult to protect the forests and natural resources (NTFP) spread over an area of 72000 Km^2 by only 600-700 regular staff of the Forest Department. The policy has been changed and rules are being changed to involve communities in conservation of natural resources

The department is facing financial problems. The department is cooperating different NGOs working in the province. The department is active stakeholder of GLOF project. The department provided office building for the Field Manager of GLOF project and extending all the cooperating for GLOF project in Bagrote Valley. The department participated in the inception workshop and attended all the awareness workshops and DRM trainings. The Conservator Forest Gilgit appreciated the GLOF project in strengthening their department and particularly for providing sound system for the meeting hall.

It was informed Forest department has provided 10,000 seedlings of blue pine for planting in Bagrote valley. The communities have planted the seedlings.

As there is demand of glacier ice in Gilgit city and glacier ice taken from Hinarchi glacier and marketed in Gilgit city, it was suggested by DFO Giligit that an Ice factory may be established in Bagrote valley for using the glacier melt water for preparing ice and marketed in Gilgit. It will save the glacier and will create jobs for communities of Bagrote valley.

2.1.2 Visit of Field Manager GLOF

The office of the Field Manager located in Forest Department building was visited at night on 25th April 2014. Mr. Zahid Hussain Shah Field manager Gilgit showed all the rooms in their possession and showed the facilities provided by the GLOF project. He also briefed about the activities of GLOF in Gilgit Baltistan. He informed about his role in arranging awareness and DRM training programme through FOCUS and LEADS Pakistan in Gilgit and in Bagrote valley. He also informed he has been facilitating the different national consultants in the visit of Bagrote valley and cooperating in providing the information they needed for completing their studies.

2.1.3 Visit of Deputy Commissioner(could not be done because of strike around the office of the DC)

As there was a sit-in strike against the removal of subsidy on wheat around the office of Deputy Commissioner the visit of the office of Deputy commissioner office was not possible. Deputy Commissioner and his staff was busy and under tension to tackle the strikers. Anyhow the Field Manager explained the facilities and equipment provided by GLOF for strengthening the office of DC office and District Disaster Management Authority (DDMA) and establishment of DRC in the office of the Deputy Commissioner Gilgit.

2.2 Strengthening of Communities

2.2.1 Visit of Bagrote valley

As the Bagrote valley is divided by a ridge into two valleys Chuni bar Bagrote and Bari bar Bagrote, both the valleys were visited to meet the communities and visit the adaptation structures being constructed for protecting the land and properties in different villages.

2.2.2 Meeting with communities of Chunibar Bagrote

Meeting was held with communities of Chuni Bar Bagrote. After introduction of MTE mission and communities objective of the MTE visit was explained. Haji Adil Shah briefed about the activities of GLOF project in Chuni Bar Bagrote. There are three villages in the sub-valley and is the most remote area in GB. There is no primary school or health facility in the villages. There is no communication system; even mobile phone service is not available. There is no public transport. In case of emergency they have to hire special jeeps for taking the patients to Gilgit.

It was informed that 2010 flood and followed by another flash flood in 2013 damaged the irrigation channels and washed away the agriculture lands in one village. The road was damaged by a huge landslide. The communities rehabilitated the road on self help basis. Some of damaged irrigation channels were also rehabilitated on self help basis. One irrigation channel could not be rehabilitated because it was damaged by huge landslide and rehabilitation of channel is impossible through the landslide, which is still active. The only way is to put pipe through landslide area which is beyond the capacity of the poor communities of the area. The orchard of the command area of that channel have dried up and agriculture is barren

Avalanches and flash flood are common now and occur almost every alternate year. In response to question it was informed that 1992 a huge flood occurred in the valley causing the death of a person and 70 goats. The dead body of diseased person could not be found. The 2010 flood caused heavy damage throughout GB but during 2013 there was serious flash which dragged huge boulders in the stream causing cutting of agriculture lands in Bagrote valley. The boulders were stuck under the RRC bridge over the stream(Photo) below;

Briefing on the activities of GLOF it was informed that awareness workshops about climate change impacts and risks of GLOF were held at Jalalabad village located at the outlet of the Bagrote valley and in Bari Bar Bagrote valley. Community members from the three villages of Chuni Bar Bagrote attended the workshops.

It was also informed that a Hazard Watch Group has been formulated in the Chuni Bar. The members of the hazard watch group are ex- army personnel and herders The hazard watch group member are trained in DRM and have been supplied the necessary equipment for tackling the emergency and flood disasters.

It was told that the equipment is not sufficient and need more equipment for hazard watch group members.

It was also informed that DDMA has approved a community center hall at Taisote village of 10x 16 feet. The community hall is under construction. The GLOF project will help the communities in providing strengthening the community center by providing furniture and other necessary equipment

I was told that safe heavens have been identified and the project will help in improvement of path to reach the safe heavens in case of floods. It also informed that FOCUS provided tents and other relief equipment for the village. There are two parts of village Taisote village: Taisote Hatey and Taisote Yurey. Taisote Hatey village has 130 household which are being protected through a Gabion Protection walls, but similar danger of avalanches occur above the Taisote Yurey which need similar Gabion protection.

Another problem identified by the communities of Taisote Yurey was that the spring near the village has lot of sulfur which causes diseases and stomach disorder. They need help for a water supply scheme for the village. Field manager promised to contact different NGOs and Government concerned line departments for water supply.

Two requests were put forward one was for stabilization of the landslide on Girch village, which is creating problem of damage to the link road, irrigation channel and agriculture lands.

The second request was to either stabilize the landslide which had damaged the suspension bridge and had cut off Hamaran village from the link road and the communities have to cross the channel on foot. In case of emergency they have no link to road. There is also a crack on the slope above the village, which shows hazard of huge landslide which can cause the blockade of the Bari bar Bagrote and Chuni bar Bagrote streams and whole village along with productive agriculture lands can be affected by the landslide. The picture of the broken bridge and landslide is attached below;

Picture the Hamaran village and broken bridge . The picture below close up of the broken end of bridge by landslide

Meeting with DRMC Bagrote at their office at Datuchu Bagrote on 25 April 2014

Mr. Zahid Hussain Field Manager gave presentation on the achievement of GLOF project in Bagrote valley, Gilgit Baltistan. The main achievements are as under

- Community awareness and sensitization on climate change and GLOF
- Mass awareness through print, electronic media and radio Pakistan
- Establishment of Endowment Fund for sustainability CBDRM in the Bagrote valley.
- Establishment of DRMS office and support for sustainable management of the office of DRMC
- Strengthening of the village hazard watch groups. Each group is provided with necessary equipment to cope with any emergency.
- Strengthening of indigenous Early Warning System. The communities and watch groups are strengthened by providing necessary communication and management equipment to cope with the situation and generate warning to the downstream villages for their safety
- Climate Change adaptation structures at different hotspots were identified by the concerned communities and work on the completion of the structures is in progress. .
- The CBDRM training conducted for male and female community members
- Installation of automatic weather station, rain, snow and river gauging carried out at different location of the valley by PMD.

- Identification of Safe Haven and access routes in different hazard vulnerable villages
- Bagrote Valley Disaster Risk Management Plan is prepared
- District Gilgit Disaster Risk Management Plan is prepared
- Establishment of District Emergency Response Cell in Gilgit
- Strengthening of Key Stakeholder/departments (DDMA and Forest Department)
- GLOF Impact Study on Biodiversity and Ecosystems in Bagrote
- GLOF communication and awareness strategy GLOF communication and awareness strategy
- Identification of key stakeholders and potential partners at provincial levels to share knowledge, strengthen linkages and develop partnership for GLOF Risk Reduction

It was informed that Dubani Development Organization was established during 1997 is partner Organization for implementing the GLOF project. Disaster Risk Management Committee of Bagrote was formulated.

After completing the presentation questions were asked from the community members about the performance of the GLOF project. They confirmed the statement given in the presentation given by the Mr. Zahid Hussain Shah Field Manager.

It was informed that an endowment fund has been established in name DRMC Bagrote in which Rs. 1,000,000 has given from adaptation fund by GLOF and Rs.100,000 has been donated by DDO for using its profit for the maintenance of the office of the DRMC Bagrote. DRMC has hired two Coordinator male and female. Both the Coordinators are being paid Rs. 5000 per month each from the profit of the Endowment fund.

GLOF project has strengthened the DRMC Bagrote office. The building was provided by the communities and GLOF provided the furniture, laptops and desk tops, generator, fax machine, scanner and photocopier. They are using SCOM phone line and internet is being used with mobile phone. Now they are using internet and connected with outside word through internet and e-mails. They have now established a website of their own. All the information about the activities are available on their website.

The DRMC has formulated Hazard Watch Groups for each village. The members of the hazard watch groups were herders, hunters and ex-army officers. The members of the hazard watch groups were trained in CBDRM by FOCUS and LEADS.

GLOF strengthened indigenous EWS by providing necessary communication system. EWS will be established by PMD during the current year. In response to a a question it was informed that after 2010 flood, they experienced a flash flood during April 2013. They experienced a serious GLOF during 1985 in Bari bar Bagrote.

The communities indicated threat of flash floods in Sanikar village which was experienced in 1995. They requested for protection above the village for saving the village from such flash floods in future. The team visited the village after meeting and it was suggested to construct gabion check dams in narrow deep stream passing from the right side of the village. The check dams can reduce the speed of the flash flood to protect village from cutting of the banks of the stream.

The other problem identified by the communities was of expected disaster of huge landslide of Hamaran village as large cracks are seen above the village on slope. It may repeat the history of Attaabad landslide which created a 22 km long lake on silk route. The problem was also identified in meeting with Chuni Bar Bagrote communities.

2.2.3 Visit of Adaptation Structures in Bagrote Valley

The adaptation structures were visited in the Chuni bar Bagrote on 23rd April and 25th April respectively. At Chuni Bar there is only one structure (Protection wall) to protect the Taisote Hatey village having 130 household. The flood already damaged the village in the past. The construction work of the gabion protection wall was in progress. Two steps were completed and they were hoping to complete the structure in next 15 days. The second step was constructed by giving step of 3 feet. The length of the gabion is 330 feet with 4 steps. The width of the first, second third and fourth steps is 12, 9, 6 and 3 feet respective. They are using machine woven wire crates for the gabion wall construction. As the wall is constructed on the ridge, it was suggested that the third step should be in center of the second step leaving 1.5 feet on both sides and fourth step should again be in the center of the third step wall leaving 1.5 feet on both sides. The photographs of the gabion wall are attached;

Next day visited Bari bar Bagrote and the construction of other protection was observed. A gabion protection wall was under construction on the north side of Chira village near the tongue of the Hinarchi Glacier. The protection wall is 300 ft. long with three steps. The width of the first, second and third steps are 9, 6 and 3 feet respectively. The first potion of the gabion was completed through which an irrigation has been passed for the Chira village. The first step which in the foundation was complete and the villagers were working on the second and third steps. The photographs of the wall are attached below. The workers were weaving wire crates on site.


On right side photo of whole protection wall under construction & on left side villagers are busy in construction

Photo of completed first portion of protection wall at village Chira Bari Bar Bagrote

Another gabion protection wall is under construction in Khama village where avalanches hit the village from Rakaposhi peak. The length of the wall is 350 feet. The construction work is in progress. We could not visit the site because a full day was needed for walking up and down to visit the site.

From Chira village we drove up into upper part of the valley where the Unna glacier and Gargo glaciers are meeting. At Darija village the work on path clearance of stream was in progress. The photo of excavator busy in path clearance is shown below. It was

told that a bulldozer was hired for constructing the road through stream bed for taking the excavator to site at Darija village for path clearance. The path clearance was considered necessary because during 2013 the flood from the stream damaged the agriculture lands because of obstruction of the stream bed by boulders dragged by the flood water.

The Unna glacier has advanced down in the stream bed and blocked the stream where it meets the Gargo glacier. There is chance if both the glaciers meet a temporary lake may be developed and may cause GLOF. The photographs of the advanced Unna glaciers are attached.

Photographs of advancement of Unna glacier, on right is the close up of the glacier tongue

Hinarchi glacier had advanced and reached the main stream above the Chira village, but now is retreating. The glacier at the tongue is covered with debris, but the portion under the cover of the debris can be seen on right side photograph below

3. Conclusions:

- The communities at both the valleys confirmed that the GLOF project has successfully completed awareness about the GLOF risks and CBDRM training programme in both the valleys
- The DRMC committees has been strengthened by providing necessary office equipment and are using internet and established their own websites in both the valleys
- Hazard Watch Groups has been formulated in the vulnerable villages and the members of hazard watch groups has been trained in CBDRM and has been provided necessary equipment for coping the any emergency
- With the establishment of Endowment fund the DRMC sustainability has been ensured. Both the DRMCs have engaged office Coordinators to help the DRMCs in running the offices.
- At both valleys safe heaven has been identified and GLOF will improve paths for easy access to safe heavens in case of emergency.
- PDM has installed automatic weather stations in both the valleys and stream gauges system at Bagrote valley but the location is in the lower reaches of the stream below some of the villages. PDM has to put stream gauging in the upper reaches of the stream above the all the villages so that under EWS the communities of all the all villages are informed well before the flood reaches
- The indigenous EWS system has been strengthened by providing necessary communication equipment
- The gabion protection walls are properly designed and constructed well particularly with provision of apron in Bindo Gol valley
- In Bagrote valley the work on the construction of gabion protection walls is in progress and expected to be completed in May 2014.
- The gabion protection walls will resist the normal and above normal floods but floods of 2010 flood magnitude may dangerous but even then the communities are feeling safe where constructed

- Although there is no glacier lake in BindoGol valley and there are only para-glacial lakes in Bagrote valley but the frequency of flash floods has increased because of cloud bursts and outburst of temporary lakes due to blockage of the channels. The adaptation structures constructed in both the valleys are justified and the communities are feeling safe where the structures has been constructed
- PEPACK has considered only Gabion protection walls and have not considered the option of gabion spurs which are more useful and economical, may be because of demand of the local communities.
- The diversion dike for diversion of Chitral river at Shogram Payan seems to be weak. It is felt that it may be washed away during high flows in summer. It is suggested that the diversion dike may strengthened by increasing its height by 4 meters and extended up to bank on the north as soon as possible but before monsoon season.
- It was better that four to five layered gabion spurs with apron around their tips had been constructed instead of protection walls and river diversion at Shogram Payan.
- There are still some critical sites such as Qaziabad in Bindogol valley and Taisote Yuree village in Chuni Bar Bagrote where gabion protection walls or gabion spurs are needed to protect the houses of poor inhabitants.
- There are many landslides and destabilized slopes in Bindogol valley particularly in Ozagh (Gokhir) area and few landslides in Bagrote valley which may be considered for stabilization by GLOF project. It is suggested the communities from both the valleys may be taken for exposure visit of slope stabilization activities in Shangla and Buttagram and Balakot areas in Mansehra district of KP where successful slope stabilization activities has been carried out through UNDP projects
- Hamaran village is endangered by huge landslide because cracks are seen on the slope above the village. Gabion spurs and protection walls are needed on both side of the village in the streams from Chuni Bar and Bari Bar Bagrote valleys. GLOF project may consider the protection activities along both the streams around Hamaran village to reduce the risk of disaster of huge landslide which may take away the whole village
- The suspension bridge for Hamaran village over Chuni Bar Bagrote stream, the only approach to the village is damaged at one end because of a landslide. The bridge can be rehabilitated by stabilizing the landslide. GLOF project may consider stabilization landslide below the bridge because the landslide was triggered because flood during 2013.
- Although the livelihood programme is not in the mandate of the Project but rehabilitation of water channels and reconstruction of suspension bridges may be considered by the GLOF project because both irrigation channels and bridges were damaged because floods. The activities of the GLOF project in both the valleys will serves as demonstration for future GLOF Programme in Pakistan.

4. Acknowledgement

I am extremely thankful to Mr. Khalil Ahmad NPM GLOF project, who travelled himself for facilitating my field visit and the hospitality he extended during my visit to both Chitral and Gilgit. I also thankful to both Mr. Hamid and Mr. Zahid Hussain Field Managers GLOF for extending their cooperation and facilitation for making my field visit possible in both the valleys. I appreciate the cooperation of Assistant Commission Chitral for sparing time and briefing about the role of GLOF in strengthening DDMA and establishment of DRC in the office of the Deputy Commissioner. I am indebted to the DRMC members of both the Bindo gol and Bagrote for time they spared for briefing and sharing their views and hospitality. I am also thankful to forest officers of both Chitral and Gilgit Baltistan for sparing time for the briefing on the role GLOF in strengthening their offices.

List of Participants of community meeting at Chunibar Bagrote on 23 April 2014

1. Haji Adil Shah
2. Ashdo Ghulam
3. Mohammad Ayub
4. Abdullah
5. Mohammad Hassan
6. Ghulam Hussain
7. Ali Murtaza
8. Rehmat Ali
9. Ghulam Mohammad
10. Shakoor Ali
11. Khushdad

List of Participants of community meeting at DRMC Office Datuchu Bagrote on 25 April 2014

1. Mohammad Ali
2. Hussain Ali
3. Ali Murtaza
4. Amir Jan
5. Matmeen
6. Alnoor
7. Mazhar Ali
8. Shahadat Noor
9. Mazhar Ali
10. Sajid Ali
11. Shahid Ali
12. Tanveer
13. Ashdar
14. Mohammad Aman
15. Ayub Hussain
16. Mehar Ali

17. Zahid Ali
18. Safar Ali
19. Haji Adil Shah

List of Participants of meeting with Forest Department G. B at Forest Complex Gilgit

1. Mr. Mohammad Ismail Zafar Conservator of Forest
2. Mehmood Ghaznavi Divisional Forest Officer Gilgit
3. Mr. Yaqub Ali Khan Divisional Forest Officer Hunza Nagar
4. Jamshed Khan Dukhi PRO Forest Department
5. Mohammad Akram SDFO
6. Sabir Hussain SDFO
7. Ghulam Mohammad Range Forest Officer
8. Mohammad Ilyas PA
9. Mr. Khalil Ahmad NPM, GLOF Project
10. Mr. Zahid Hussain Field Manager Gilgit, GLOF
11. Pr. Iqbal Khan consultant GLOF

List of Participants of community meeting at DRMC Office Bindogil Chitral on April 2014

1. Hameed-Ur-Rehman General Secretary DRMC Bindogol
2. Mohammad Ibrahim President DRMC Bindogol
3. Burhan-udin Vice President DRMC Bindogol
4. Sher Azim Shah Deputy Secretary DRMC Bindogol
5. Jaj Mohammad Cashier DRMC Bindogol
6. Sher Azeem Shah Member DRMC Bindogol
7. Khush Kher Member DRMC Bindogol
8. Abdul Ghafoor Member DRMC Bindogol
9. Dinar Khan Member DRMC Bindogol
10. Khalil ullah Member DRMC Bindogol
11. Janat khan Member DRMC Bindogol
12. Saleem ullah Member DRMC Bindogol
13. Abdul Khaliq Member DRMC Bindogol
14. Dost Mohammad Member DRMC Bindogol
15. Talib udin Member DRMC Bindogol
16. Abdul Rauf Member DRMC Bindogol

List of Participants of community meeting at Shogram village Bindogil Chitral on April 2014

1. Mohammad Ibrahim Chairman DRMC Bindo Gol
2. Hameedur-Rehman General Secretary DRMC Bindo Gol
3. Janat Khan Member DRMC Bindo Gol Member DRMC Bindo Gol
4. Abdul Rauf Member DRMC Bindo Gol
5. Sher Mohammad Din Member DRMC Bindo Gol
6. Abdul Basit Coordinator DRMC Bindo Gol

7. Dinar khan Member DRMC Bindo Gol
8. Khalique-Zaman Member DRMC Bindo Gol
9. Qayyaum Member Project Committee
10. Yamir-udin Member Project Committee
11. Riaz Member Project Committee
12. Aziz -ur-Rehman Member Project Committee

Field Visit Plan of Chitral with MTE Mission

DATE	ACTIVITY	TEAM
17-04-2014 Thursday	Travel from Islamabad to Chitral (by air)	MTE National Consultant (NC) and NPM
17-04-2014	Visit of DERC Chitral and Community Development Section of Chitral Forest Division & visit Shogram village in the afternoon	NC & NPM and FM
18-04-2014 Friday	Visit of Adaptation Structures and Meeting with Community at Bindo Gole Visit office of Field Manager GLOF Chitral in the evening	NC & NPM & FM
19-04-2014 Saturday	Travel Back Islamabad (by-road)	NC & NPM

FIELD VISIT PLAN WITH MTE MISSION TO GILGIT

DATE	ACTIVITY	TEAM
22-04-2014 Tuesday	Travel from Islamabad to Gilgit by road	-MTE National Consultant (NC) and NPM
23-04-2014 Wednesday	Visit of DERC Gilgit and Forest Complex of GB Forest Department	NC & NPM
24-04-2014 Thursday	Visit of Adaptation Structures and Meeting with Community at Chuni Bar Bagrot	NC & NPM & FM

25-04-2014 Friday	Visit of Adaptation Structures and Meeting with Community at Bari Bar Bagrot	NC & NPM & FM
26-04-2014 Saturday	Travel back to Islamabad by road Visit Slope stabilization River bank erosion structures in Dubair nalla Kohistan Shangla district (night at Besham)	NC & NPM
27-04-2014 Sunday	On way to Islamabad visit Flood protection measures & slope stabilization in Buttagram Arrival Back in Islamabad	NC & NPM

ANNEX 6 List of Project Documents consulted

Project Document Revised Final Version April 26th 2011

Inception Report, Report of the Inception Phase and Inception Workshop, organised on 15-17 September 2011

Annual Progress Report 2012
Annual Progress Report 2013

Quarterly Report January- March 2013
Quarterly Report April-June 2013
Quarterly Report July-September 2013

Annual Work Plan 2012
Annual Work Plan 2013
Annual Work Plan 2014

Minutes of the 1st, 2nd, 3rd and 4th PSC Meetings

Project Reports:

Fariduddin, S. (2013). GLOF Communication and Awareness Raising Strategy for Pakistan, 54 pages.
FOCUS (2013). Project Progress Report on Community Based DRM and Hazard and Risk Mapping in Bagrote and Bindogol Valleys, 15 pages.
Gohar, A. (2013a). Study on the Best Practices and Indigenous Knowledge of GLOF and other Climate Change Induced Disasters in Chitral District, KP Province, 50 pages.
Gohar, A. (2013b). Study on the Best Practices and Indigenous Knowledge of GLOF and other Climate Change Induced Disasters in Gilgit District (Gilgit-Baltistan), 51 pages.
Haider, N. (2012). Literature Review on GLOF Issues: Work done in Pakistan, 15 pages.
Iqbal, A. (2013). Developing a GLOF Knowledge Repository for Pakistan.
Khan, A.N., Ali, A. and Jan, M.A. (2012a). Knowledge, Attitude and Practice (KAP) about Glacial Lake Outburst Floods (GLOFs) in Bindo Gol Valley, District Chitral, , 53 pages. University of Peshawar.

Khan, A.N., Ali, A. and Jan, M.A. (2012b). Socio-Economic Impacts of Glacial Lake Outburst Floods (GLOFs) in Bindo Gol Valley, District Chitral, 61 pages. University of Peshawar.
Khan, M.I. (2013). GLOF Risk Reduction Guidelines for Chitral, Khyber, Pakhtunkhwa, Pakistan, 43 pages.
LEAD Pakistan (2013).GLOF Disaster Risk Management, Training Manual, October 2013, 73 pages.
Lone, M. A. (2012a). A Study on Socio-Economic Impact of the GLOFs at Bagrot Valley in Gilgit-Baltistan, 44 pages.
Lone, M. A. (2012b). Knowledge, Attitude and Practice (KAP) Studies on GLOFs at Bagrot Valley, Gilgit Baltistan, Pakistan, 65 pages.
NCER (2013). Ground Penetrating Radar (GPR) Survey of Bindogol Valley Glacier (Chitral) and Bagrot Valley Glacier, Gilgit. Identification & measurements of GLOF lakes. Technical Report prepared by Sarfraz Khan and Asif Khan, National Center of Excellence in Geology (NCEG), University of Peshawar, 15 pages.
PMD (2012a). Development of Criteria for Hazard & Vulnerability Risk Assessment, 21 pages, June 2012.
PMD (2012b). Feasibility of Early Warning System, 2 pages, September 2012.
PMD (2013a). Scientific Indicators for Monitoring GLOF, 8 pages, January 2013.
PMD (2013b). Hazard Assessment and Identification of Sub-/Supra Glacier Lake of Bindigol Valley, Chitral, 2 pages, November 2013.
PMD (2013c). A GIS based Draft Report on updating of GLOF Lake Inventory of Northern Pakistan & Establishment of Community-based Erly Warning System in Bagrot and Bindogol Valleys, 10 pages.
PMD (2013d). Standard Operating Procedures (SOP) for DRR Committees, Early Warning Systems (EWS) and Emergency Response Cell (ERC). Draft Report, December 2013, 21 pages.
Rao, A.L. (2013a). GLOF Risk Management Report, Part-I, for the Pakistan GLOF Project, 58 pages.
Rao, A.L. (2013b). GLOF Risk Management Manual, for the Pakistan GLOF Project, 37 pages.
Wani, B.A. (2013a). Impact of Glacial Lake Outburst Floods (GLOFs) on Biodiversity & Ecosystem in Bagrote Valley, Gilgit-Baltistan, 79 pages.
Wani, B.A. (2013b). Impact of Glacial Lake Outburst Floods (GLOFs) on Biodiversity & Ecosystem in Bindo Gol Valley, District Chitral, Khyber-Pakhtunkhwa, 66 pages.

Additional Scientific Literature consulted:

Bolch, T. (2012). The State and Fate of Himalayan Glaciers. Science, Vol.336, 20 April 2012, p. 310-314.
Gardelle, J. (2012). Evolution recente des glaciers du Pamir-Karakoram-Himalaya: apport de l'imagerie satellite. Decembre 2012, PhD Thesis, University of Grenoble.
Hewitt, K. (2005). The Karakoram Anomaly? Glacier Expansion and the "Elevation Effect", Karakoram Himalaya. Geography and Environmental Studies Faculty Publications, Paper 8.
Kääb, A. (2012). Contrasting patterns of early twenty-first century glacier mass change in the Himalayas. Nature, Vol. 488, issue 7412, p.495-498, 12 August 2012.

Annex 7 Co-financing Table

Sources of Co-financing[3]	Name of Co-financer	Type of Co-financing[4]	Amount Confirmed at CEO endorsement / approval	Actual Amount Materialized at Midterm	Actual Amount Materialized at Closing
Adaptation Fund	AF	Grant	3,600,000	1,507,556[5]	
Multilateral Agency	UNDP Pakistan	Regular (core resources)	500,000	326,510	
National Government	Government of Pakistan	In-kind	3,500,000	400,000[6]	
		TOTAL	**7,600,000**	**2,234,066**	

[3] Sources of Co-financing may include: Bilateral Aid Agency(ies), Foundation, GEF Agency, Local Government, National Government, Civil Society Organization, Other Multi-lateral Agency(ies), Private Sector, Other

[4] Type of Co-financing may include: Grant, Soft Loan, Hard Loan, Guarantee, In-Kind, Other

[5] Based on Expenditure Statement of PMU, March 2014

[6] Based on estimation compiled by PMU, March 2014

Annex 8 Log of amendments and edits in response to the feedback and comments to the MTE draft report

Page numbers refer to the numbering of the draft report, not the present report.

Comment	Page	Action
1	9	The report of the field visits is annexed as Annex 5, including a list of main findings.
2	9	The report of the field visits is annexed as Annex 5, including a list of main findings. Dates are added.
3	14	The new scientific information related to the "Karakoram Anomaly" confirms the complexity of the reaction of the Pakistani glaciers to climate change and variation, but also confirms the relatively poor (field-based) knowledge base and scientific understanding of glacier response, including glacial lake formation. It helps to some extent in understanding the updated glacial lake inventory and the trends therein reported.
4	15	The evaluation team here expresses that it understands that in the design phase a decision had to be made in which areas piloting activities would be developed. As there were multiple potential areas a decision was apparently made for these 2 particular valleys with known GLOF exposure. A detailed documentation for this choice is not known to the team, as expressed, but the team sees the choice in the context of a need to pilot and learn, even given the limited field knowledge of local conditions.
5	16	Only minor edits and additions to the described project outcomes have been made after the field site visit. The key findings are reflected in Annex 5. No deviations of initial findings have been made.
6	17	A Valley DRM plan is being drafted. "Drafted" replaced the initial "developed", to indicate that the valley-wide DRM plan is being compiled, making use of the local CB DRM plans and consolidated into a district DRM plan. This process is not yet finalized and will be updated with the EWS and the related SOP.
7	20	The evaluation teams comments here that individual hazard maps have been compiled and on these maps vulnerable areas have been indicated, but not reflected in separate vulnerability maps. Risk maps have not been prepared and can only be produced as a result of the combination of the hazard and vulnerability inventories.
8	28	The visit to the Bhutan GLOF project is initially aimed at PMD staff directly involved with the set-up and testing of the EWS.
9	29	"Therefore, it is too early to claim any real impact after two years of project implementation". The team has added here: "Early outputs in the fields of sensitization, awareness raising, CB DRM, linkage to local authorities and emerging climate change adaptation structures are acknowledged, but have to proof themselves over time".
10	29	Added is: "Some communities reported that the skills learned through the project training and construction facilitates them in getting skilled construction work outside of the community." The team agrees that it is difficult to ensure lasting livelihood contribution through these activities and therefore suggests to explore possible alternative activities with beneficial livelihood impact, e.g. irrigation inlet rehabilitation works.

11	30	Regarding the working season/access the following sentence is added: “In practice, the project can work in the field from April to October/November. Access to high-altitude sites is even more limited from late June to September.”
12	31	The level of the 2014 budget is sees as ambitious as it is clearly higher than the initial budgets, but as experience has been gathered and the communities trained, it is still considered as realistic. The delay of the first quarter of 2014, with no budget release was taken into consideration by naming the budget ambitious.
13	31	$400,000 instead of the $40,000 mentioned (typo)
14	32	Outsourced activities referred to are: “in particular the series of GLOF related studies and the activities undertaken by PMD and its sub-contractors”.
15	34	Ground truthing here refers to the planned field verification of potentially hazardous glacial lakes identified in the updated glacial lake inventory by PMD, based on remote sensing imagery and needing a check in the landscape.
16	34	The sentence referring to the Chitral lake has been rephrased into: “Field verification has shown that the potentially hazardous lake in Chitral is not a pro-, supra- or en-glacial lake. It represents a recurrent temporal lake, formed by snow avalanches and mass movement materials blocking a narrow gorge downstream of the glacier tongue. The research conducted is still valuable as the ephemeral downstream lake represents a real and serious recurrent hazard with GLOF–like characteristics.”
17	34	Rephrased to: “Hire additional technical staff to strengthen the PMU with regards to documentation and monitoring and evaluation.” The procurement process for an additional staff member to strengthen the PMU is discussed by the PSC and covered in the AWP-Budget.