UNITED NATIONS DEVELOPMENT PROGRAMME

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PROJECT DOCUMENT

Pakistan

Project Title: Glaciers & Students - A scientific based approach to monitor climate and glaciers in Pakistani mountain regions and support hydrogeological risk prevention

Project Number:00144462

Implementing Partner: EvK2-CNR (Italy)

Start Date: July 2021 **End Date:** 30 September 2024 **PAC Meeting date:** 18 May 2022

Brief Description

The northern parts of Pakistan are home to some of the vast stretches of glaciers after the northern pole. The glacier reserves feed local livelihood system and support unique ecosystems of global importance, in addition to serve as source of water for downstream areas. In face of growing threat from global warming, these resources need assessment and monitoring through scientific technologies. The people living in mountain slopes of GB region are faced with risk of mountain hazards originating from glacier changes under the effect of climate change. The lack of information on climate change and assessment of glacial changes makes it difficult to predict the hazards. This project proposal aims at developing a consolidating program to establish monitoring of high-altitude climate and assessment of glacier changes, in support of environmental monitoring and natural resources management in Pakistan Mountains, Project activities will also contribute to improve risk assessment and prevention, dealing in particular with GLOFs and hydrogeological hazard, thanks to the application of remote sensing and GIS techniques and a dedicated web information system.

The project intends to actively involve Pakistan Universities and their students in the monitoring activities through a dedicated training and capacity building program in the field of glaciers monitoring activities and remote sensing analysis in order to provide the appropriate tools to ensure the pursuing of a long-term research activities at the end of the project.

Contributing Outcome (UNDAF/CPD):

UNDP Strategic Plan outcome 3: Countries can reduce the likelihood of conflict and lower the risk of natural disasters, including from climate change.
CPD Outcome 2 (UNSDF Outcome 6): Enhanced resilience and socioeconomic development of communities

CPD Output 6.3: Legal and regulatory frameworks and policies are in place, and institutions capacitated for the conservation, sustainable use, inclusive access and benefit-sharing of natural resources, biodiversity, chemicals, waste management and ecosystems.

Indicative Project Output(s) with gender marker[2]

1. Assessment and monitoring system of mountain glaciers and climate improved in Pakistan contributing to improved planning and management of water resources and natural resources including the sustenance of biological diversity and support to local livelihood base (*GEN-01*).
2. Collaboration and sharing mechanism among Pakistani and international institutions and students strengthened to build capacities for longer term glaciers monitoring through innovative approaches & technologies (*GEN-01*).

Total resources required:	Eur 1,100,000. USD 1,193,310	
Total resources allocated:		
	UNDP TRAC:	
	Donor (Govt. of Italy):	Eur1,100,000 USD 1,193,310
	Government:	
	In-Kind:	
Unfunded:	0	

Agreed by (signatures):

UNDP-Pakistan	Government of Gilgit-Baltistan	Implementing Partner EvK2CNR Italy
DocuSigned by: 89CEAEBB476B44B... Samuel Rizk, RR		Agostino Da Polenza, President
Date: 29 December 2023	Date:	Date:

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I. DEVELOPMENT CHALLENGE

Gilgit-Baltistan in the north of Pakistan, is home to unique geo-morphological set-up, hosting some of the precious ecological systems characterised by floral and faunal species of global importance. The vast glacier stretches on top of the Karakoram, Hindu Kush and Himalayan hills, classified as one of the largest glacier reserves after polar ice, serve as water towers for the productive and economic sectors of entire Pakistan. The steep rocky slopes and wide green grassy meadows, as we come down the glaciers, provide a favourable habitat to rare wildlife species; Markhor, Ibex, Blue Sheep, Snow Leopard, Lynx, Eagle, Marmot, Flying Squirrel, are some to quote, in addition to a large number of plant species having scientific and economic significance.

The valley floors are habituated by local human population, living there since long with their rich cultural heritage. The bond among humans, land, plants and wildlife for a mutually inter-dependent livelihood system is very strong and self-sustaining. It is further strengthened by flows of water from glaciers that irrigate their farmlands, nourish natural vegetation and fulfil human needs. An important element, since last few decades, has been the growing trend of nature tourism. Whereas the natural landscape, glaciers, wildlife and waterfalls attract a large number of national and international tourist, this becomes a source of employment and income for locals.

The ecosystem and natural resources, however, are not without risk and are taking the brunt of changing environmental and climatic patterns in the region. Whereas the reducing land cover, deforestation, over exploitation of land and wildlife species are directly linked to human interventions, the mountain disasters in the form of glacial lake outburst floods, landslides etc are the result of increased melting of glaciers. The number and frequency of these disasters has been increasing at fast pace, leaving behind damage to lives, property and infrastructure.

The mountain communities, already living in subsistence, are the most vulnerable to social and economic damage of these disasters. Women folks in mountain communities, who live behind at homes or work in their field while men are gone for business and labour, are at the forefront to take the damage of disasters. The economic impact of loss of livestock, houses, land and crops as a result of these disasters are felt life-long by the marginalized mountain population.

The government agencies and institutions have been performing, at the most, a role of providing relief after disasters. Risk management and reduction, at source level, has been lacking because of insufficient information on glacier resources.

The huge glacier reserves in the Gilgit-Baltistan region, despite of their scientific and economic significance, have been one of the least monitored resources in this region, owing mainly to the lack of capacities, technology and accessibility. Due to lack of monitoring data and capacities, devising effective strategies to cope with the increased occurrence of disasters originating has not been accomplished so far. It is important to mention that glaciers management and monitoring, due to their ecological, social and economic importance, has been part of development frameworks in other parts of the world.

The role of glaciers in freshwater provision and regulation is proven in many other parts of the world, necessitating for us to monitor these precious resources. By providing baseline information on hydrological and hazard assessments, the observation of glaciers in mountain regions help us understand the changes occurring in glaciers. The measurements of changes in glaciers mass and length through in-situ methods and remote sensing in mountain ecosystems have indicated changes in climate patterns (Nussbaumer S.U. et al., 2017). This leads us to the conclusion also, that in order to better understand the root causes of glacier melting and other changes, we must monitor meteorological factors in the glacier region.

The knowledge of the glacier “health state” is crucial for determining water availability, especially during the dry season. It is thus mandatory to collect information on specific, important glaciers, to determine their yearly contribution to river flow. Glacial systems work through a delicate equilibrium between snow accumulation and snow ice melting. In Karakoram, this balance is complicated by the debris cover, widely present on most glacier surfaces. Baltoro Glacier, thanks to its dimensions (about 60 km long and more than 500 km2 wide) and the fact that it is the way to K2, is one of the symbols of Karakoram glaciers. Owing to the fact that its lower part is debris covered and its upper

part is debris free, Baltoro can offer a wide spectrum of the different morphologies and typologies of Karakoram glaciers.

The glaciers of Gilgit-Baltistan provide 50.5 billion cubic meters of water to River Indus upon which country's 70 and 40 percent of agriculture and hydropower generation depends. This manifest that the food and energy security of Pakistan is highly dependent on this water tower, which is susceptible to global climate change phenomena. High altitude mountain glaciers of the region also serve as "Barometers of Climate Change" meaning that a slight change in the mean temperature imparts drastic changes on the glacial mass. Increase in the mean annual temperatures are recorded in Gilgit-Baltistan and there is also seasonal shift in the precipitation increasing the frequency and ferocity of hydro-metrological disasters.

Remote mountain communities of Gilgit-Baltistan inhabit in valley bottoms along rivers and streams are highly vulnerable to the disasters triggered due to climate change. The response time is usually in minutes due to close proximity to the glaciers steep slopes.

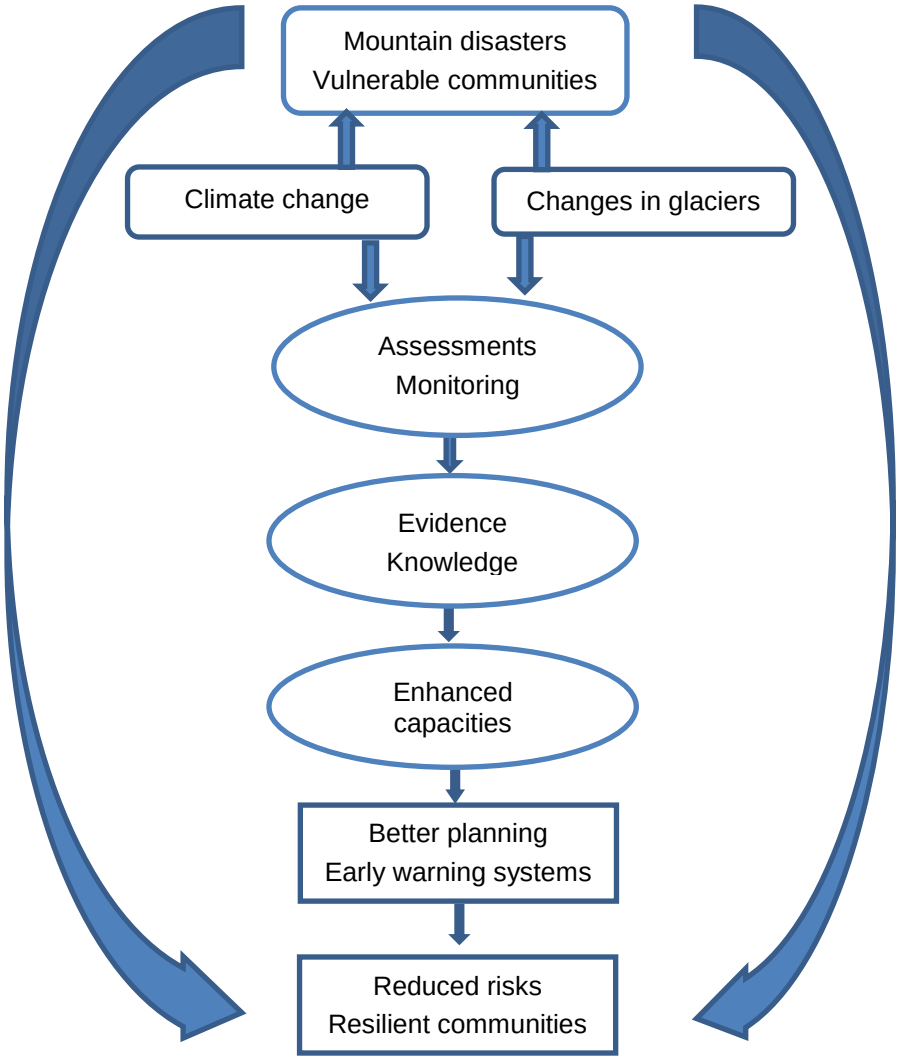
To devise effective strategies for sustainable mountain development and monitoring, prevention and adaptation to climate change it is also fundamental to increase capacity both at local and institutional level in mountain regions. Previous experiences in other regions of Europe and South America demonstrate that a sound understanding of measurement techniques and of the purpose of measurements is necessary for successful glacier monitoring. In addition, establishing durable institutions, capacity-building programs, and related funding is necessary to ensure that glacier monitoring is sustainable and maintained in the long term.

The mountains and glaciers are highly sensitive to climate change and may have serious consequences downstream e.g. changes in sea level, effects on hydro-power planning for industries, and water management in agriculture sector. Systematic research into and long-term monitoring of cryosphere is therefore necessary. However, it is the complex environmental and geophysical setting in mountain regions that makes it difficult to conduct research and monitoring (Salzmann et al 2014; Strachan et al 2016).

The measurement of glacier resources and monitoring of climate factors in Gilgit Baltistan will generate knowledge that can be used for awareness raising, decision making and formulating long term strategies for disaster risk reduction and better management of sectors related to water. However, at the same time, this necessitates the building of capacities to generate, manage and share these knowledge resources for coordinated efforts. Better decisions and actions in these sectors will have positive impacts on the management of water and land resources, ultimately enabling us to establish better responses to climate change and contribute in poverty reduction (Sustainable Development Goals No. 1, 6, 13 and 15).

II. STRATEGY

This project proposes an approach that will facilitate assessments, build capacities and hence reduce the risk of natural hazards originating from melting of glaciers under the effect of climate change. This approach consists of measuring the changes in glacier resources and the climate patterns at high altitude through advanced and proven scientific techniques using scientific equipment. The knowledge generated will be archived and shared through GIS based applications for scientific purposes, awareness raising, work planning and decision making at policy level. The same processes will be used to enhance local capacities in scientific institutions (i.e. universities) that will serve as an asset for longer term sustainability of the project initiatives. The concept can be illustrated as below:



Apart from establishing, maintaining and monitoring a network of high-altitude meteorological observation system, changes in the glacier bodies will be monitored implying in-situ measurements and remote sensing techniques. The data trends generated over a period will be used to establish a link between climate variations and glacier changes. The same will also provide indication of disaster risks and hence favour better planning and timely decision making to reduce risks in dependent sectors e.g. agriculture, water management, power production, disasters etc.

The in-situ measurement techniques used for glacier bodies are time consuming and require more resources, owing to the accessibility problems and harsh climatic conditions in the study area. The concept of observation in combination with a numb er of carefully selected index stakes can be used. They can be complemented with topographic precision mapping at about decadal intervals (volume change of entire glaciers) for smaller ice bodies or with laser altimetry/kinematic Global Positioning System for large glaciers. Following the monitoring strategy of the GTN-G, it is recommended to periodically validate and calibrate annual glaciological mass balance series with decadal, geodetically derived mass balances in order to detect and remove potential measurement or calculation errors (see Zemp et al 2013).

In addition, glacier front variation series (i.e. length changes) will be developed to assess the representativeness of the existing mass balance. These series provide insight into climate–glacier processes and glacier dynamics.

On the other hand, remote sensing methods will enable globally standardized glacier monitoring, which implies the potential for mountain wide and global inventories, as recommended by GTN-G. Remote sensing will also reduce the cost and time required to calculate changes in glacier length. This technique further allows determination of geodetic glacier mass changes for both individual glaciers and entire mountain ranges (see Gardner et al 2011; Jacob et al 2012).

There are several satellite instruments that can be successfully used in the field of glacier mapping, from declassified Corona panchromatic images (in operation from 1960 to 1972) to the suite of Landsat platforms (1972–today), Advanced Spaceborne Thermal Emission and Reflection Radiometer (2000–today) and Satellite pour l'Observatoire de la Terre (1986–today).

Remote sensing data will complement the in-situ measurements. Recent developments in remote sensing techniques promise automatic retrieval of glacier lengths in the near future, which will enlarge the available dataset substantially. Although satellite imagery allows for glacier outline mapping, terminus-position identification, and area and elevation determination and monitoring (also in remote areas), other observations can only be obtained in situ. Because ice can be hidden beneath the surface, proper mapping of debris-covered glaciers often requires control by fieldwork. Locally measured data are indispensable for understanding the physical processes that link glaciers and climate—information that is necessary for constructing better forecasting models.

Karakorum Range is equipped with a network of meteorological stations, installation which started in 2004. The automatic weather stations are located in Askole (3.500 m asl), Urdukas (4.000 m asl) and Concordia (4.700 m asl). The network is managed by Ev-K2-CNR in collaboration with the Pakistan Meteorological Department and provides unique ground-based information on Pakistan mountain meteorology, fundamental to improve the calibration of meteorological models and to support the study of climate variations and glacier dynamics in the area and the management of Pakistan mountain natural resources. Hydrogeological risk assessment and prevention, including landslides, flood and GLOFs hazard, is still a key challenge in the area and the use of GIS and remote sensing techniques can support the prevention and the mitigation of such risk in the region.

The data generated from climate and glacier monitoring will be archived in GIS based systems. It will be updated periodically and analysed for deducting conclusions. The information will be shared with stakeholders regularly to enable them take decisions on right time and make necessary arrangements for disaster management. The data can also be a valuable contribution to early warning system in the region. Through universities, and concerned departments, the data will be shared widely at local, provincial, national and international level with concerned entities.

The '*Scaling-up of Glacial Lake Outburst Flood (GLOF) risk reduction in Northern Pakistan- (GLOF-II)'*— a project funded by the Green Climate Fund and implemented by the Ministry of Climate Change, Govt of Pakistan together with Govt of Khyber Pakhtunkhwa and Gilgit-Baltistan with support of UNDP— is also expanding the early warning systems and discharge measuring network in the region by installing 50 automatic weather stations (AWS)- 22 in KP and 28 in GB-to upscale ongoing initiatives to protect communities from GLOF risks.

The Gilgit-Baltistan Wildlife & Parks Division of the GB Forest, Wildlife & Environment Department is the custodian of wilderness areas including the glaciers, whereas the GB Meteorology Department takes care of the observation of climate factors. Gilgit-Baltistan Environmental Protection Agency looks after the affairs of climate change, environmental monitoring and reporting to MoCC on climate and INDC's etc. Currently there is basic network of climate observatories in GB but does not suffice to take care of high-altitude needs. The technical capacities required for measuring the changes in glaciers are also lacking in the local research institutions like the Karakoram International University and Baltistan University.

The activities proposed under this project, however, require enhanced local capacities. The students and faculty of the local universities will be engaged in undertaking these measurements to build local skills and to develop their linkages with Italian research institutions who will be undertaking the field work.

For this purpose, the project will develop platforms where local research institutions can partner with international organizations to exchange knowledge and expertise and hence provide opportunities for collaboration leading to capacity building. The same is necessary to increase the sustainability of the ultimate outcome from this project.

The knowledge generated and enhanced capacities will contribute to reduction of risks from mountain hazards. These will also enable local communities, particularly youth and women to better cope with mountain hazards originating from changes in glacier bodies under the effect of climate change. Information on climate factors and changes in the glacier masses, will provide timely information for making informed decisions, and this will reduce the risk from mountain hazards at

local level and in the downstream areas. The knowledge generated will be disseminated through universities, local departments and other stakeholders to all concerned, for example, the agriculture department, Ministry of Climate Change, Gilgit-Baltistan Environmental Protection Agency, Disaster Management Authorities, FAO, GLOF-II, ETI and other identified in the process. For wider audience and the scientific community at global level, the glacier inventory will be published and circulated, and the research articles will be published in international journals.

The benefits of enhanced knowledge, information and capacities will be reaped by the people of Pakistan in general and the Gilgit-Baltistan in particular, irrespective of their gender, age, social and economic status or political affiliations. The knowledge and skills assets will strengthen the local policies and management strategies of natural resources that will ultimately reduce risks from natural hazards and ensure all-inclusive access to better livelihood opportunities for mountain communities. The marginalized rural communities dwelling in far flung upstream areas, particularly rural women, will be benefited the most, thus ensuring the principle of 'leaving no-one behind' and 'reaching to the farthest first'. The project outputs are in line with UNDP Strategic Plan outcome 3: Build resilience to shocks and crises' and SP Outcome 3: Resilience built to respond to systemic uncertainty and risk (2022-2025). The project adapts Signature Solution 3 i.e. Enhance national prevention and recovery capacities for resilient societies (2018-2022) and Signature Solution 3: Resilience (2022-2025).

III. RESULTS AND PARTNERSHIPS

General Objective: Management of natural resources and mechanism for risk prevention in Pakistani Mountain Areas improved by enabling an evidence-based assessment and monitoring system for mountain glaciers in face of growing threat from global warming.

Specific Objectives / Project Outputs: Include;

1. **Assessment and monitoring** system of mountain glaciers and climate improved in Pakistan contributing to improved planning and management of water and other natural resources including the sustenance of biological diversity
2. **Collaboration and sharing** mechanism among Pakistani and international institutions and students strengthened to build capacities for longer term glaciers monitoring through innovative approaches and technologies.

A - Project Outputs, Indicators, Activities and Activity Results

Output 1: Assessment and Monitoring:

"Assessment and monitoring system of mountain glaciers and climate improved in Pakistan mountain areas contributing to improved planning and management of water and other natural resources including the sustenance of biological diversity"

This result area addresses the technological and systematic needs for establishing an assessment and monitoring system for mountain glaciers. There is also a knowledge gap on Pakistani mountain glaciers, their status and threats faced because of global warming that need to be covered by providing evidences. The results achieved under this area will support decision making for sustainable natural resource management leading to conservation of important ecosystems and the strengthening of livelihood support systems at local level.

Moreover, the Project will make sure that Government of Gilgit-Baltistan, will be able to continuously provide necessary data to government partners to ensure adaptation of the agricultural and livelihoods sector to the changes generated from the glaciers' behaviour regarding GB and other provinces downstream. It will also be ensured that the climate data storage, processing, ready delivery to user and reporting to the national and global actors.

Output Indicators:

1.A Number of climate monitoring stations in glacier region established and maintained to provide data on changing climate patterns for use by MET Deptt, GB Government (GB-EPA) and other concerned.

1.B Number of glacial bodies measured, monitored and documented to monitor changes over time that can provide early warning for natural hazards and contribute in reducing risks faced by mountain communities, particularly women and marginalized groups, in downstream valleys.

Activity 1.1: Install/improve and maintain climate monitoring network

Maintain and improve the monitoring activities in order to assure the long-term availability of reliable data to support the management of these mountain protected areas. This component will be a key point to preserve the unique long-term environmental time series available in Karakorum through the maintenance and the improvement of the climate monitoring network. The activity foresees both the maintenance and the upgrading of the existing network installed by Ev-K2-CNR in the Central Karakorum National Park and the installation of new monitoring stations in other key sites of the region that will be identified during the first phase of the project in accordance with the foreseen research plan of the project, to support glacier monitoring activities too. The data generated from these stations will fill the gap in climate data already maintained by the MET department and can also be used by other departments like the GB-EPA, Agriculture Department, water management department and others as important information for taking decisions.

Activity Result: 8 (number of climate monitoring stations installed and/or improved)

Activity 1.2: Study and monitoring of glaciers and glacial bodies

This task could also foresee the carrying out of specific glacier and water monitoring/field campaign managed by Ev-K2-CNR. This work will be functional to several other potential activities, that could be developed in this framework, but also within other ongoing or new projects dedicated to water resources management, hydrological risk assessment prevention and natural resource preservation and management. This activity will foresee a preliminary survey to identify the monitoring sites. In the selected glaciers periodical field campaign will be organized to install monitoring equipment and to study glacier dynamics. Field data will be coupled with remote sensing information to better understand the impact of climate variations and future scenarios of glacier evolutions and water resources availability to support risk assessment prevention, including GLOFs.

This valuable information when analysed in relation to climate data can provide insights into the dynamics of changes in climate and glacier bodies. Information on changes in glacier bodies (length, depth, volume, mass) can provide valuable and timely indication of hazards originating from glacial melting (e.g. GLOFs) and thus will enable the Disaster Management Authorities to take timely and informed decisions to manage disasters and the risks associated to these calamities. Hence, the risks faced by mountain communities in downstream areas due to natural hazards will be reduced. Particularly women and marginalized groups, who are more vulnerable to mountain hazards, will benefit from these informed decisions and actions taken by the concerned authorities to cope with hazards. Long term climate, glacier and hydrological data will also be beneficial for hydropower planners in GB in order to plan and build hydropower projects, reducing risks to the hydropower projects by taking information of hydro-metrological disasters and also to take the climatic and hydrological parameters in account while taking executive decisions.

The results generated under this and previous activity will, in combination with data evidences generated under other projects (including GLOF-II project), help the regional and national or provincial governments to evolve their agriculture and livelihood strategies according to the behaviour of glaciers under changes in climate factors.

Activity Result: 4 (number of glaciers and glacial bodies monitored and studied)

Activity 1.3: Update the Pakistan Glacier Inventory

Publish the Pakistan updated glacier inventory, applying the methodology of Ev-K2-CNR used to develop the Central Karakorum Glacier Inventory to the Pakistan's Glaciers. The publication will be an enhancement of the Ev-K2-CNR "Central Karakorum Glacier Inventory" and will be extended to all glaciers in Pakistan. The report will describe all the glacial bodies and GLOFs in Pakistan, providing scientific -based comprehensive overview of the cryosphere resources of Pakistan, including detailed analysis of the recent glaciers' evolution and variations that will help in better understanding future scenarios.

Activity Result: 4 {Updated Pakistan Glacier Inventory Report (1), and other scientific research articles published (3)}

Output 2: Collaboration and Sharing:

"Collaboration and sharing mechanism among Pakistani and international institutions and students strengthened to build capacities for longer term glaciers monitoring through innovative approaches and technologies"

Output Indicators:

2.A Web based GIS climate and glaciers data archiving and sharing system developed and maintained to enable knowledge and data sharing among international institutions for scientific purposes, and the provincial and national authorities e.g. Met Deptt, GB-EPA, Water and Power Department GB, Disaster Management Authorities, Agriculture Deptt, and Water Mgt. Deptt.

2.B Number of students and faculty members of the local universities in Gilgit-Baltistan trained in glacier inventory and monitoring

Activity 2.1: Design and establish a web-based GIS information system

Implement a web GIS information system based on Ev-K2-CNR/SHARE GeoN etwork to collect and share the environmental information available in the area. The platform will support concerned authorities, local stakeholder and beneficiaries to monitor the status and the evolution of glaciers, thus supporting the prevention of GLOF and hydrogeological risk. The system will automatically elaborate satellite images and remote sending input in order to provide processed maps, data and metadata. This platform will represent a unique data and information repository and could have several applications to support glacier and water resources management and risk assessment prevention. The information system will be interoperable and will follow the international standards in terms of metadata and data format and QA/QC procedure, in order to guarantee the reliability of the information, facilitating the exchange of information at different level.

Thus relevant government departments responsible for monitoring climate (Met Deptt), disaster management (GB Disaster Management Authority), GB sectoral departments (Agriculture, Water), Gilgit-Baltistan Environmental Protection Agency and international development agencies (FAO, IFAD-ETI, WMO) will benefit from these platforms by gaining access to knowledge and data and mutual sharing of knowledge resources.

Activity Result: Web-based GIS information system developed, and data archived

Activity 2.2: Capacity building programme for faculties and students of Pakistani universities

Ensure a dedicated training and capacity building program for local universities in Gilgit-Baltistan involved in project activities. Thanks to the collaboration of Italian Universities, students and faculty of Karakoram International University (KIU) and University of Baltistan (UoB) could improve their knowledge in this filed, both by participating in monitoring field

activities and remote sensing analysis and through exchange programmes with Italian universities. This exchange will ensure the sustainability and the pursuing of the activities in the long-term period. International expert will prepare dedicated learning program that will be carried out at the Universities through seminars and workshop, on the field and through the involvements of students in the preparation of dedicated master and PhD Thesis.

Students read the Glaciers - A communication system within the universities will allow the competent department with the federal and provincial related institutions and part of the students to monitor and broadcast the results and participate in the actions downstream whenever relevant.

Activity Result: 100 (number of students and faculty members trained in glacier monitoring and related technologies with considerable representation of females)

B – Potential Proposed Partnerships

- **Government of Gilgit-Baltistan:** Gilgit-Baltistan presently consists of ten districts, has a population approaching one million, an area of approximately 28.000 square miles (73.000 km2), and shares borders with other provinces of Pakistan, China, Afghanistan, and India. The government of Gilgit Baltistan consists of democratically elected body with the Governor of Gilgit-Baltistan as the constitutional head. The Chief Minister of Gilgit-Baltistan is elected by the Provincial Assembly of the Gilgit-Baltistan to serve as the head of the provincial government in Gilgit-Baltistan. Planning and Development Department of GB leads the development of the province and is the custodian of all the development programmes that are implemented on the annual basis, in coordination with all the departments of the provincial government. They monitor the utilization of funds of the Annual Development Programme (ADP), provide approval of development schemes and coordinate training of economic development for all officers serving with the Gilgit-Baltistan Government. The GB Disaster Management Authority is the arm of National Disaster Management Authority responsible for managing the risks associated with natural hazards in the region. The GB-DMA will be one of the beneficiaries by getting access to real time and timely data on climate factors and changes in the glaciers that could become source of hazards, enabling them to take timely decisions and strengthen their early warning system for disasters. Gilgit-Baltistan Environmental Protection Agency will be one of the key, beneficiary as the Agency has already started programme on glacier monitoring, climate reporting, climate change strategy and climate change adaptation action plan.
- **Pakistan Meteorological Department:** The Pakistan Meteorological Department is both a scientific and a service department. It is responsible for providing meteorological service throughout Pakistan to wide variety of interest and for numerous public activities and projects which require weather information. In its services to aviation the department responsibility goes to some extent beyond national boundaries in fulfilment of accepted international agreements and obligations which include, among other things, the collection and rebroadcast of meteorological data. Apart from meteorology, the department is also concerned with Agrometeorology, Hydrology, Astronomy and Astrophysics (including solar physics), Seismology, Geomagnetism, Atmospheric Electricity and studies of the Ionosphere and Cosmic Rays. Pakistan Meteorological Department shoulders the responsibility to investigate the factors responsible for global warming, climate change its impact assessment and adaptation strategies in various sectors of human activities. Pakistan Met Department has been partnering in other projects like the GLOF-II project, and hence can benefit also from the database generated for high altitude climate assessment.
- **Karakoram International University (KIU):** The KIU was established in 2002 by a charter from the Federal Government on the orders of General Pervez Musharraf, President of Islamic Republic of Pakistan. KIU is to be a multi-campus university and is seeking to establish additional campuses where feasible, according to the availability of special support, local resources and indigenous expertise. Currently, the main campus has nearly 2300 students, nearly 100 faculty members and over a hundred administrative staff in sixteen academic departments. Skardu Campus has been started with four disciplines i.e. English, Computer Sciences, Business Management and Education. The Karakoram International University is a leading institution of higher learning committed to social development and evolution of peaceful

and pluralistic societies in the mountainous areas of Pakistan and geographically similar regions elsewhere. KIU mission is to promote human development at all stages of life; through growth, evaluation, synthesis, dissemination and application of knowledge, and provide a service that values sustainable, humanitarian, and economic development of the environment. Through the SEED project the KIU had received substantial support in several fields, as infrastructure development, furniture of equipment, including the installation of a Water Laboratory, scientific, such as the establishment of the Centre for Applied Mountain Studies (IMARC – Integrated Mountain Area Research Centre) and educational, with twenty students completing the PhD in Italian Universities. Thus, KIU is well acquainted in dealing with Italian partners. The faculty and students of the KIU will participate in monitoring and assessment activities in the field and will also benefit from exchange programmes with Italian universities. The project proposes to establish a Glaciology Centre in the University that can serve as knowledge repository and sharing platform for knowledge and experiences.

- **University of Baltistan (UoB):** The UoB, Skardu was established on August 25, 2017, under the "University of Baltistan Order 2016" as a federal public-sector university. The University is open to all persons of either gender and of whatever religion, race, creed, class, colour, or domicile. Earlier, as a higher education institution, the university started functioning as a sub-campus of Karakoram International University in 2011 with four departments including Computer Science, Modern Languages, Business Management and Educational Development. The Department of Biological Sciences was established in 2017 hence increasing the number of departments to five. The University of Baltistan, Skardu is a public-sector university and the only higher education institution offering various degree programs in the region. The establishment of this university has multiplied prospects for the local, national, and international students. he geographical location of the university gives a strong foundation for the current and future programmatic activities. Baltistan is situated in the lap of the two largest mountain ranges, i.e., Himalaya and Karakoram, in the extreme north of Pakistan. The region is composed of several enchanting valleys including Skardu, Khapulu, Shigar, Kharmang, Gultari and Roundu. Skardu is the capital city of the entire region. The region abounds with natural resources, landscapes and unique climatic conditions. It hosts some of the largest glacial ranges such as Baltoro, Biafo, Siachen, Trango and Godwin-Austen. The region is a home to five summits which are more than 8000 meters. Among them, K2 is the second highest peak of the world. In addition, a cluster of 150 world famous mountain peaks are also located in this region. Deosai, the world's highest tableland, is also located in Baltistan. Indus river, one of the longest rivers of the world, creeps crossing different valleys of Baltistan till it rushes towards the North-west into the gorge Roundu and adjacent valleys. Several natural and artificial lakes increase the beauty of this region. There are thousands different types of herbal medicinal plants in this region. Other than these, Baltistan is also famous for mining, wildlife, built-heritage, unique cultural customs and games (polo, skiing, etc). The mesmerizing features of Baltistan attract thousands of national and international tourists and researchers every year. Therefore, all the programs and activities in the university reflect the local resources of the region. The university plays a pivotal role in the socio-economic and educational development of the region and nation through robust and contextually relevant programs.

C - Risks and Assumptions

The project has been carefully planned on the identified needs for knowledge and capacities keeping in view the current situation in project area. It is assumed that the local mountain communities in Gilgit-Baltistan, particularly women and marginalized, depend heavily on natural resources e.g. water, land and livestock, for their livelihood, and hence are more vulnerable to natural hazards originating from mountains and glaciers in the Karakoram region. Since these communities are in closer vicinity of major glacier bodies, their vulnerability is even increased. It is assumed that the project findings will fill the gap of knowledge and data on climatic and glacial aspects in the Gilgit-Baltistan region, and that the staff of authorities of the relevant government department in GB region (e.g. GB Met Department, GB Disaster Management Authorities & GB-EPA) will be able to own the project outputs in their best interest and put into practice for the benefit of the local marginalized communities. It is also assumed that the target high altitude area, located in glaciers, is accessible

for activities by national and international experts. Currently, the area of Gilgit-Baltistan, like the rest of the country and the world, is facing a Lockdown situation due to COVID-19 pandemic that is affecting activities in every field of life due to restrictions on land and air travel and social activities. It is assumed, keeping in view the current government strategies, that the situation will be improved till the operationalization of this project, at least partially to allow air travel for experts to Travel to Pakistan and to the Gilgit-Baltistan region.

There are however certain risks that the project needs to take account of. The high-altitude range in Karakoram, Hindu-Kush and Himalayan region, as the record shows, may become inaccessible on certain occasions because of bad weather conditions. Prolonged winter season and occurrence of heavy snowfall may also shorten the period available for implementation of project activities. On the other hand, the pandemic crisis may escalate to unexpected limits, against the forecasts of the government, forcing the agencies to enforce more restrictions on travel and social activities, or prolong the lock down situation to unexpected time period. There is also a risk that, the Gilgit-Baltistan region due to its undecided constitutional status and presence of heavy network of security agencies, may pose restrictions on the entry and movement of foreign experts.

In face of these risks, the project teams will maintain a close liaison with government authorities (including the District Administration, Met department, Disaster Management & GB-EPA) to get regular forecasts on weather conditions, local socio-political condition and situation analysis of the COVID-19 pandemic in Pakistan and in the region of GB. The project partners and implementation teams will maintain close consultation with security agencies to move things in transparent way. The project will plan to engage the international experts for establishing the field network of observation stations and use local personnel to collect data or periodic intervals. Intensive field operations will be undertaken in favourable weather conditions to take maximum advantage and to lower the impact of bad weather conditions.

A detailed Risk Log (Operational, technical, security and other risks including Social & Environmental risks) is attached as Annex-3. Partner Capacity Assessment Tool (PCAT) and subsequent Micro-Capacity Assessment (MCA) have also been conducted with identification of relevant risks included in the Risk Register. PCAT shows overall risk rating to be “Low” however under programme and project management area shows “Moderate” risk for EvK2CNR capacity on having a robust policy guidelines and mechanisms for Prevention of Sexual Exploitation and Abuse/Sexual Harassment. Risk mitigation actions have been included in the project risk register for EvK2CNR’s actions. UNDP will keep a close oversight on satisfactory completion of these actions by EvK2CNR.

D - Stakeholder Engagement.

Since the proposal is based on a consolidated long-term experience that brought to the implementation of similar projects for several years, there is an established model of working with various national and international stakeholders. The proposed activities have been generated through consultation with stakeholders and beneficiaries, therefore there is a great deal of ownership in achieving results. At the launch of the project, stakeholders will be invited for an inception workshop to discuss proposed interventions in full detail, to ensure that proposed activities are implementable and remain valid.

The direct beneficiaries are the Government of Gilgit-Baltistan, Pakistan MET Deptt, Ministry of Climate Change and people of mountain villages (local communities) in Gilgit-Baltistan in general but also people living in the downstream that are beneficiaries of mountain ecosystem services. More specifically, within the GB Government, the regional office of the Department of Meteorology will benefit from the climate and glacier monitoring data to supplement their official database and strengthening their capabilities to provide timely information and weather forecasts/warnings to other departments like the Agriculture Department. Similarly, the GB Disaster Management Authority will be the main beneficiary of information generated on Glacier Bodies Changes, providing them timely indication of glacial hazards.GB-EPA will be facilitated by providing climate and glacier data in update their climate change cell established under GLOF-II Project in order to streamline the climate reporting system Also, the faculty and students of Karakoram International University will benefit

from the capacity building programme through engagement in field monitoring and exchange programmes with Italian universities.

On community side, main beneficiaries will be the mountain rural people living on mountain slopes and valley bottoms of Gilgit, Hunza, Nagar, Shigar, Khaplu and Skardu. These constitute all areas that are directly under the effect of water resources originating from major glaciers, and where the geomorphology of the terrain makes them directly vulnerable to glacial hazards. Within these communities, the women and poor are particularly vulnerable to mountain hazards due to their mobility status, lack of access to resources and information on hazards, and capabilities to cope with crisis at a time of hazard. The timely information form relevant agencies and the adequate planning for risk management will reduce the risk to lives, property and infrastructure in the region. Preliminary contacts with the beneficiary Governments have already been established at different levels. A general willingness to cooperate within the framework of this project, and to support the proposed environmental and development objectives, has emerged.

Sustainability of the interventions beyond the project implementation phase will be dependent on the ownership and involvement of the local universities and all the participating institutions. The capacity building activities will ensure full ownership of the project at the regional level. Participating institutions and specialized staff will acquire and maintain new expertise through this project; even after the end of the project, high levels of know-how will be maintained and will constitute an important resource for their own similar initiatives. By integrating implementing activities, the project will contribute to guiding regional environmental policies and refining national capacities for combating or mitigating the risks of “less sustainable” practices and policies.

E - South-South and Triangular Cooperation (SSC/TrC)

N/A

F - Knowledge

One of the major components of the project focuses on generating and disseminating knowledge and best practices in glacier and climate monitoring and related applications for environmental risk assessment. The proposed project will work to contribute mountain ecosystem services in Pakistan by improving knowledge (data and capacity building), risk prevention (remote sensing analysis for the definition of possible scenarios), water resources management, developing an effective response to climate change. Specifically, the project will focus on consolidating glacier and climate monitoring, establishing an adequate information system and promoting training and capacity building at local level.

All of this will further necessitate the strengthening of capacity in both custodian government departments and local communities, to be part of solutions to emerging challenges and implement effective strategies to cope with climate change. Capacity building of women in the above regard will be carried out in a focused based approach as women are at most vulnerable affectees of climate change hence gender sensitive strategies will be identified to cope with the situation. Women are not only vulnerable to climate change, but they are also effective actors or agents of change in relation to both mitigation and adaptation. Women often have a strong body of knowledge and expertise that can be used in climate change mitigation, and adaptation strategies. Furthermore, women’s responsibilities in households and communities, as stewards of natural and household resources, positions them well to contribute to livelihood strategies adapted to changing environmental realities. In addition, the project shall provide online platforms for sharing, knowledge, contributing to the establishment of a research base for addressing decision-making and management issues, using wide-ranging consultations to find solutions to climate change related problems.

G- Sustainability and Scaling Up

The project will be implemented in sync with other long-term initiatives of government and development counterparts (GLOF-II) in the region, which will allow the continuation of the proposed activities beyond the implementation of this project.

By involving local universities, the project aims to strengthen scientific and technical capacity in the region and support continuation and replication of the methodology by concerned organizations beyond the implementation phase. Prospects for success are based mainly on the attention that government authorities will give to climate change and environmental monitoring and related impacts, as well as their commitment to institutionalizing related planning mechanisms, thus ensuring the vitality of the monitoring and risk assessment activities promoted by the project. As mentioned, several regional and international level agreements have already been adopted by local authorities, demonstrating strong commitment for collaboration. According to internationally consolidated participatory methodologies adopted by this project, specific attention will be given to the role of women in glaciological and climatological studies. Capacity building programmes for students and faculty of universities will observe equal participation of women. Furthermore, the project will ensure equal involvement of women and men while designing orientation sessions, and scientific studies/methodologies hence reducing the chances of gender-based biases. Also, from an environmental point of view, the systemic planning and management process stimulated by this project will provide the best prospects for sustainable development, not only limited to spot interventions, but in terms of integrating management actions with preventative activities that foresee reduction of climate change impacts.

The enhanced capabilities of the MET department GB-DMA & GB-EPA will ensure continuity of the monitoring and assessment activities through maintenance of the climate observation stations and data collection points on selected sites of glacial bodies. Similarly, the establishment of a Glaciology centre at local university will ensure the sustainability of research activities, sharing and exchange of knowledge and experiences and networking with international bodies. The Glaciology Centre will become a foundation block for the establishment of a full fledge Department of Glaciology at the Karakoram International University as already foreseen by the university.

IV. PROJECT MANAGEMENT

Cost Efficiency and Effectiveness

The project approach and methodology to monitor high altitude climate and assess changes in glaciers is based on international best practices from Italy. In the project implementation, EVK2CNR (Italy) will involve expertise from Italian universities having previous experience in Pakistani North and other glacial parts of the world. Also, the previous experience of Glacial Inventory conducted in Central Karakoram National Park region will provide guidance to lead the process in this project as many experts worked on that assignment will be engaged for this one too.

The proposed project is the natural extension of environmental initiatives successfully carried out by the EVK2CNR in the mountain regions of Pakistan. The available experience and the past achievements allow through this proposal to move forward in climate change studies, water resources management and environmental risk mitigation. The possibility of involving partners, with a long-term consolidated experience in this framework, and a well-established network of relationships with local institutions and communities, would facilitate the execution and the initiation of the foreseen activities. The project could finally be linked to other important initiatives ongoing in the area at national (like GLOF-II) and international level, thus becoming a reference initiative for environmental monitoring and climate change and related impact awareness, fundamental for any other initiatives which intend operate in a vulnerable, fragile and protected mountain ecosystem.

The project field work will build on existing work resources. Most importantly, the project will count upon updating/value addition, where possible, in the existing network of climate monitoring observatories, and replicating the processes adopted earlier in carrying out the glacier inventory within the Central Karakoram National Park. The project duration has thus been spread on 2.5 years (30 months).

Project Management

The project will be operated under NGO-Execution where EvK2-CNR has been selected as Implementing Partner which will be accountable and responsible for the implementation, monitoring, reporting of results and resources in accordance with NGO-Execution modality of UNDP. In accordance with NGO-Execution Modality, UNDP Pakistan will provide quality assurance and oversight role in accordance with UNDP Programme and Operations Policies and Procedure (POPP).

Partner Capacity Assessment Tool and subsequent Micro-Capacity Assessment (MCA) for EVK2CNR (Italy) have also been conducted with identification of relevant risks included in the Risk Register, in accordance with UNDP POPP guidelines. These risks will be monitored during implementation by UNDP through its assurance and oversight function.

A Project Board will also be constituted in accordance with the UNDP POPP guidance. The Board will provide oversight to the project through annual review of progress, risks, lessons learnt and alignment to the overall project goal. To ensure best value for money and just use of project financial resources, the UNDP usual annual processes of Spot Check and Annual Audit will be followed as guided by UNDP Harmonised Approach to Cash Transfer (HACT) Framework.

V. RESULTS FRAMEWORK[1]

Intended Outcome as stated in the UNDAF Programme Results and Resource Framework: UNSDF (Outcome 6): By 2022, the resilience of the people of Pakistan, especially the most vulnerable populations is increased by addressing and mitigating natural and human induced disasters, including climate change mitigation and adaptation measures, and sustainable management of cultural and natural resources.
Outcome indicators as stated in the Country Programme Results and Resources Framework, including baseline and targets: **UNSDF indicator 6.2**: Number of integrated policies/ strategies/ plans operationalized which increases their ability to protect the environment and population as well as adapt and mitigate the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production (SDG 13.2.1) **Baseline 6.2:** 01 National level regulatory framework **Target 6.2:** 04 Provincial level integrated sustainable land management policies, 01 National Action Plan on Sustainable Energy for All and 01 National legislation on reduction and elimination of persistent organic pollutants in Pakistan
Applicable Output(s) from the UNDP Strategic Plan (2022-2025): SP IRRF Output 3.1: **Institutional systems to manage multi-dimensional risks and shocks** strengthened at regional, national and sub-national levels
Project title and Atlas Project Number: Glaciers & Students - A scientific based approach to monitor climate and glaciers in Pakistani mountain regions and support hydrogeological risk prevention; **Project Number:00144462**

[1] UNDP publishes its project information (indicators, baselines, targets and results) to meet the International Aid Transparency Initiative (IATI) standards. Make sure that indicators are S.M.A.R.T. (Specific, Measurable, Attainable, Relevant and Time-bound), provide accurate baselines and targets underpinned by reliable evidence and data, and avoid acronyms so that external audience clearly understand the results of the project.

EXPECTED OUTPUTS	OUTPUT INDICATORS	DATA SOURCE	BASELINE		TARGETS (by frequency of data collection)				DATA COLLECTION METHODS & RISKS
			Value	Year	Year 1 *(06 months)*	Year 2 *(12 months)*	Year 3 (09 months)	FINAL (27 months)	
Output 1 Assessment and monitoring system of mountain glaciers and climate improved in Pakistan contributing to improved planning and management of water resources and natural resources including the sustenance of biological diversity	1.1: Number of climate monitoring stations in glacier region established and maintained to provide data on changing climate patterns for use by MET Deptt and other concerned	Ev-K2-CNR	03Existing Automatic Weather Stations [Inadequate network of climate monitoring stations are available with inadequate maintenance]	2020	03 new Automatic Weather Stations are installed/established; and 02 existing Automatic Weather Stations are improved *Description:* installation of new and improvement of existing monitoring stations will be carried out.	02 new Automatic Weather Stations are installed/established; and 01 existing stations improved *Description:* In the second-year equipment installation and maintenance will continue.	No. 0 Automatic Weather Stations *Description:* Data management protocols according to QA/QC WMO standards will be prepared.	No. 5 new Automatic Weather Stations installed; and 3 are improved *Description:* Data management protocols will be prepared. Results will be communicated to relevant government departments to supplement knowledge for adoption in devising applicable strategies	Monthly or quarterly field visits, surveys and assessments based on the nature of data collection methods. Review of available data, information and publications

	1.2: Number of glacial bodies measured, monitored and documented to monitor changes over time that can provide early warning for natural hazards and contribute in reducing risks faced by mountain communities, particularly women and marginalized groups, in downstream valleys	Ev-K2-CNR	Baseline: 0 Partial inventory of CKNP Glaciers	2020	02 glacier bodies identified, surveyed and monitored *Description*: Preliminary surveys will be carried out to define the monitoring and research plan. Field activities will be imitated in the selected glaciers. Gender disaggregated Data from the communities will be collected and reported, particularly women and marginalized groups, in downstream valleys	02 glacier bodies identified, surveyed and monitored *Description:* Field surveys will also foresee data collection, data validation and reporting. . Gender disaggregated Data from the communities will be collected and reported, particularly women and marginalized groups, in downstream valleys In the second-year glacier monitoring will continue.		4. surveyed glacier bodies, monitored, studied, analysed and reported *Description:* Multi temporal analysis and field monitoring of glaciers and glacial body and validation of acquired data. Gender disaggregated Data from the communities will be collected and reported, particularly women and marginalized groups, in downstream valleys	Field visits, surveys and assessments Review of available data, information and publications

	1.3: Update the Pakistan Glacier Inventory Baseline: Inventory of CKNP glaciers exist	EvK2-CNR	Baseline: 0 and 0 [Partial Inventory of CKNP Glaciers exists]	2020	No. 0 Identification of sites for assessment and measurements, methodology and work planning	No. 0 Data collection and assessments initiated	No. 4 01 updated Pakistan glacier inventory published; 03 scientific publications in international journals	No. 4 01 updated Pakistan glacier inventory published; 03 scientific publications in international journals	
Output 2 Collaboration and sharing mechanism among Pakistani and international institutions and students strengthened to build capacities for longer term glaciers monitoring through innovative approaches and technologies.	2.1 Web based GIS climate and glaciers data archiving and sharing system developed and maintained to enable knowledge and data sharing among the authorities responsible e.g. Met Deptt, Disaster Management Authorities, Agriculture Deptt, Water Mgt. Deptt & EPA at GB and national level.	Ev-K2-CNR	0	2020	No. 0 *Description:* The information system will be interoperable and will follow the international standards in terms of metadata and data format and QA/QC procedure, in order to guarantee the reliability of the information, facilitating the exchange of information at different level.	No. 1 *Description:* Monitoring data will be uploaded and processed through the information system. The archive will be a repository for both raw and validated data and will support data validation process and elaboration of the information to facilitate the sharing and publication of the results.		No. 1 *Description:* Processed data will be the scientific base for the publication of the Pakistan Glacier inventory. Processed data, georeferenced maps, trend and scenarios will be also made available through the information system	Site visits (monthly and quarterly), expert reviews Review of available data, information and publications

	2.2 Number of students and faculty members of the local universities in Gilgit-Baltistan trained in glacier inventory and monitoring Baseline: 0 Target: 100 (End target with considerable female students participation)	Ev-K2-CNR	0 No capacities exist in local universities in GB for glacial inventory and monitoring	2020	50 (with 20 female students) *Description: Training programs for students and faculties of Pakistan Universities will be identified and carried out in consultation with international experts and Italian universities*	50 (with 20 female students) *Description: Training programs for students and faculty of Pakistan Universities will be carried out in collaboration with Italian universities.*	No. 0 *Description:* Certificate distribution, Pakistan Glacier Inventory printing, sharing and Final project event	No. 100 (with 40 female students) *Description: Training programs for students and faculty of Pakistan Universities will be carried out in collaboration with Italian universities*	Capacity building plan and university training and exchange program

VI. MONITORING AND EVALUATION

In accordance with UNDP's programming policies and procedures, the project will be monitored through the following monitoring and evaluation plans: *[Note: monitoring and evaluation plans should be adapted to project context, as needed]*

Monitoring Plan

Monitoring Activity	Purpose	Frequency	Expected Action	Partners (if joint)	Cost (if any)
Track results progress	Progress data against the results indicators in the RRF will be collected and analysed to assess the progress of the project in achieving the agreed outputs.	Quarterly, or in the frequency required for each indicator.	Slower than expected progress will be addressed by project management.		
Monitor and Manage Risk	Identify specific risks that may threaten achievement of intended results. Identify and monitor risk management actions using a risk log. This includes monitoring measures and plans that may have been required as per UNDP's Social and Environmental Standards. Audits will be conducted in accordance with UNDP's audit policy to manage financial risk.	Quarterly	Risks are identified by project management and actions are taken to manage risk. The risk log is actively maintained to keep track of identified risks and actions taken.		
Learn	Knowledge, good practices and lessons will be captured regularly, as well as actively sourced from other projects and partners and integrated back into the project.	Annually	Relevant lessons are captured by the project team and used to inform management decisions.		
Annual Project Quality Assurance	The quality of the project will be assessed against UNDP's quality standards to identify project strengths and weaknesses and to inform management decision making to improve the project.	Bi-Annually (once in 2 years)	Areas of strength and weakness will be reviewed by project management and used to inform decisions to improve project performance.		
Review and Make Course Corrections	Internal review of data and evidence from all monitoring actions to inform decision making.	Annually	Performance data, risks, lessons and quality will be discussed by the project board and used to make course corrections.		

Project Report	A progress report will be presented to the Project Board and key stakeholders, consisting of progress data showing the results achieved against pre-defined annual targets at the output level, the annual project quality rating summary, an updated risk log with mitigation measures, and any evaluation or review reports prepared over the period.	Annually, and at the end of the project (final report)	APRs and End of project report		
Project Review (Project Board)	The project's governance mechanism (i.e., project board) will hold regular project reviews to assess the performance of the project and review the Multi-Year Work Plan to ensure realistic budgeting over the life of the project. In the project's final year, the Project Board shall hold an end-of project review to capture lessons learned and discuss opportunities for scaling up and to socialize project results and lessons learned with relevant audiences.	Annually	Any quality concerns or slower than expected progress should be discussed by the project board and management actions agreed to address the issues identified.	Extended membership in the Project Board to be established, and partners involved as per membership	

Evaluation Plan

Evaluation Title	Partners (if joint)	Related Strategic Plan Output	UNDAF/CPD Outcome	Planned Completion Date	Key Evaluation Stakeholders	Cost and Source of Funding
End project evaluation				2024	Government of Gilgit-Baltistan, Academic institutions (Local and Italian Universities)	9,000 EUR

VII. MULTI-YEAR WORK PLAN

EXPECTED OUTPUTS	PLANNED ACTIVITIES	Planned Budget by Year				IP/UNDP	PLANNED BUDGET		
		Y1 (6 months)	Y2 (12 months)	Y3 (12 months)	Y4 (9 months)		Funding Source	Budget Description	Amount (USD)
Output 1: Assessment and monitoring system of mountain glaciers and climate improved in Pakistan contributing to improved planning and management of water resources and natural resources including the sustenance of biological diversity	**1.1:** Install/improve and maintain climate monitoring network		$50,000	$72,323	$0	EVK2CNR	AICS	72100	$122,323
	1.2: Study and monitoring of glaciers and glacial bodies		$104,000	$210,798	$0	EVK2CNR	AICS	72100	$314,798
	1.3 Update the Pakistan Glacier Inventory		$43,256	$104,885	$18,442	EVK2CNR	AICS	72100	$166,584
	Sub-Total for Output 1		**$197,256**	**$388,007**	**$18,442**				**$603,705**
Output 2 *Collaboration and sharing mechanism among Pakistani and international institutions and students strengthened to build capacities for longer term glaciers monitoring through innovative approaches and technologies.*	*2.1 Design and establish a web-based GIS information system*		$51,490	$111,458	$21,697	EVK2CNR	AICS	72100	$184,645

	2.2 Capacity building programme for faculties and students of Pakistani universities		$119,400	$54,462	$48,817	EVK2CNR	AICS	72100	$222,679
	Sub-Total for Output 2		***$170,890***	***$165,920***	***$70,514***				***$407,324***
Monitoring Evaluation *(including travel, end term evaluation)*	Monitoring and evaluation		$3,200	$4,057	$9,000	UNDP	AICS	71600, 74110	$16,257
GMS (8%)			$29,945	$46,135	$11,566	UNDP	AICS	75100	$87,646
Coordination Levy (1%)			$10,092	$0	$0	UNDP	AICS	74500	$10,092
Quality Assurance and Oversight Cost (DPC (CO quality review; Third Party financial spot-checks and audit fee) Operational and Staff Cost.			$2,965	$18,703	$46,618	UNDP	AICS	71800, 73400, 71400, 64300, 72100,	$68,286
TOTAL			***$414,348***	***$622,822***	***$156,140***				***$1,193,310***

VIII. GOVERNANCE AND MANAGEMENT ARRANGEMENTS

The project will be implemented through NGO-Execution Modality, as described in the UNDP Programme and Operations Policies and Procedures (POPP). UNDP has selected EvK2CNR as Implementing Partner after following a thorough procedure as described under UNDP POPP for selection of an IP. EvK2CNR has found to have prior experience in the target area on similar projects under the thematic-area of this project. UNDP Partner Capacity Assessment Tool and HACT Micro-Capacity Assessment was conducted and has identified Risk Rating as Low..

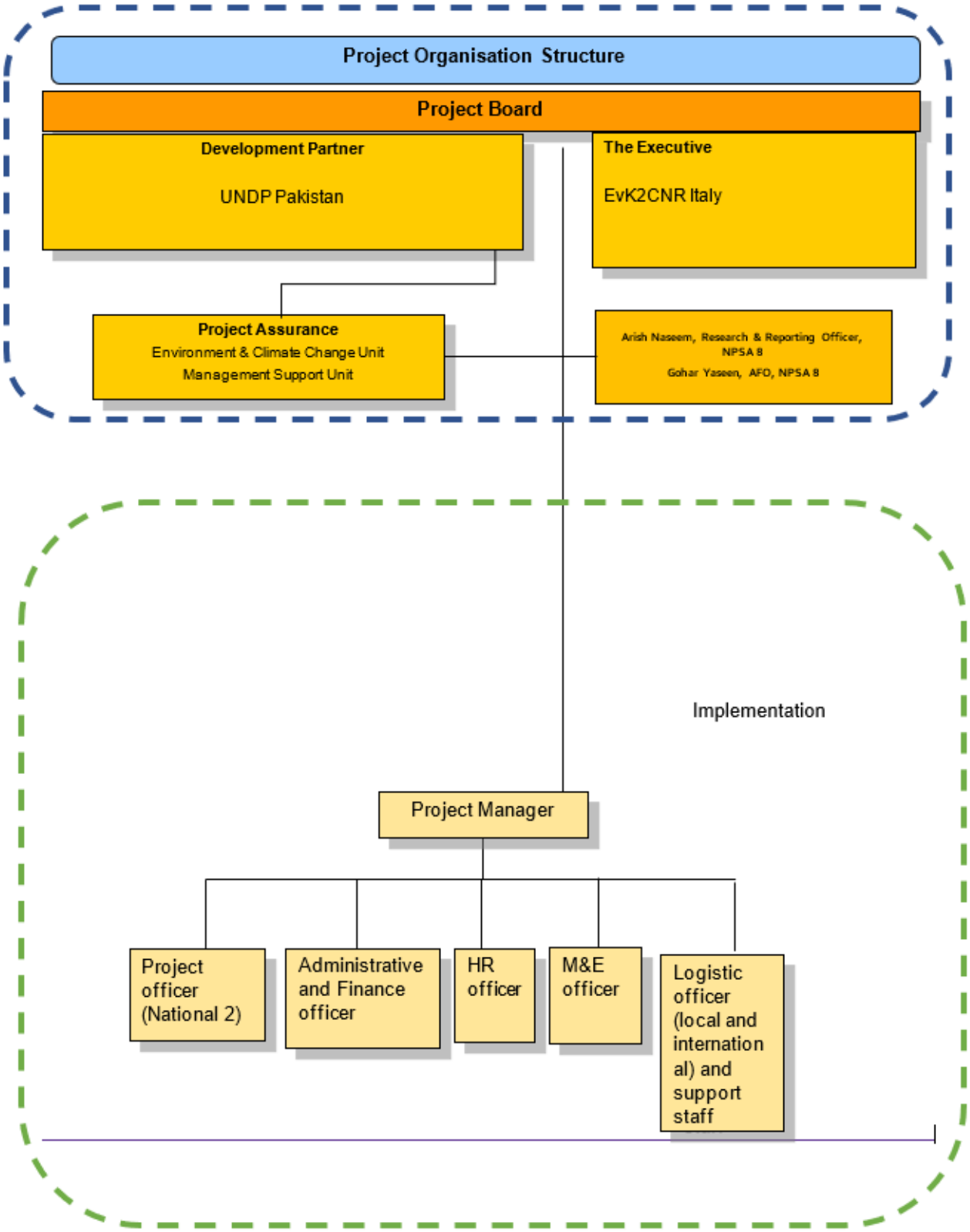
UNDP Pakistan will provide quality assurance and oversight role in accordance with UNDP Programme and Operations Policies and Procedure (POPP).

Project Board:

The project board is responsible for making management decisions by consensus when required, including the approval of project plans and revisions, and the project manager's tolerances. It reviews evidence on project performance based on monitoring, evaluation and reporting, including progress reports and the combined delivery report. The project quality assurance report and donor reports should be discussed with the board, along with management actions to improve quality. Board decisions are made in accordance with standards to ensure management for development results: best value for money, fairness, integrity, transparency and effective international competition. In case a consensus cannot be reached within the board, a final decision shall rest with the UNDP Resident Representative.

13. The project board is consulted when a project manager's tolerances (normally in terms of time and budget) have been exceeded. There is a tolerance for failure, as long as it: (a) results in timely course correction that improves the design of the project, and (b) leads to explicit learning that is shared within UNDP and among external partners. The board authorizes any major deviation from the approved multi-year workplan and decides on project changes through appropriate revisions. It ensures that required resources are committed, arbitrates any conflicts in the project, and negotiates any issues between the project and external bodies. In addition, it approves the appointment and responsibilities of the project manager and any delegation of project assurance responsibilities.

The board will meet at least once in a year and when required for taking important decisions. Representative of other stakeholders will be included in the Board as appropriate, as observers upon agreement of all members of the Project Board. Meetings of the Project Board are organized at least once a year, but more often as required. Project Board contains three distinct roles, including Executive, Senior Beneficiary and Senior Supplier.



The Executive

The Executive role will be performed by EvK2CNR Italy, which is ultimately responsible for the project. The Executive's role is to ensure that the project is focused throughout its life cycle on achieving its objectives and delivering outputs that will contribute to higher level outcomes. The Executive must ensure that the project gives value for money, ensuring a cost-conscious approach to the project, balancing the demands of beneficiary and supplier. The Executive is responsible for overall quality assurance of the project as described below. If the project warrants it, the Executive may delegate some responsibility for the project assurance functions.

Development partner:

UNDP Pakistan will act as Development Partner to the Project Board.

Project Assurance: The Project Assurance role supports the Project Board by carrying out objective and independent project oversight and monitoring functions. This role ensures appropriate project management milestones are managed and completed. The project assurance role will rest with UNDP Pakistan Environment and Climate Change Unit and Management Support Unit (MSU). The assurance functions will involve commissioning independent Evaluation, 3rd party financial spot checks, and 3rd party financial audits as well as regular quality assurance on the results and financial resources reports submitted by the IP to UNDP in accordance with the agreed frequency identified in the Project Cooperation Agreement.

Tolerance Level of Multi-year Budget and Workplan: As agreed in the PSC held on 13th Feb 2023, tolerance level for each detailed plan under the overall multi-year budget and workplan will be up to 10%.

IX. LEGAL CONTEXT

Where the country has NOT signed the Standard Basic Assistance Agreement (SBAA)

The project document shall be the instrument envisaged and defined in the Supplemental Provisions to the Project Document, attached hereto and forming an integral part hereof, as "the Project Document".

This project will be implemented by EvK2CNR Italy("Implementing Partner") in accordance with its financial regulations, rules, practices and procedures only to the extent that they do not contravene the principles of the Financial Regulations and Rules of UNDP. Where the financial governance of an Implementing Partner does not provide the required guidance to ensure best value for money, fairness, integrity, transparency, and effective international competition, the financial governance of UNDP shall apply.

X. RISK MANAGEMENT

1. Consistent with the Article III of the *Supplemental Provisions to the Project Document*, the responsibility for the safety and security of the Implementing Partner and its personnel and property, and of UNDP's property in the Implementing Partner's custody, rests with the Implementing Partner. To this end, the Implementing Partner shall:
   a) put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;
   b) assume all risks and liabilities related to the Implementing Partner's security, and the full implementation of the security plan.

2. UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder

shall be deemed a breach of the Implementing Partner's obligations under this Project Document and the Project Cooperation Agreement between UNDP and the Implementing Partner[2].

3. The Implementing Partner agrees to undertake all reasonable efforts to ensure that no UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via http://www.un.org/sc/committees/1267/aq_sanctions_list.shtml.

4. The Implementing Partner acknowledges and agrees that UNDP will not tolerate sexual harassment and sexual exploitation and abuse of anyone by the Implementing Partner, and each of its responsible parties, their respective sub-recipients and other entities involved in Project implementation, either as contractors or subcontractors and their personnel, and any individuals performing services for them under the Project Document.

   (a) In the implementation of the activities under this Project Document, the Implementing Partner, and each of its sub-parties referred to above, shall comply with the standards of conduct set forth in the Secretary General's Bulletin ST/SGB/2003/13 of 9 October 2003, concerning "Special measures for protection from sexual exploitation and sexual abuse" ("SEA").

   (b) Moreover, and without limitation to the application of other regulations, rules, policies and procedures bearing upon the performance of the activities under this Project Document, in the implementation of activities, the Implementing Partner, and each of its sub-parties referred to above, shall not engage in any form of sexual harassment ("SH"). SH is defined as any unwelcome conduct of a sexual nature that might reasonably be expected or be perceived to cause offense or humiliation, when such conduct interferes with work, is made a condition of employment or creates an intimidating, hostile or offensive work environment.

5. a) In the performance of the activities under this Project Document, the Implementing Partner shall (with respect to its own activities), and shall require from its sub-parties referred to in paragraph 4 (with respect to their activities) that they, have minimum standards and procedures in place, or a plan to develop and/or improve such standards and procedures in order to be able to take effective preventive and investigative action. These should include: policies on sexual harassment and sexual exploitation and abuse; policies on whistleblowing/protection against retaliation; and complaints, disciplinary and investigative mechanisms. In line with this, the Implementing Partner will, and will require that such sub-parties will take all appropriate measures to:

   i. Prevent its employees, agents or any other persons engaged to perform any services under this Project Document, from engaging in SH or SEA;

   ii. Offer employees and associated personnel training on prevention and response to SH and SEA, where the Implementing Partner and its sub-parties referred to in paragraph 4, have not put in place its own training regarding the prevention of SH and SEA, the Implementing Partner and such sub-parties may use the training material available at UNDP;

   iii. Report and monitor allegations of SH and SEA of which the Implementing Partner and its sub-parties referred to in paragraph 4 have been informed or have otherwise become aware, and status thereof;

   iv. Refer victims/survivors of SH and SEA to safe and confidential victim assistance; and

   v. Promptly and confidentially record and investigate any allegations credible enough to warrant an investigation of SH or SEA. The Implementing Partner shall advise UNDP of any such allegations received and investigations being conducted by itself or any of its sub-parties referred to in paragraph 4 with respect to their activities under the Project Document, and shall keep UNDP informed during the investigation by it or any of such sub-parties, to the extent that such notification (i) does not jeopardize the conduct of the investigation, including but not limited to the safety or security of persons, and/or (ii) is not in contravention of any

[2] Use bracketed text only when IP is an NGO/IGO

laws applicable to it. Following the investigation, the Implementing Partner shall advise UNDP of any actions taken by it or any of the other entities further to the investigation.

b) The Implementing Partner shall establish that it has complied with the foregoing, to the satisfaction of UNDP, when requested by UNDP or any party acting on its behalf to provide such confirmation. Failure of the Implementing Partner, and each of its sub-parties referred to in paragraph 4, to comply of the foregoing, as determined by UNDP, shall be considered grounds for suspension or termination of the Project.

6. Social and environmental sustainability will be enhanced through application of the UNDP Social and Environmental Standards (http://www.undp.org/ses) and related Accountability Mechanism (http://www.undp.org/secu-srm).

7. The Implementing Partner shall: (a) conduct project and programme-related activities in a manner consistent with the UNDP Social and Environmental Standards, (b) implement any management or mitigation plan prepared for the project or programme to comply with such standards, and (c) engage in a constructive and timely manner to address any concerns and complaints raised through the Accountability Mechanism. UNDP will seek to ensure that communities and other project stakeholders are informed of and have access to the Accountability Mechanism.

8. All signatories to the Project Document shall cooperate in good faith with any exercise to evaluate any programme or project-related commitments or compliance with the UNDP Social and Environmental Standards. This includes providing access to project sites, relevant personnel, information, and documentation.

9. The Implementing Partner will take appropriate steps to prevent misuse of funds, fraud or corruption, by its officials, consultants, responsible parties, subcontractors and sub-recipients in implementing the project or using the UNDP funds. The Implementing Partner will ensure that its financial management, anti-corruption and anti-fraud policies are in place and enforced for all funding received from or through UNDP.

10. The requirements of the following documents, then in force at the time of signature of the Project Document, apply to the Implementing Partner: (a) UNDP Policy on Fraud and other Corrupt Practices and (b) UNDP Office of Audit and Investigations Investigation Guidelines. The Implementing Partner agrees to the requirements of the above documents, which are an integral part of this Project Document and are available online at www.undp.org.

11. In the event that an investigation is required, UNDP has the obligation to conduct investigations relating to any aspect of UNDP programmes and projects in accordance with UNDP regulations, rules, policies and procedures. The Implementing Partner shall provide its full cooperation, including making available personnel, relevant documentation, and granting access to the Implementing Partner's (and its consultants', responsible parties', subcontractors' and sub-recipients') premises, for such purposes at reasonable times and on reasonable conditions as may be required for the purpose of an investigation. Should there be a limitation in meeting this obligation, UNDP shall consult with the Implementing Partner to find a solution.

12. The Implementing Partner will promptly inform UNDP in case of any incidence of inappropriate use of funds, or credible allegation of fraud or corruption with due confidentiality.

    Where the Implementing Partner becomes aware that a UNDP project or activity, in whole or in part, is the focus of investigation for alleged fraud/corruption, the Implementing Partner will inform the UNDP Resident Representative/Head of Office, who will promptly inform UNDP's Office of Audit and Investigations (OAI). The Implementing Partner shall provide regular updates to the head of UNDP in the country and OAI of the status of, and actions relating to, such investigation.

13.

UNDP shall be entitled to a refund from the Implementing Partner of any funds provided that have been used inappropriately, including through fraud or corruption, or otherwise paid other than in accordance with the terms and conditions of the Project Document. Such amount may be deducted by UNDP from any payment due to the Implementing Partner under this or any other agreement.

Where such funds have not been refunded to UNDP, the Implementing Partner agrees that donors to UNDP (including the Government) whose funding is the source, in whole or in part, of the funds for the

activities under this Project Document, may seek recourse to the Implementing Partner for the recovery of any funds determined by UNDP to have been used inappropriately, including through fraud or corruption, or otherwise paid other than in accordance with the terms and conditions of the Project Document.

Note: The term "Project Document" as used in this clause shall be deemed to include any relevant subsidiary agreement further to the Project Document, including those with the Implementing Partner, responsible parties, subcontractors and sub-recipients.

14. Each contract issued by the Implementing Partner in connection with this Project Document shall include a provision representing that no fees, gratuities, rebates, gifts, commissions or other payments, other than those shown in the proposal, have been given, received, or promised in connection with the selection process or in contract execution, and that the recipient of funds from the Implementing Partner shall cooperate with any and all investigations and post-payment audits.

15. Should UNDP refer to the relevant national authorities for appropriate legal action any alleged wrongdoing relating to the project, the Government will ensure that the relevant national authorities shall actively investigate the same and take appropriate legal action against all individuals found to have participated in the wrongdoing, recover and return any recovered funds to UNDP.

16. The Implementing Partner shall ensure that all of its obligations set forth under this section entitled "Risk Management Standard Clauses" are passed on to each responsible party, subcontractor and sub-recipient and that all the clauses under this section entitled "Risk Management" are included, *mutatis mutandis*, in all sub-contracts or sub-agreements entered into further to this Project Document.

XI. ANNEXES

1. **Project Quality Assurance Report (Design and Appraisal)**

2. **Social and Environmental Screening** including additional Social and Environmental Assessments or Management Plans as relevant.

3. **Risk Analysis**

4. **Capacity Assessment:** Results of capacity assessments of Implementing Partner (including HACT Micro Assessment) Annex 4a (PCAT EvK2CNR), Annex 4b (HACT Report EvK2CNR Italy)

5. **Supplemental Provisions to SBAA**