

Concept Note

Recharge Pakistan: Building Pakistan's Resilience to Climate Change through Ecosystem-Based Adaptation for Integrated Flood Risk Management

Pakistan | WWF

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Concept Note

Project/Programme Title:	Recharge Pakistan: Building Pakistan's Resilience to Climate Change through Ecosystem-Based Adaptation for Integrated Flood Risk Management
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National Designated Authority(ies) (NDA):	Ministry of Climate Change, Government of Pakistan
Accredited Entity(ies) (AE):	World Wildlife Fund (WWF)
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Notes

- The maximum number of pages should **not exceed 12 pages**, excluding annexes. Proposals exceeding the prescribed length will not be assessed within the indicative service standard time of 30 days.
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A. Project/Programme Summary (max. 1 page)			
A.1. Project or programme	<input checked="" type="checkbox"/> Project <input type="checkbox"/> Programme	A.2. Public or private sector	<input checked="" type="checkbox"/> Public sector <input type="checkbox"/> Private sector
A.3. Is the CN submitted in response to an RFP?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If yes, specify the RFP: _____	A.4. Confidentiality	<input type="checkbox"/> Confidential <input checked="" type="checkbox"/> Not confidential
A.5. Indicate the result areas for the project/programme	<p>Mitigation: Reduced emissions from:</p> <input type="checkbox"/> Energy access and power generation <input type="checkbox"/> Low emission transport <input type="checkbox"/> Buildings, cities and industries and appliances <input type="checkbox"/> Forestry and land use <p>Adaptation: Increased resilience of:</p> <input checked="" type="checkbox"/> Most vulnerable people and communities <input checked="" type="checkbox"/> Health and well-being, and food and water security <input checked="" type="checkbox"/> Infrastructure and built environment <input checked="" type="checkbox"/> Ecosystem and ecosystem services		
A.6. Estimated mitigation impact (tCO₂e over lifespan)	Not Applicable	A.7. Estimated adaptation impact (number of direct beneficiaries and % of population)	Direct beneficiaries: 10 million people (~5% of ~207 million) Indirect beneficiaries: Approximately 20 million (~10% of ~207 million)
A.8. Indicative total project cost (GCF + co-finance)	Amount: USD 150 million	A.9. Indicative GCF funding requested	Amount: USD 50 million
A.10. Mark the type of financial instrument requested for the GCF funding	<input checked="" type="checkbox"/> Grant <input type="checkbox"/> Reimbursable grant <input type="checkbox"/> Guarantees <input type="checkbox"/> Equity <input type="checkbox"/> Subordinated loan <input type="checkbox"/> Senior Loan <input type="checkbox"/> Other: specify _____		
A.11. Estimated duration of project/ programme:	10 years	A.12. Estimated project/ Programme lifespan	10 years (2020-2030; this is Phase 1 of a 30 year Program Vision)
A.13. Is funding from the Project Preparation Facility requested?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Other support received <input checked="" type="checkbox"/> If so, by who: Cash, data, and in-kind support from WWF (USD 70,000) and Government of Pakistan (USD 100,000)	A.14. ESS category	<input type="checkbox"/> A or I-1 <input checked="" type="checkbox"/> B or I-2 <input type="checkbox"/> C or I-3
A.15. Is the CN aligned with your accreditation standard?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	A.16. Has the CN been shared with the NDA?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
A.17. AMA signed (if submitted by AE)	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	A.18. Is the CN included in the Entity Work Programme?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
A.19. Project/Programme rationale, objectives and approach of programme/project (max 100 words)	<p>The Indus River is Pakistan's lifeline, and is now experiencing catastrophic floods and droughts exacerbated by climate change. Pakistan relies on costly hard-infrastructure flood and water management measures with limited efficacy. This project will build Pakistan's climate resilience and water security through cost-effective ecosystem-based adaptation. Recharge Pakistan will: increase water storage and recharge through wetlands, floodplains, and hill-torrents management; promote climate-adapted community-based natural resource management and livelihoods; and forge a paradigm shift to scale up this approach. This project unifies several Government entities in an unprecedented collaboration with WWF-Pakistan to effect nature-based solutions for crucial climate change adaptation in Pakistan.</p>		

B. Project/Programme Information (max. 8 pages)

B.1. Context and baseline (max. 2 pages)

Pakistan's Climate Vulnerabilities

Pakistan is a lower-middle income country, with USD 1,443.6 per capita GDP (World Bank, 2016), and a population of 207.8 million (Government of Pakistan, 2017d). It is ranked the 8th most affected country in the world on Germanwatch's Long-Term Climate Risk Index (1998-2017), with losses from recent disasters amounting to USD 3.8 billion in Purchasing Power Parity terms (Eckstein et al., 2018). In addition, Pakistan is one of the most water-stressed countries of the world, with average per capita water availability of 964 m³ per annum (Government of Pakistan, 2014). It has one of the world's highest water use and water intensity rates (water used per unit GDP). Water is crucial for the country's predominantly agriculture-based economy, which accounts for 19.5% of GDP, 42.3% of jobs (Government of Pakistan, 2017c), and 91.6% of the annual freshwater usage (UNDP, 2016b). Climate change is anticipated to alter annual precipitation patterns and exacerbate floods and droughts across Pakistan (Annex 1B). Water availability is expected to be less predictable, and floods and droughts more common. Moreover, studies indicate that Pakistan will reach 'absolute scarcity' water levels by 2025 (Government of Pakistan, 2018) due to depleting ground-water resources, thereby adding to climate change induced vulnerabilities of millions of poor people affected by lack of water, food and energy security. During the catastrophic 2010 Indus flood, which affected more than 20 million people, approximately 2,000 lives were lost, 3,000 people were injured, 1.6 million houses and millions of acres of crops were damaged, and financial damages were estimated at USD 40 billion. Since then, Pakistan has experienced large floods for 6 consecutive years, which is unprecedented (Government of Pakistan, 2017e).

Indus River Basin: Water Resources and Infrastructure, and Historical Trends and Projections for Climate

Pakistan is highly dependent on the Indus River that flows 3,200 km down the length of the entire country and is fed by five tributaries. The target sites for this proposed 'Recharge Pakistan' project are scattered along a 1300km stretch of the Indus River from Tarbela Dam to Kotri Barrage across four provinces, and include a mix of upstream (watersheds and hill torrents) and downstream (wetlands and floodplains) locations (Annex 1A). Renewable water resources in the Indus Basin amount to approximately 175 billion cubic meters (bcm), fed by glacier and snow melt from the Hindukush-Karakoram-Himalayan ranges and monsoon rains. Almost 82% of the water inflows are during summer (April-September) and about 18% in winter (October-March). The Indus Basin hosts one of the world's largest irrigation systems and supports 95% of the nation's irrigated agriculture; the existing infrastructure includes 4 reservoirs, 16 barrages, 12 inter-river link canals, irrigation canals, and flood embankments (Annex 1C). However, the present water storage capacity of Pakistan corresponds to just 15% of the average river flow, i.e. far lower than the world average, and this capacity is decreasing annually by 0.2 MAF due to heavy sediment load (Qureshi, 2011; ADB, 2017).

The Indus River also brings increasingly frequent and severe riverine floods, which build up slowly from heavy rains and glacial melt, and flash floods from hill torrents that are due to sudden, heavy cloudbursts. Over the last century, Pakistan's average annual temperature has increased by 0.57°C and the average annual precipitation has increased by 25%. Heat waves per year increased by 31 days in the period of 1980 to 2007, while cold waves decreased in north-eastern and southern parts, and increased in western and north-western parts of the country. Annual precipitation has increased by 61 mm in Pakistan from 1901 to 2007; monsoon rains increased by 22.6 mm, and winter precipitation increased by 20.8 mm. During 1960–2007, there has been: an increase of 0.6°C to 1.0°C in the mean temperature over the hyper arid plains, arid coastal areas, and mountain regions of Pakistan; a decrease of 10%–15% in winter and summer rainfall in the arid plains and coastal areas; and a rise of 18%–32% in the summer rainfall over the core monsoon region of Pakistan. The number of heavy rainfall events has increased since 1960, and the nine heaviest rains recorded in 24 hours were recorded in 2010. The figures below illustrate: 1) the time series data for area-weighted mean annual temperatures; 2) long-term annual average precipitation; and 3) the occurrences of floods, landslides (mainly due to hill torrents and flash floods) and droughts in Pakistan. (ADB 2017)

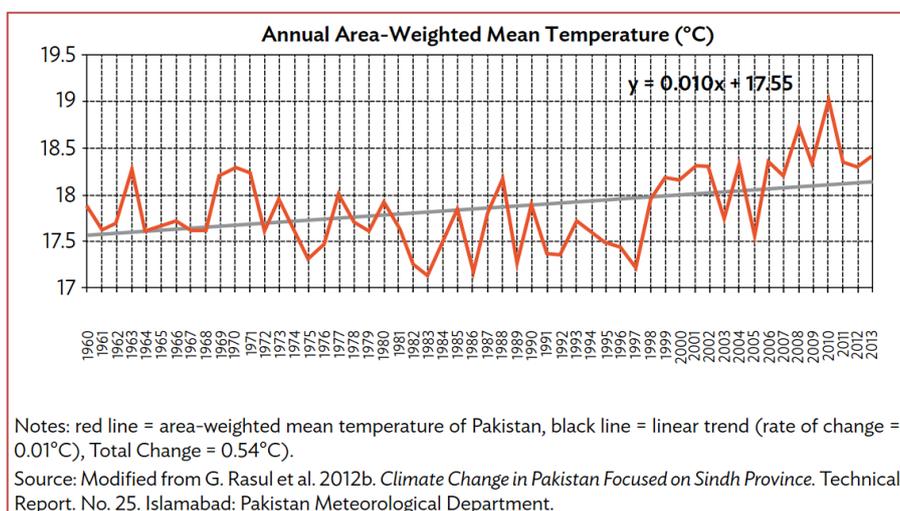


Figure 1: Time Series of Area-Weighted Mean Daily Temperatures Averaged Yearly, 1960–2013 (ADB, 2017)

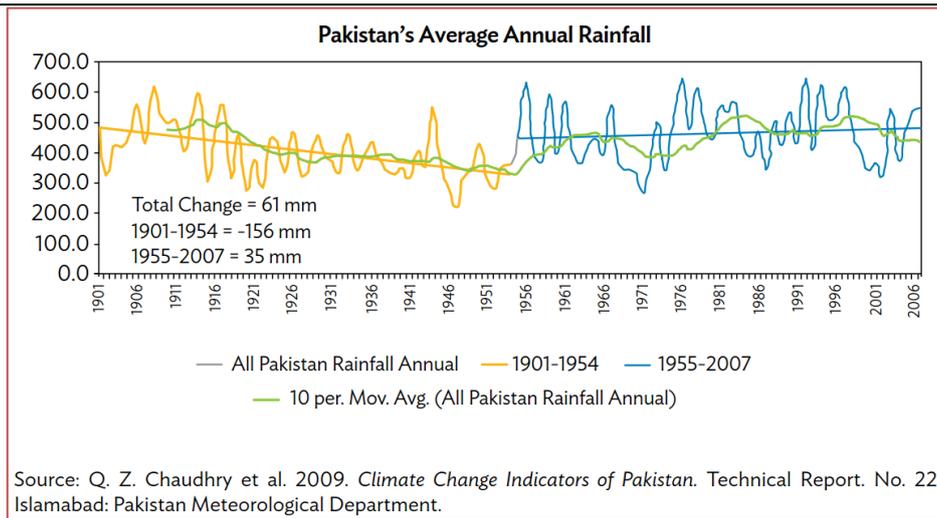


Figure 2: Time Series Annual Average Precipitation in Millimetres, 1901–2007 (ADB 2017)

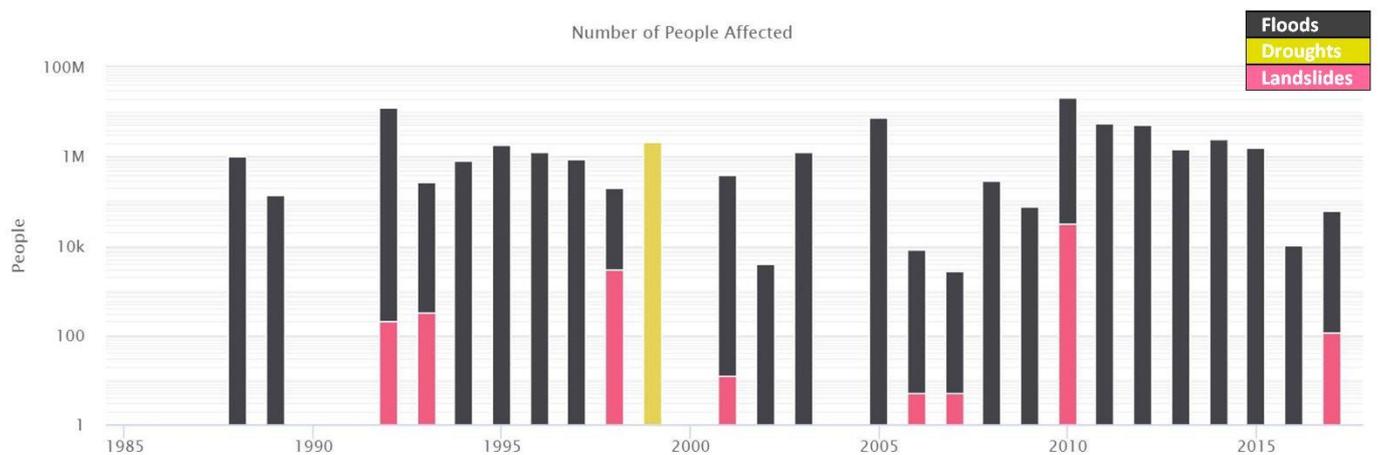
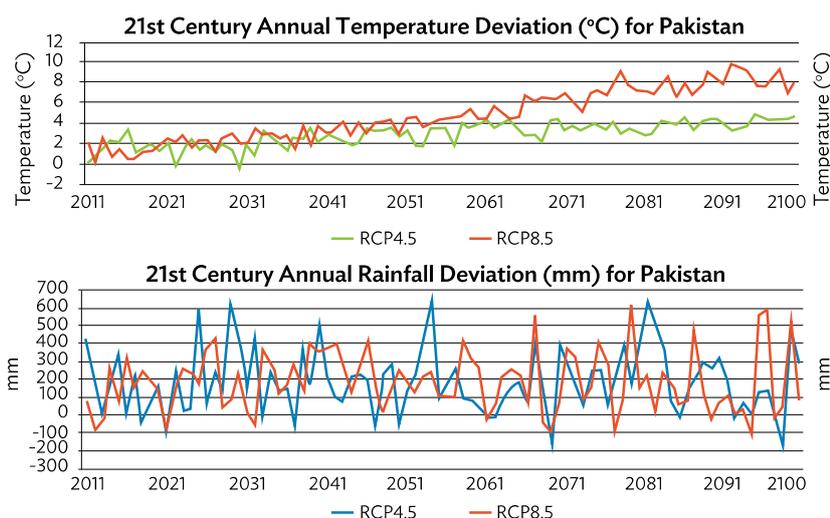


Figure 3: Occurrence of Flood, Landslide, and Drought Events 1985-2018 (World Bank Group, 2020)

National level climate change projections for the Indus Basin conducted by the Pakistan Meteorological Department (PMD) in 2015 provide empirical evidence of increasing variability in mean annual temperatures (°C) and precipitation levels (mm) for the Upper Indus Basin and Lower Indus Basin. The trends projecting variations in temperature and rainfall patterns under the Representative Concentration Pathways (RCP) 4.5 emission scenario and RCP 8.5 emission scenarios (see Figure 4 below), reveal an estimated 3 – 5°C rise in the entire Indus Basin by 2060; Pakistan’s projected temperature increase is expected to be higher than the global average. Whereas, high peaks of precipitation levels are forecasted between 2011 – 2100, indicating frequently occurring heavy rainfalls in some instances and conditions of extreme drought in others. (ADB, 2017)

To elaborate, projections show an annual increase in temperature of 3°C – 4°C under RCP 4.5 and 3°C – 8°C under RCP 8.5 in the northern areas of Pakistan, as well as 2°C – 3°C under RCP 4.5 and 5°C – 7°C under RCP 8.5 in the southern part of the country, this demonstrates an accelerated rate of warming at high elevations that will impact snow and glacial melt. The annual precipitation also shows an overall increase of 2 – 3 mm/day and 3 – 4 mm/day under RCP 4.5 and RCP 8.5 respectively. Heavy rainfall event analysis shows intense rainfall events over Pakistan being confined to the key monsoon region and coastal area of Sindh with return periods of 1 to 2 years. A significant increase in the number of dry days is expected, i.e. 130/year under RCP4.5 scenario and 420/year under RCP 8.5. As a consequence of longer dry periods with intense heavy precipitation days, under both RCP scenarios, there is a higher risk of flooding because the decrease in regular light and moderate rainfall will make the ground drier, harder and unable to absorb excess water in short spans of time. (Ikram, et al. 2016)



mm = millimeter, RCP4.5 and RCP8.5= Representative Concentration Pathways (RCPs) are emission IPCC AR5 scenarios. RCP4.5 is a stabilization scenario where greenhouse gas emissions stabilize by 2100. In RCP8.5 radiative forcing does not peak by year 2100.

Source: Pakistan Meteorological Department. 2015. High Resolution Climate Scenarios. http://www.pmd.gov.pk/rnd/rndweb/rnd_new/climchange_ar5.php

Figure 4: Pakistan's Mean Annual Temperature and Precipitation Deviation Projections during 21st Century Using Two Different Emission Scenarios (ADB, 2017)

Hence, extreme rainfall events in the future, including the projected increase in the South-Asian monsoons (Pachauri & Meyer, 2014), combined with drier and more compacted soil due to higher temperatures and reduced wet days, will increase flood peaks and associated damage through higher frequency and intensity of flash floods in hill-torrent prone areas (Babar et al., 2016). Natural wetlands and floodplains that regulate floods have been disconnected and constrained by irrigation infrastructure, and catchment areas have been degraded, reducing the ecosystems' groundwater recharge and storage capacity. This has hampered the Indus Basin's natural ability to absorb runoff, passing extra flows downstream, and exacerbating flood peaks. Integrated ecosystem-based adaptation across the Indus Basin is, therefore, critical for Pakistan to adapt and build resilience to climate change, and to effectively utilize floodwater in dry spells to overcome water insecurity and associated socio-economic and environmental challenges.

Climate Change Impacts on Vulnerable Communities and Ecosystems

According to the Multidimensional Poverty Index, 38.8% of Pakistan's population is poor. Most of the poor reside in rural areas (54.6% rural poverty), including this proposed project's target sites (Annex 1E provides the population and poverty profile of proposed sites), and are disproportionately more vulnerable to climate change impacts (UNDP, 2016a). Factors that contribute to and compound this vulnerability include high dependence on agriculture, livestock, and fishing livelihoods, and inadequate safe drinking water, food, and basic services. Climate change is already causing and will worsen: unpredictable floods and droughts; decreased agriculture productivity, especially for wheat and rice; reduced water availability per capita; degradation of surface water quality; increased irrigation demand due to higher evaporation rates at higher temperatures; reduction in water storage capacities due to higher sedimentation from floods; and other issues, exacerbating communities' vulnerability (ADB, 2017). Pakistan's projected temperature rise and increased uncertainty and variability in precipitation, glacial melt, and river flows (ADB, 2017), will impact the Indus Basin's wetlands, floodplains, and watersheds ecosystems and their services. Vulnerable communities depend on the water supply and recharge, food and products, flood protection, sediment control, carbon sequestration, climate regulation, and other benefits provided by these ecosystems for their survival. For example, ecosystem services from Keenjhar Lake, in the lower Indus Basin, have an estimated Total Economic Value of over USD 11,500/hectare¹ (Dehlavi & Nawaz, 2012). Degradation of wetlands, forests, and pastures due to climate change is causing habitat and land productivity loss and decreasing grazing areas and fodder (ADB, 2017). These are compounded by the constraints on the Indus Basin by irrigation infrastructure and other stresses, e.g. pollution of ecosystems, adding to the vulnerability of communities and their livelihoods.

Water Resources and Flood Management Sector in Pakistan

In Pakistan there are numerous Government stakeholders at the federal, provincial, and local levels that govern the environment, water resources, flood management, and other sectors relevant for the proposed concept. At the Federal level: Ministry of Water Resources, and its attached departments and agencies (e.g. the Federal Flood Commission) oversee water resources management, hydropower development, flood management, and National Water Policy implementation; Ministry of Climate Change (NDA for GCF) holds the mandate for environment and climate change policies and interventions; the National Disaster Management Authority coordinates and implements disaster risk reduction and management strategies; and others. The Provincial Irrigation, Drainage, Environment, Disaster

¹ Total Economic Value (TEV) figure was inflation adjusted in 2012, from a TEV derived in 2008 under a WWF-Pakistan study; this TEV assumes a limitless time horizon.

Management, and other Departments manage water use, irrigation, and floods and implement plans on the ground. Annex 2 describes Government stakeholders and Annex 3 outlines stakeholder engagement for this concept.

Country Ownership and Alignment - Building Resilience to Indus Floods is a National Priority

Improving resilience to climate change hazards, particularly floods and droughts, is among the top priorities for the Government of Pakistan (GoP). Following a Ramsar Advisory Mission (RAM) recommended exposure visit to China's Yangtze Basin project (which integrates ecological solutions with 'hard' infrastructure to optimize water resource management), the GoP increasingly recognizes that "a mono-disciplinary approach based on engineering solutions alone - as in the case of the Indus Basin - cannot fully handle hydrological cycles, ecosystems, and the security of people prone to flood risks" (Ali, 2013). A 'Diversified Portfolio Approach' is needed, combining: infrastructure; non-structural interventions, e.g. floodplain zoning; and green infrastructure, e.g. wetlands restoration and reconnection, for ecosystem-based adaptation (Opperman et al., 2017). **WWF's desk research and stakeholder consultations illustrate that nearly all of Pakistan's ongoing and in-pipeline initiatives for water resource management focus on hard infrastructure (Annex 10). This project's interventions, by contributing towards regulation of flow and recharge of water bodies, will help sustain those projects (in proximity or further downstream) that aim to improve water supplies for communities.**

This proposed project will also contribute towards achieving commitments under relevant policies, including the National Climate Change Policy and Pakistan's Nationally Determined Contributions (NDCs). It contributes to the short, medium (2030), and long-term visions of the NDCs by "enhancing integrated water resource management" and "harvesting rainwater and floodwater", sub-national adaptation planning, capacity building, and climate resilient infrastructure. Under NDC Priorities, it contributes to "additional water reservoir capacity on the river system to regulate water discharges during high floods" and "promote(s) local rainwater harvesting and development of small storages on run of the rivers during peak flows" (Government of Pakistan, 2016). Alignment with other commitments and policies, e.g. Pakistan's Strategic Framework for Engagement with GCF, National Flood Protection Plan IV, National Water Policy, and Sustainable Development Goals, are discussed in Section B.3. In addition, the proposed project is aligned with, and complements, other initiatives, e.g. World Bank's and Asian Development Bank's Balochistan Integrated Water Resources Management work, the GCF funded 'Scaling Up of Glacial Lake Outburst Flood (GLOF-II) Risk Reduction in Northern Pakistan' project being implemented by UNDP, and FAO's 'Climate Resilient Agriculture and Water Management' proposal in the pipeline for GCF funding. This proposed concept **brings together more than 20 Government of Pakistan Ministries and Departments** in a concerted and collaborative action in the face of increasing climate change impacts. The concept has generated momentum and ownership for a "Recharge Pakistan" vision among the highest levels of the Government of Pakistan. **It is 1 of 5 national initiatives that the Ministry of Climate Change is prioritizing** and is being discussed internationally at platforms such as UNFCCC's COPs.

Barriers to be Addressed

There are various policy, financial, and capacity constraints that inhibit the GoP from responding effectively to climate change. **1) Lack of holistic, basin level policy and planning:** There is still neither an Indus Basin management plan, nor a holistic flood management plan; the National Water Policy was approved (2018) after a decade. There has historically been an ad-hoc, reactive approach to flood management. Provincial Irrigation Departments have Annual Flood Fighting Plans that focus on maintenance of flood embankments and irrigation infrastructure, without addressing vulnerable ecosystems and communities. **2) Inadequate finances and coordination across government entities:** There are several GoP ministries, departments, and agencies at the federal, provincial, and district levels, with different plans, policies, and mandates for flood and disaster management. These lack coordination, coherence, and adequate budgets; only 5-7% of their budget is designated for climate change adaptation (see sections B.3. and C.2.). GoP plans predominantly focus on hard infrastructure for flood protection that incurs significant annual rebuilding and maintenance costs. **3) Limited capacities for effective inclusion of climate change adaptation in planning instruments:** Information on future scenarios and long-term impacts of climate change is not incorporated within GoP policies and development plans. There is no precedence for ecosystem-based solutions, e.g. storage for flood peak attenuation, being included in plans. Bridging this gap in knowledge is critical, as it limits GoP decision makers to traditional, reactive options for flood risk and disaster management plans and investments. These inadequacies result in large-scale loss of infrastructure, livestock, crops, and other assets during floods. **4) Limited knowledge about ecosystem services and livelihood options for vulnerable communities:** There is lack of expertise to harness flood mitigation and other ecosystem services provided by floodplains, watersheds, and wetlands, limiting inclusion in GoP planning for climate change adaptation and communities' resilience. Limited economic options restrict communities to livelihoods (e.g. agriculture) that are not only negatively impacted by climate change (e.g. unpredictable harvests) but increase their vulnerability to climate change impacts and economic shocks (e.g. inability to climate-proof assets due to worsening poverty-environment cycle). Women and marginalized groups are at higher risk of negative impacts due to lack of access to knowledge and livelihoods options, and exclusion from the decision-making on climate adaptation solutions that meet their needs.

B.2. Project/Programme description (max. 3 pages)

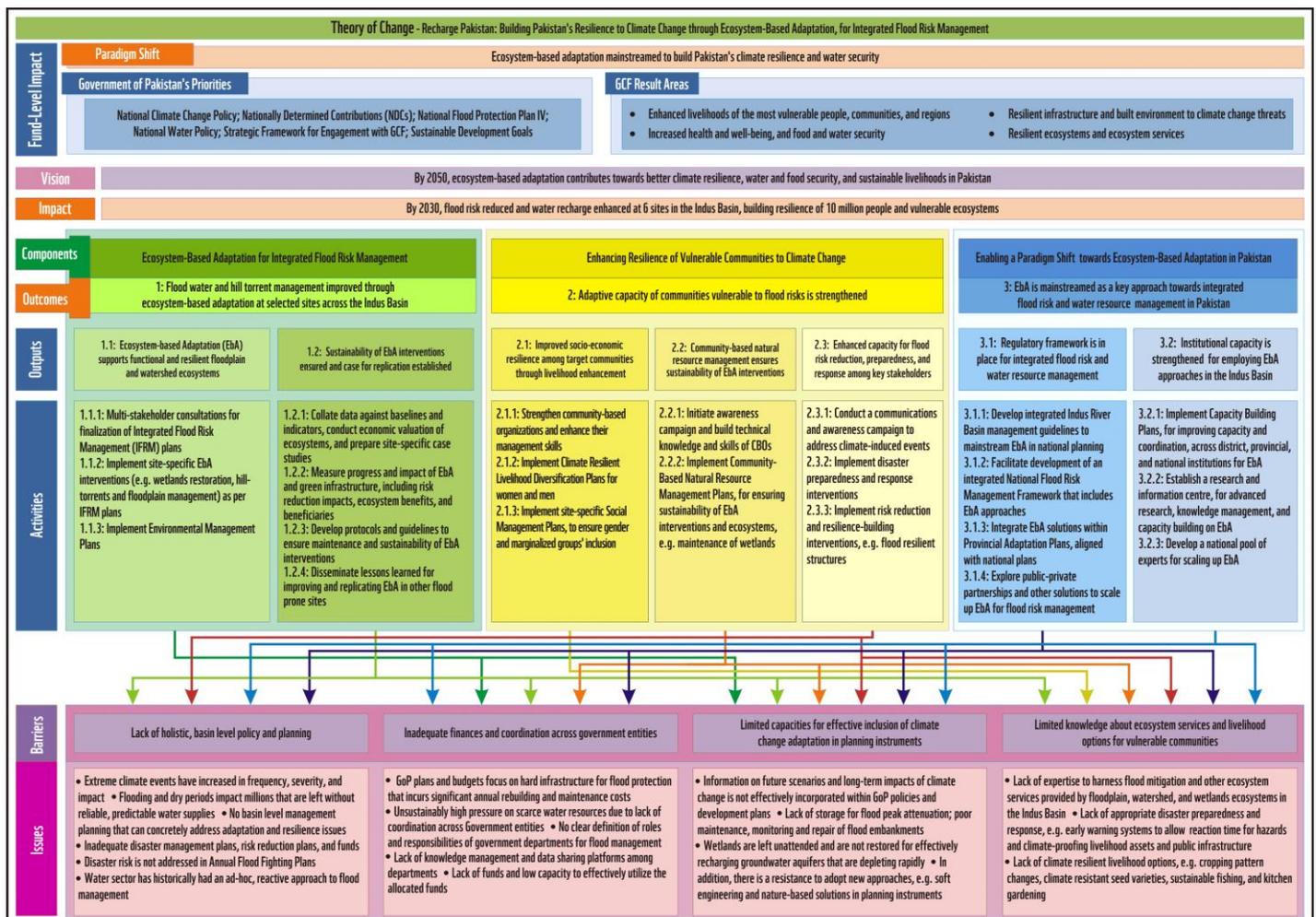
Rationale

Flooding is increasing in intensity and frequency in the Indus Basin, with large numbers of vulnerable people adversely affected, and the capacity of existing grey infrastructure to manage the flood volumes is limited, resulting in serious humanitarian and economic impacts. Integrated flood risk management is now a key national priority for the Government of Pakistan (GoP). The project proposes to undertake ecosystem-based adaptation (EbA) interventions that will store flood water in wetlands, floodplains and depressions (green infrastructure) at several priority sites, build resilience of communities at these sites, and enable the GoP and relevant stakeholders to implement and replicate EbA work, providing a cumulative, no-regrets approach to building climate change resilience. To ensure that the EbA interventions are sustained and continue to function effectively, the project will ensure that climate-adapted, community-based natural

resource management is implemented locally. Thus, this project will contribute towards improving water and food security at a national level, and climate-adapted livelihoods locally, increasing resilience through the protection and restoration of ecosystems, and building the climate resilience of vulnerable communities in the Indus Basin.

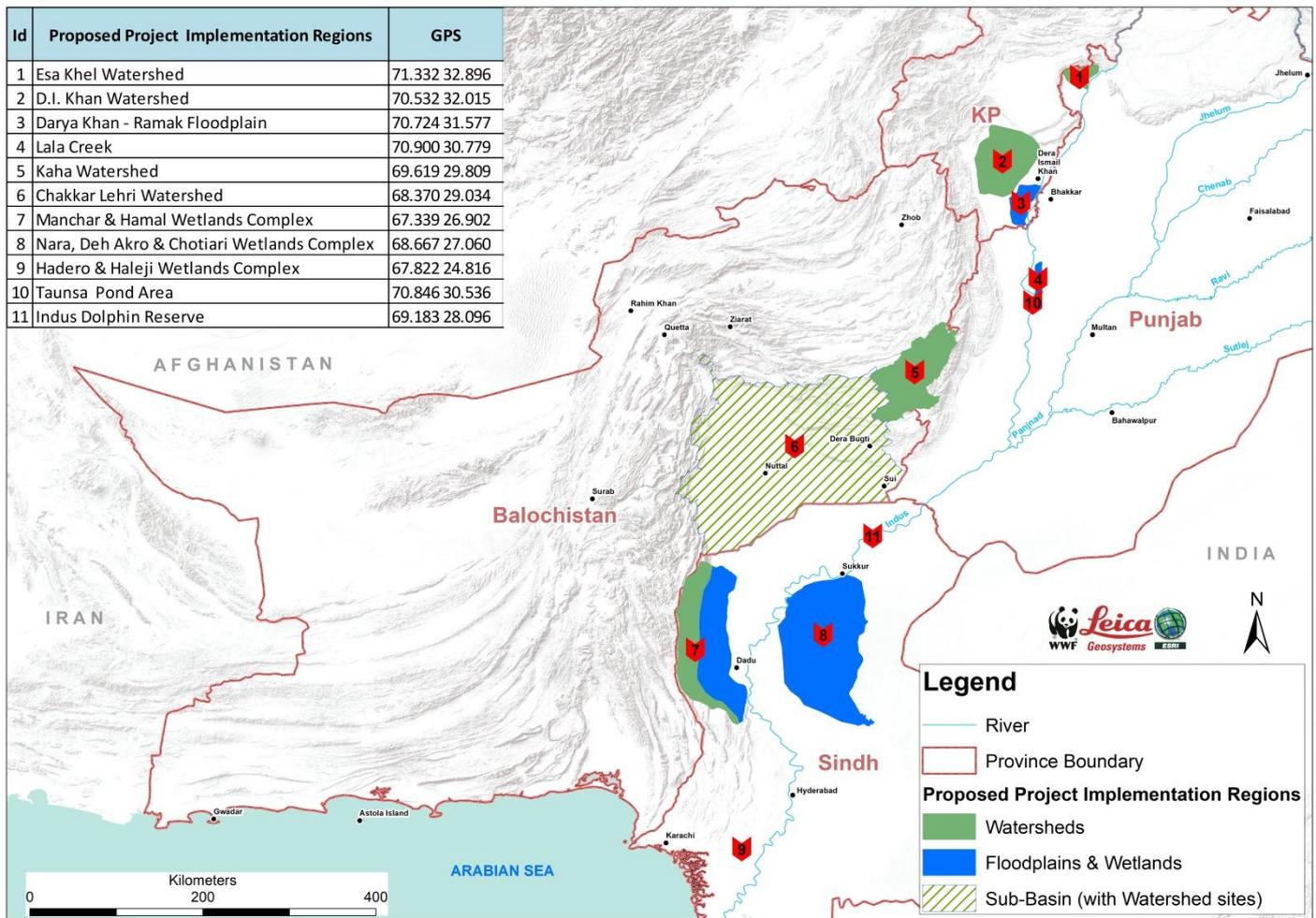
Theory of Change

IF: a diversified portfolio approach is taken for integrated flood risk management in the Indus Basin, which includes green infrastructure for ecosystem-based adaptation, going beyond traditional hard infrastructure investments only; local communities at target sites are involved in ecosystem restoration and management that benefits their livelihoods and empowers them to build their own resilience for climate adaptation; and there is Government leadership to drive a paradigm shift towards mainstreaming EbA into sectoral plans across Government entities through a multidisciplinary, coordinated approach. **THEN:** the proposed project will create **multi-sectoral, long-term benefits** for Pakistan, including: a) improved resilience of vulnerable communities to river and hill-torrent flooding; b) increased capacity of this water-stressed country to efficiently store and use floodwater; c) enhanced recharge of groundwater; d) improved biodiversity, habitat conservation, and other ecosystem services e.g. carbon sequestration; e) climate-adapted alternative livelihoods for local communities; and f) a new standard for integrated flood risk management that combines scalable green and grey infrastructure approaches in Pakistan. **The Theory of Change is given below and in Annex 4.**



Project Locations

Ten possible sites, including upstream watersheds and hill torrents and downstream wetlands and floodplains that are linked to the Indus River, have been identified based on flood risks, climate projections, water storage and recharge potential, and local communities' needs. These are scattered along a 1300km stretch of the Indus River, across the provinces of Khyber Pakhtunkhwa, Punjab, Balochistan and Sindh. Please see the map provided below. From these potential sites, at least 6 will be shortlisted for this project after detailed feasibilities are carried out for funding proposal development. Annex 1 provides details on site selection criteria, maps, climate projections, and a concept illustration (also provided further below) for one proposed site as an example.



Project Preparation Phase

The project will be applying for Project Preparation Facility (PPF) support to supplement GoP and WWF funds to finance the necessary assessments for the development of a full funding proposal for the GCF. These assessments will include but will not be limited to: gender-responsive and inclusive local communities’ consultations and assessments on water rights and natural resource use and management; stakeholder consultations and feasibility studies for drafting site-specific Integrated Flood Risk Management (IFRM) plans with detailed designs and costing of EbA and green infrastructure interventions; assessments of surface water and groundwater water balance and storage potential at sites, e.g. using the Basin Assessment Scenario Intervention Tool; local socio-economic analyses and gender assessments; development of Environmental and Social Management Framework (ESMF) and Environmental Management, Social Management, and Gender Action Plans; Community-Based Natural Resource Management Plans; and a Monitoring & Evaluation Plan.

Project Outline: Annex 5 provides a detailed project outline and proposed EbA interventions.

Vision: By 2050, ecosystem-based adaptation contributes towards better climate resilience, water and food security, and sustainable livelihoods in Pakistan. **Impact:** By 2030, flood risk reduced and water recharge enhanced at 6 sites in the Indus Basin, building resilience of 10 million people and vulnerable ecosystems.

Component 1: Ecosystem-Based Adaptation for Integrated Flood Risk Management

Outcome 1: Floodwater and hill torrent management improved, through ecosystem-based adaptation at selected sites across the Indus Basin

Output 1.1: Ecosystem-based adaptation supports functional and resilient floodplain and watershed ecosystems

1.1.1: Multi-stakeholder consultations for: final adjustments of Integrated Flood Risk Management (IFRM) plans; alignment with GCF and other donor-funded initiatives in the Indus Basin (e.g. GLOF-II); and partner mobilization for implementation. **1.1.2:** Implement site-specific EbA interventions as per IFRM plans (Annex 5B gives details of recommended EbA interventions): **1.1.2.1** – Integrated floodplain management to manage flood flow in the Indus River: multi-purpose flood bypasses; diversion of flood water to wetland restoration sites; restoring degraded wetlands; introducing suitable sub-surface water storage solutions; riverine afforestation; and erosion control. **1.1.2.2** – Hill-torrent management in catchments, to alleviate flood peak pressures on the Indus River: watershed management, e.g. check dams, delay-action/recharge dams, terracing, and afforestation; flash flood dispersion for spate irrigation; diversion and storage for dry season. **1.1.3:** Implement Environmental Management Plans.

Output 1.2: Sustainability of EbA interventions ensured and case for replication established

1.2.1: Collate data against baselines and indicators (including metrics for a ‘Ground Water Atlas’ under National Water Policy), conduct economic valuation of ecosystems and their services and benefits (using tools such as InVEST), and

prepare case studies. **1.2.2:** Measure progress and impact of EbA and green infrastructure, including risk reduction impacts, ecosystem benefits such as groundwater recharge, improved soil and water quality, and number of beneficiaries. **1.2.3:** Develop protocols and guidelines with relevant provincial government line departments to ensure maintenance and sustainability of the project's EbA interventions. **1.2.4:** Disseminate lessons learnt for improving and building the case for replication of EbA in other flood prone sites.

Component 2: Enhancing Resilience of Vulnerable Communities to Climate Change

Outcome 2: Adaptive capacity of communities vulnerable to flood risks is strengthened

Output 2.1: Improved socio-economic resilience among target communities through livelihoods enhancement

2.1.1: Strengthen community-based organizations (CBOs), e.g. women organizations and youth development organizations, and enhance their management skills. **2.1.2:** Implement Climate Resilient Livelihood Diversification Plans for women and men, which include: **2.1.2.1** - Site-level income generation initiatives, e.g. fishing, ecotourism, fish drying and storing facilities to reduce post-harvest losses. **2.1.2.2** - Skill development, market access and linkages, and exploring financing through public-private partnerships for sustainability. **2.1.3:** Implement Social Management Plans, which include social safeguards, gender, and marginalized groups' inclusion considerations.

Output 2.2: Community-based natural resource management ensures sustainability of EbA interventions

2.2.1: Initiate an awareness campaign and build technical knowledge and skills of CBOs, employing a gender balanced and inclusive approach, to participate in implementation of IFRM interventions. **2.2.2:** Implement Community-Based Natural Resource Management Plans, for ensuring sustainability of interventions and ecosystems, e.g. maintenance of wetlands, floodplains, flood bypasses and washlands, watersheds and plantations.

Output 2.3: Enhanced capacity for flood risk reduction, preparedness and response among key stakeholders

2.3.1: Conduct a communications and public awareness campaign to enable better responses to climate-induced extreme events. **2.3.2:** Implement disaster preparedness and response interventions, e.g. early warning systems and hydrological gauging stations, Disaster Recovery and Resource Centres, and Disaster Rapid Response Force, aligned with Disaster Management Plans. **2.3.3:** Implement risk reduction and resilience-building interventions, e.g. no-build zones, flood resilient structures (e.g. raised platforms, and flood vents), community-based disaster risk management and insurance solutions, and support roll-out of funds (e.g. National Disaster Risk Management Fund).

Component 3: Enabling a Paradigm Shift towards Ecosystem-Based Adaptation in Pakistan

Outcome 3: Ecosystem-based Adaptation is mainstreamed as a key approach towards integrated flood risk and water resource management in Pakistan

Output 3.1: Regulatory framework is in place for integrated flood risk and water resource management

3.1.1: Develop integrated Indus River Basin management guidelines to mainstream EbA in national plans (in line with National Water Policy and National Flood Protection Plan IV). **3.1.2:** Facilitate development of an integrated National Flood Risk Management Framework that includes EbA approaches. **3.1.3:** Integrate EbA approaches within Provincial Adaptation Plans, aligned with the National Adaptation Plan (Ministry of Climate Change), and the National Wetlands Management Plan (under National Water Policy). **3.1.4:** Explore public-private partnerships, blended financing, incentive schemes, micro-insurance, community-based enterprises, and other private sector based solutions to scale up EbA for flood risk management and community-based disaster management.

Output 3.2: Institutional capacity is strengthened for employing EbA approaches in the Indus Basin

3.2.1: Implement Capacity Building Plans, based on institutional needs and gaps assessments, for improving capacity and coordination, and ensuring a social safeguards and gender responsive approach, across district, provincial, and national institutions for EbA approaches. **3.2.2:** Establish a research and information centre for advanced research, knowledge management, and capacity building on integrated flood risk management. **3.2.3:** Develop a national pool of experts for scaling up EbA through investment in curriculum development, academic programmes, training of trainers, and exposure visits.

Concept Illustration – Manchhar Lake Site: The diagram below illustrates the different types of EbA interventions proposed in the watershed and floodplain areas around the Manchhar Lake, which is one of the potential wetland sites for the project.

Diversified Portfolio Approach:
Integrating Ecosystem-Based Adaptation with Government Irrigation Departments' Grey Infrastructure Solutions

Potential Benefits:

1. *Environmental benefits* (e.g. net volume of water in lake increased and quality improved, improved hydrological flows around Manchar Lake, ecosystem services improved)
2. *Social benefits* (e.g. reduced flood risk to lives and assets, local and provincial institutions strengthened, local knowledge and capacity built keeping in view gender sensitivity)
3. *Economic benefits* (e.g. reduced flood damages and costs avoided, green/grey infrastructure made more resilient to flooding, livelihoods sustained through improved aquaculture and agriculture development in and near Manchar Lake site)

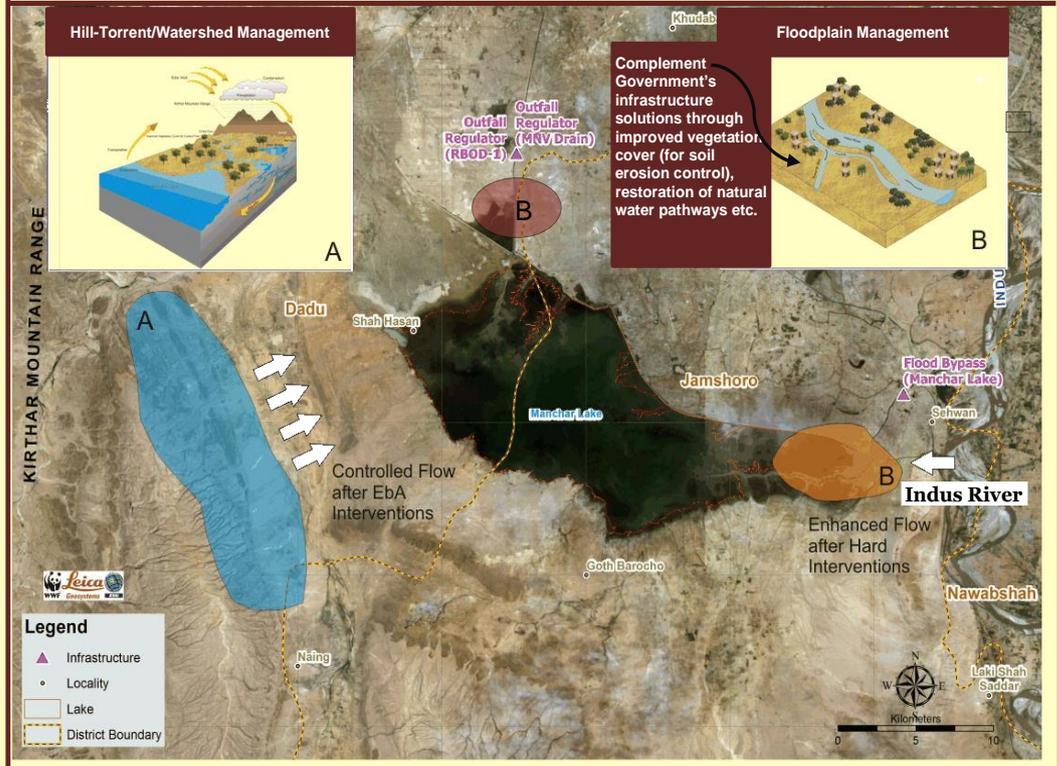
Potential Interventions:

Site A: Hill-torrent and watershed management interventions in Kirthar Mountains:

Alleviate flash flood risks on communities, while maintaining flows to Manchar Lake; watershed management, e.g. check dams, terracing, and afforestation; flash flood dispersion for spate irrigation; diversion, soil bio-engineering.

Site B: Floodplain management to manage flood flow from Indus River on eastern end of Manchar Lake:

Identify naturally inundated and undeveloped areas to be maintained as floodways/ washlands/ bypass channels, restore floodways and bypass channels through removal of blockages, re-linking with main river channels, and flood tolerant plantations etc; riverine afforestation; and erosion control.



Capacity of Accredited Entity

WWF: World Wildlife Fund (WWF) US, the AE for this project proposal, is part of the global **WWF Network** that is present in over 100 countries. More than 6,000 WWF staff collaborate with an extensive network of partners at the local, national, and global levels to deliver science-based solutions for conserving biodiversity, halting environmental degradation, and tackling climate change. WWF has well-established relationships with country governments, private sector entities, indigenous peoples' groups, and civil society partners. Recently, WWF and the Royal Bhutan Government launched a GCF funded project, "Bhutan for Life", which leverages nearly USD 100 million, with a GCF contribution of USD 26.6 million.

The **WWF Network** supports implementation of the Paris Agreement; it works with communities, governments, industries, and the development sector, and leveraged USD 555 million in 2017, to address climate change, water, and other conservation issues. WWF is a global leader in EbA approaches, including climate-adapted water management. Examples of publications include: *Natural & Nature-based Flood Management: A Green Guide* developed with the USAID (WWF, 2017); *Flood Risk Management: A Strategic Approach* developed with China's Ministry of Water Resources, ADB and UNESCO (Sayers et al., 2013). WWF Network experts have also developed various tools for EbA implementation, e.g. *Water Risk Filter*, *Green Recovery and Reconstruction Toolkit* with the Red Cross, *Flowing Forward* with the World Bank, and *Shifting Course: Climate Adaptation for Water Management Institutions*. WWF's relevant on-ground experience around the world, mentioned in Annex 6, will allow effective planning and implementation for the EbA interventions proposed under this project.

Capacity of Executing Entities and Implementation Strategy

The Government of Pakistan has requested **WWF-Pakistan** to serve as the lead **Executing Entity** (EE) for the project. Project funds will flow from the Accredited Entity to WWF-Pakistan, which will then disburse funds to the Executing Partners for their respective roles under the project. As the Executing Entity, WWF-Pakistan will lead coordination between all Government (through the Federal Flood Commission), non-Government, and community' stakeholders. It will lead implementation of interventions with target communities for community-based EbA, natural resource management, and livelihood development, as well as coordinate effective project delivery in collaboration with key government and non-government stakeholders. It has experience in climate change adaptation, managing and restoring wetlands, rivers, and watersheds (ecosystem-based approaches), disaster risk reduction and management (e.g. flood recovery), and sustainable agriculture. **WWF-Pakistan's EbA experience includes Watershed Management in Ayubia National Park's buffer zone (recently closed after a decade) and Khanpur Dam's catchment areas (ongoing since 2017), with interventions such as afforestation and natural regeneration support in degraded forest patches, slopes and landslip stabilization**

through bioengineering, terracing, check damming for streams, soil erosion control, that are being proposed for the hill torrents management interventions for Recharge Pakistan. Other major interventions in the past that have employed EbA measures for conservation and climate change adaptation include the Indus for All Programme, Flood Early Recovery Programme, Climate Change Adaptation Project, and Pakistan Wetlands Programme. WWF-Pakistan's ongoing projects that have EbA elements and contribute towards climate change adaptation include: 1) Sustainable Management of Mangroves Ecosystem and Enhancing Resilience of Communities in Indus Delta, Sindh, Pakistan, funded by BMZ via WWF-Germany; 2) Integrated Watershed Management and Livelihood Improvement Project in Selected Sub-catchments of Khanpur Dam – Phase II, funded by The Coca-Cola Foundation; 3) Agriculture, Water, Energy, and Hazard Management in the Upper Indus Basin for Improved Livelihoods - Phase II, funded by the International Centre for Integrated Mountain Development (ICIMOD); 4) Improvement of Central Karakoram National Park Management System as a Model for Mountain Ecosystems in Northern Pakistan: Assessing Climate Change Impacts and Introducing Adaptation Measures and Sustainable Livelihood Options – Phases I & II, funded by the United Nations Development Programme (UNDP), Pakistan; and 5) Harmonizing Conservation with Sustainable Development in Hindukush Karakoram Pamir Landscape in Pakistan, funded by the International Centre for Integrated Mountain Development (ICIMOD). WWF has worked with the Government of Pakistan for replication of its successful interventions, e.g. watershed management interventions under the 'Billion Tree Afforestation Programme' (see Annex 6). WWF-Pakistan has also been working on effective decision making and action on water issues, e.g. coordinating the River Ravi Commission. WWF and its partners are also developing a Basin Assessment Scenario Intervention Tool (BASIT) that utilizes an integrated approach to assess both surface water and groundwater data of a river basin to identify the water balance. These approaches and BASIT will support effective planning, flood zone mapping, green infrastructure investment, and alignment of stakeholders across sectors for Indus.

The **Federal Flood Commission (FFC)**, under the **Ministry of Water Resources (MoWR)**, will be the second **executing entity** for this project and will lead coordination on behalf of the Government of Pakistan, steering the project directly through the Federal Government's MoWR that has authority over flood and water resources management. The FFC, as a part of MoWR, has the mandate and authority to manage water allocations and diversions through the Indus River Basin irrigation system, including: preparation of National Flood Protection Plans; approval of flood control schemes prepared by Provincial Governments and concerned Federal Agencies; review of flood damages to flood protection infrastructure and review of plans for restoration and reconstruction works; and undertaking measures for improvements in Flood Forecasting and Warning Systems. The FFC will be coordinating on-ground implementation of green infrastructure and EbA interventions at the target sites through the respective Provincial Irrigation Departments, zonal irrigation teams, and focal experts. In addition, the FFC is the key partner for any water resources-related policy development, planning, and institutional capacity building proposed under this project.

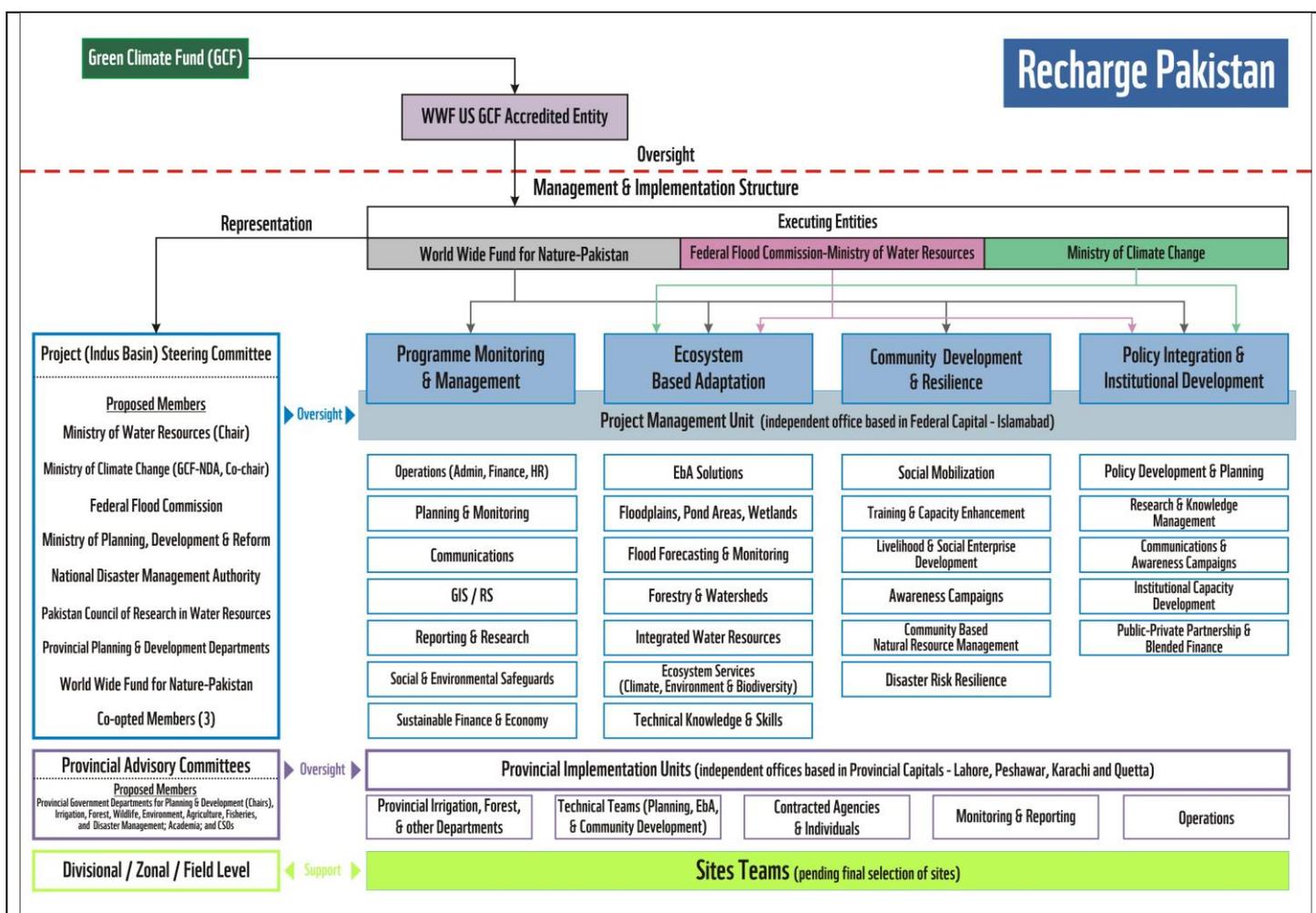
The third **executing entity** is the **Ministry of Climate Change (MoCC)**, the **GCF NDA** for Pakistan, which holds the national mandate for climate change, environment, and Multilateral Environmental Agreements, including UNFCCC and NDC commitments. The EE and main Executing Partner (FFC) will coordinate with the MoCC for on-ground implementation of interventions through the Provincial Forest and Environment Protection Departments. The Executing Partners are also mobilizing Government co-financing for the project. The AE will monitor use of funds and compliance with GCF regulations, while the EE will ensure on-ground alignment with national and international priorities, and relevant standards and policies.

A **Project (Indus Basin) Steering Committee (PSC)** will be established to guide the project with representatives from the following: MoWR (Chair), MoCC (Co-chair, & GCF NDA), FFC, National Disaster Management Authority, Ministry of Planning Development and Reform, Pakistan Council of Research in Water Resources, WWF-Pakistan, Provincial Advisory Committees Chairpersons (see below), and other members. Project teams of other GCF funded projects in the Indus Basin, e.g. UNDP's GLOF-II and FAO's proposed 'climate resilient agriculture and water management' project, will also be consulted for project design and implementation complementarities. The PSC will also ensure that EbA interventions are streamlined in the main development agenda of the Government of Pakistan.

Provincial Advisory Committees (PACs) will be established under the leadership of respective Chairs of Provincial Planning and Development Departments with members (ensuring inclusive representation of all groups and genders) from Provincial Departments of Irrigation, Forest, Wildlife, Fisheries, Environment, Agriculture, Women Development, and Disaster Management, academia, and CSOs. Provincial Focal Points will be notified to provide technical support to the field teams and for mainstreaming successful interventions into the provincial governments' development agenda.

The national **Project Management Unit** will be based in an independent office in the Federal Capital, headed by a National Project Director, with oversight by the **PSC**. There will be 4 **Provincial Implementation Units** in the Provincial Capital to coordinate project implementation through the provincial government departments, guided by the **PACs**. The on-ground site teams will be based at field offices.

The proposed implementation structure is as follows; please see Annex 6 for further details:



Risks and Mitigation

Risks identified include: a) Technical and Operational (e.g. delays, implementation complications, and low capacity); b) Social and Governance (e.g. lack of commitment from stakeholders); c) Financial (e.g. changes in rates/inflation, delays in disbursement); d) Environmental (e.g. extreme events during project implementation). These risks will be assessed in detail during project preparation and appropriate mitigation measures will be incorporated in the project design, e.g. sensitization of policy makers and ensuring government and communities' participation in the project planning and implementation process, dedicated efforts from WWF and GoP for streamlining coordination mechanisms, and collaboration with Disaster Management Authorities. See Annex 7 for a preliminary Risk Analysis Matrix.

B.3. Expected project results aligned with the GCF investment criteria (max. 3 pages)

Impact Potential

- Ecosystem-based Adaptation and Green Infrastructure (estimates to be revised during feasibilities):
 - 14,000 square kilometres of multi-purpose flood bypasses, washlands, and wetland restoration and reconnection sites; about 3-4 Million Acre Feet of water retention capacity expected to be added with these interventions.
 - 40,000 square kilometre area under watershed and hill torrent management. It is expected that an additional 25% of rainwater will be retained through watershed protection interventions for hill torrent management.
 - Groundwater recharge potential will increase as a result of wetlands, floodplains, watershed, and hill-torrent management interventions. This will improve water security for local communities by improving the water table around the project sites and help build drought resilience and climate change adaptation capacity for dry seasons.
 - Overall enhanced services from restored ecosystems, e.g. rivers and lakes provide services valued (2007 PPP) at 1,779-13,487 Int.\$/ha/year² and floodplains/marshes 981-44,597 Int.\$/ha/year (Russi et al., 2013).
- Direct benefits to approximately 10 million individuals (around 5% of Pakistan's population, 52% of whom are women) among vulnerable communities in and in close proximity to target sites, through reduced flood risks, increased water security, improved agriculture productivity and food security, community-based disaster risk management (CBDRM), and climate-resilient livelihood options. Project interventions will also increase overall health, income, and food security, while improving ecosystem benefits for target beneficiaries.
- Indirect benefits to an additional 20 million people in 50 vulnerable districts along the Indus River from reduced flood risk, through early warning systems, DRM trainings to authorities, improved governance, and enhanced ecosystem services. Multiplier benefits are also expected through replication of climate resilient livelihood options introduced.

² The international dollar (Int.\$) is a hypotheticalal currency to standardise values across countries by correcting to the same purchasing power that the U.S. dollar had in the United States at a given point in time. Figures in international dollars cannot be converted using market exchange rates; they must be converted using the country's purchasing power parity exchange rate. 1Int.\$=1USD for 2007.

Paradigm Shift

Pakistan's approach to water and flood management is currently focused on grey infrastructure, i.e. hard engineering. Though this has helped manage water resources and diffuse some risks from moderate floods, albeit with very low efficiency, the high expansion costs and inflexible infrastructure are unable to manage larger floods that are likely to occur with greater frequency and intensity in the future. This project proposes a paradigm shift by introducing EbA, with a three-pronged approach that would: a) retain and store water using green infrastructure, e.g. flood bypasses, wetlands restoration, and hill torrent management, for flood risk management; b) work with rural communities at project sites to empower them for local climate adaptation, flood risk reduction and natural resources management; and c) forge a paradigm shift so the approach can be replicated and scaled-up to keep up with changes as climate change advances and climate variability increases. The project will also contribute towards exploring viable public-private partnerships, blended financing, incentive schemes, micro-insurance, community-based enterprises, and other private sector based solutions to scale up EbA for flood risk management and community-based disaster management.

- **Innovation:** The project brings innovation across its implementation areas. This will be the first project in Pakistan to implement basin-wide EbA interventions to manage flood water and advocate for more flexible and integrated decision making and responses (e.g. BASIT). Secondly, the project addresses hill torrents as part of integrated flood risk management. The implementation of EbA interventions upstream for reducing flash flood flows during extreme weather events, and harnessing their potential, especially in arid and drought prone areas such as Sindh and Balochistan, will help reduce the significant contribution of hill torrents to the flood peaks in the Indus River. There is only limited experience with the use of EbA for these purposes, and the project will document and share its lessons for application to address climate adaptation challenges in similar settings around the world.
- **Impacts beyond project life - opportunities to replicate and scale up:** The project's executing consortium, particularly the government representatives, will safeguard long-term engagement and replication of its activities, as well as stakeholder coordination, by ensuring that the Project Steering Committee (PSC) and the Provincial Advisory Committees (PACs) meet regularly during and after the project. As the Federal Flood Commission will lead the project, there will be federal level involvement in ensuring that the EbA interventions continue to benefit communities and ecosystems beyond the project span. In addition, as EbA measures are inherently long lasting, they will continue to provide benefits to vulnerable communities that are also enabled to sustain and replicate interventions through community-based natural resource management and flood risk management efforts. In Sindh and Punjab, the project will facilitate pre-existing bodies, e.g. Indus Ecoregion Steering Committee, to support the project's EbA interventions. Similar bodies will be formed for Khyber Pakhtunkhwa and Balochistan.
- **Creating an enabling environment – regulatory framework and capacity:** The project's component 3 ensures that there is an enabling environment for integrated floodplain management and ecosystem-based adaptation. A detailed set of activities, focusing on: enhancing collaboration across various government and private sector entities (both local and suppliers of international brands are being engaged for water stewardship by WWF-Pakistan); mainstreaming EbA recommendations under various policies and plans; developing basin level action plans; and building institutional capacity, strengthening regulatory frameworks for climate responsive planning, and enhancing technical capacities, will be undertaken by the project. The PSC includes the Planning & Development Departments, ensuring that EbA will be mainstreamed and budgeted for in longer term government strategies, plans and practices. The proposed trainings will also help local organizations build awareness and capacity to address climate change induced threats and risk.

Sustainable Development - Social, Economic and Environmental Co-benefits and Gender Responsiveness:

The project is being designed through a participatory approach, with multi-stakeholder consultations, particularly with local communities at target sites. Consultation sessions will be held with rural communities for free prior and informed consent and ensuring there is no resettlement or loss of agricultural land. Communities will be empowered so that local resources are better managed, livelihoods improved, and climate vulnerability reduced. The proposed project will make a significant contribution to sustainable development in the Indus Basin by reducing escalating flood risks through EbA. The expected impacts will be more accurately quantified during the detailed site level feasibility studies in the forthcoming project preparation phase. Benefits will be measured through gender disaggregated indicators during project implementation.

- **Job creation and increase in disposable income:** The project will directly benefit at least 200,000 vulnerable people through skills-based trainings and diversified livelihood interventions, which will take into account the differential needs and interests of women, men and youth.
- **Government's budget deficits reduced and savings:** The project will help the GoP to reduce the financial impacts of flooding through more cost effective and sustainable solutions (Section C.2.). EbA and green infrastructure interventions will improve the resilience of the riverine ecosystem and vulnerable communities, thus reducing pressure on the GoP's budget. There will also be reduced deficit for the GoP due to savings from EbA solutions as opposed to hard infrastructure costs, as well as reduced rescue and relief expenses.
- **Improved ecosystem services for water management, food security and biodiversity conservation:** Through flood bypasses and wetland restoration, the project will help distribute silt in the adjoining agricultural lands and increase soil fertility. The enhanced water storage and groundwater recharge will improve agricultural productivity and food security. Improved water availability will also support healthy habitats (e.g. riverine forests and wetlands), and associated ecosystem services (e.g. fish stocks, clean water, and fodder sources), as well as key species (e.g. the endangered Indus river dolphin, a species endemic to the Indus).

- **Carbon sequestration:** Although this is an adaptation-focused project, it will also contribute towards carbon sequestration. This will occur through the restoration and increased water retention capacity of targeted wetland sites, expanding and rehabilitating riverine forest areas, and improving watershed management.
- **Gender responsive development:** Rural women in Pakistan are considered more vulnerable to climate change as they have more limited access than men to resources for building resilience, including income, land, loans and access to off-farm employment. Women also have fewer opportunities than men to obtain trainings and knowledge such as those for disaster emergency response. They are often excluded from local decision-making processes, in conservative areas. Yet they are responsible for ensuring their households' energy, water and subsistence farming needs are met. Many of the proposed interventions to build resilience and provide alternate energy solutions will be specifically designed to benefit and improve the adaptive capacity of vulnerable women. The provision of alternate and efficient sources of energy for poor rural households, and improved WASH facilities, will help reduce workloads and free-up time (e.g. spent on fuel collection), which can be used for studies or income generation. In addition, skills-based training, kitchen gardening, poultry farming, establishing household level fruit orchards, and community level vocational centres will directly benefit the women as well.
- **Education, culture, health, and standard of living:** The project will promote cultural conservation by including culturally and historically significant sites in livelihood development plans and awareness campaigns, for preservation of these sites and promotion of tourism for local, sustainable livelihoods. The proposed project sites have potential for revenue generation. By introducing these interventions and by mobilising communities and local organisations, public funds can also be leveraged for providing education and health facilities, which can further improve the living standards of the local communities.

Needs of Recipients

- **Vulnerability to Climate Change:** Pakistan is ranked the 8th most affected country in the world on Germanwatch's Long-Term Climate Risk Index (1998-2017), with losses from recent disasters amounting to USD 3.8 billion in Purchasing Power Parity terms (Eckstein et al., 2018). Its contribution to global greenhouse gas emissions is only 0.8% however. Climate change poses serious threats to water, energy and food security, and, as discussed, the country has already suffered significant losses from floods. The Government's Global Change Impact Study Centre has modelled climate change projections, including changes in precipitation and flooding, for potential sites for this proposed project to help prioritize those that are at increased flood risk under medium-range stabilizing scenario Representative Concentration Pathways (RCP) 4.5 and high-end scenario RCP 8.5 (Annex 1B).
- **Economic and social development level of the country and affected population:** Pakistan is classified as a lower middle-income country, with per capita GDP of USD 1,443.6 in 2016. In the project's target rural areas, the communities are some of the poorest and most vulnerable in Asia. With 54.6% rural poverty, the majority of the rural communities living along the Indus River floodplains live below the poverty line, with poor or no access to basic facilities, such as clean drinking water, sanitation, health, education and other public infrastructure (UNDP, 2016a). Furthermore, low development in the area perpetuates a variety of socio-economic problems, e.g. limited income earning opportunities, income disparity, and unsustainable dependence on agriculture, fishing and other natural resource-based income sources. Annex 1E provides the population and poverty profile of the potential target areas along the Indus River.
- **Absence of Alternative Sources of Financing/Financing Needs for Adaptation:** Refer to Section C.2.

Country Ownership

The Ramsar Advisory Mission (RAM) recommendations and the subsequent exchanges with flood management experts in the Yangtze Basin successfully convinced the Government of Pakistan (GoP) of the advantages of EbA for the management of Indus Basin floods. This project has been developed at the request of the GoP, specifically to take actions on these recommendations, and in close consultations with all of Pakistan's main water resources, flood management, and climate change adaptation stakeholders (Annex 3 details multi-stakeholder consultations). Twenty letters of support from federal Ministries and provincial departments and the NOC from the GCF NDA, indicating the country's ownership and commitment to this project, have also been received and are attached in Annex 8 and 9.

This project has been presented and approved at the highest levels of GoP, including the Standing Committees of Senate and National Assembly in 2017 and to the Advisor to the Prime Minister on Climate Change at the Ministry of Climate Change in 2018. Both presentations led to strong agreements by officials that EbA integration was necessary to store surplus floodwater for social, economic and environmental needs of the country. The Ministry of Climate Change further presented this project to the Prime Minister of Pakistan in September 2018; during this meeting this proposed concept was approved and prioritized for immediate funding under the "Recharge Pakistan" campaign. The Office of the Advisor to the Prime Minister on Climate Change has directed relevant GoP authorities to provide necessary support for development, co-financing, and implementation of the proposed project. The Advisor to the Prime Minister on Climate Change, while leading the Pakistani delegation at UNFCCC's COPs, has been discussing this concept as a priority for the GoP among its water resources management actions, and it has also been included in discussions on a bilateral MoU between the Governments of China and Pakistan (see Annex 3 and C.4.).

Coherence and Alignment

Discussions on various aspects of climate change adaptation and flood risk management have been on-going with all relevant GoP entities, and WWF-Pakistan has been engaged with drafting relevant policies, such as the National Climate Change, Water, Wetlands and Forest Policies. The project is aligned with objectives pertaining to management of water resources and flood control under the: National Climate Change Policy (2012) and its implementation framework (2014-

30); National Forest Policy 2015; National Water Policy 2018; draft National Wetlands Policy; National Disaster Risk Management Framework (2007); and National Disaster Risk Reduction Policy (2013).

The proposed project will contribute adaptation targets outlined by the GoP in its NDCs. In the near term (2020-2025) it will: contribute to sub-national adaptation planning by building the capacity of relevant line departments and the development of adaptation strategies, such as the 'National Floodplain Management Policy, and Hill Torrent Management Policy' as described in the NFPP IV, and the 'Indus River Basin Management Plan'; and ensure an enabling environment for floodplain management at the national level. The importance of creating an enabling environment for ecological solutions to be undertaken, i.e. having relevant policies and legislation in place, a coordinated basin level approach by establishing a single coordinating body (e.g. Wetlands Management Authority under National Forest Policy, Water Council under the National Water Policy), and enhancing institutional capacity (prioritised under the NFPP IV), was also stressed in the country's NDCs and is incorporated in this proposed project.

The project will also contribute towards SDGs 6, 11, 13 and 15 and all 4 priorities under the Sendai Framework (2015-2030). Alignment has been confirmed with GoP and development sector organizations' projects. The implementation strategy also ensures coordination with other GCF funded projects, i.e. GLOF-II and FAO's project in the pipeline.

Efficiency and Effectiveness

The project proposes EbA solutions under a diversified portfolio approach to reduce disaster risks and manage floodwaters. These are based on recommendations emanating from best practices detailed in Annex 5. According to UNDP's National Economic, Environment and Development Study (NEEDS), Pakistan's current adaptation need is on average more than USD 10 billion/annum, reflected in the country's NDCs as well, and there is a significant gap between the amount of funding needed and the amount available (Khan et al., 2011; UNDP, 2015).

Not only does grey infrastructure need heavy investments, it also has high environmental costs associated with it; for example, the Indus Delta has been degrading due to the reduced flow of water as a result of the vast irrigation and hydropower infrastructure upstream. The National Flood Protection Plan (NFPP) IV budget, which predominantly focuses on rebuilding flood embankments and other hard engineering measures for flood protection, is estimated at USD 375 million. Diamer-Bhasha Dam alone is costing Pakistan more than USD 10 billion, and over 35,000 people will be displaced while historically significant sites are submerged. Tarbela Dam has been silting up for decades, due to the Indus having a very high sediment load, reducing capacity to 33% and resulting in high rehabilitation and maintenance costs. This proposed project is estimated at around USD 150 million and has multiple benefits and none of the social, economic, and environmental costs associated with water storage through grey infrastructure. Please see sections B1 and C2 for further details on economic and financial soundness and efficiency. Cost-Benefit Analyses will also be conducted to determine the economic efficiency of the proposed solutions to be piloted, in comparison to the flood control and management measures budgeted in the NFPP IV.

B.4. Engagement among the NDA, AE, and/or other relevant stakeholders in the country (max ½ page)

The project concept development is being carried out through the financial and in-kind support of the Government of Pakistan (GoP), WWF Network (including WWF-Pakistan and WWF-US), and other development sector stakeholders. In line with suggestions from Pakistan's GCF NDA and the GCF Board of Pakistan (at its meeting on 4th February, 2017), WWF-Pakistan held numerous consultations with provincial and national stakeholders. The AE, WWF-US, has been involved since the beginning of project development and has been guiding and supporting WWF-Pakistan. At the international level, a meeting of the representatives of Pakistan's GCF NDA and WWF's AE was held during the GCF Asia Dialogue (Bali, Indonesia, April 2017). The Government's Ministries of Water Resources (e.g. Federal Flood Commission, and Provincial Irrigation Departments), Climate Change, and Planning Development and Reforms have been integral in defining proposed interventions, potential sites, implementation strategy, and co-financing options.

National Consultative Sessions were conducted with representation from all relevant GoP entities. Discussions were held to identify potential sites, criteria, and alignment with Government projects. Recommendations shared by Government counterparts revealed the need for the project in the national context. The need for hill torrents management was also highlighted and led to the inclusion of additional vulnerable sites to the list. Additionally, other multi-stakeholder sessions and meetings have been held, including with the Ministry of Water Resources, Federal Flood Commission, Pakistan Council of Research in Water Resources, Ministry of Climate Change (GCF NDA), and Provincial Irrigation, Forest, Wildlife, Fisheries, Environment and Disaster Management Authorities (Annex 3). The purpose of these meetings was: a) to discuss the project design; b) to define roles and responsibilities in the proposed project; and c) to obtain formal commitments of support. Endorsements in the form of Letters of Support were obtained from all of the national and provincial government agencies as described above (Annex 8).

The **GCF Board of Pakistan** met again on **29th January 2018**, where the NDA and key stakeholders (including executing partners) discussed the project design, and **final endorsement was received**. The **NDA's No Objection Certificate (NOC)** for the project was subsequently **received in March 2018** (Annex 9).

Thereafter, as mentioned in section B.3, the concept was presented to, and approved by, the Prime Minister and his Cabinet as a national initiative termed "Recharge Pakistan". At subsequent National Consultative Sessions, the latest one in April 2019, updates to the site selection criteria, governance structure, and implementation strategy, along with Government procedures for project concept and budget development for co-financing were discussed further with Provincial and Federal Government stakeholders. The updated concept is being discussed with development partners, including ADB, for funding and implementation roles. As the concept is developed into a funding proposal, WWF will continue engaging with stakeholders, particularly local communities at shortlisted sites during feasibility assessments, for a participatory and need-based project design. The 'Project Steering Committee' and provincial and inter-provincial coordination and advisory committees will also be mobilized soon to guide the project design and inception.

C. Indicative Financing/Cost Information (max. 3 pages)

C.1. Financing by components (max ½ page)

Government of Pakistan's Ministries, Departments, and Authorities, WWF Network, and other partners will be contributing in cash and in-kind towards this project. Please note that at this concept stage, the funding numbers below are indicative only and co-funding and roles have been discussed with partners at a high level. Detailed discussions and costing will follow during the feasibility assessments and project proposal development for each potential site, with relevant provincial and national/federal level Government, communities, and other stakeholders.

Component	Indicative cost (USD)	GCF financing		Co-financing		
		Amount (USD)	Financial Instrument	Amount (USD)	Financial Instrument	Name of Institutions
Component 1: Ecosystem-based Adaptation for Floodplain and Hill Torrent Management	USD 95 million	32	Grant	63	Grant, In-kind	Federal Flood Commission, MoWR; MoCC; National Disaster Risk Management Fund (NDRMF); NDMA; PDMAs; Provincial Irrigation & Forest Departments; WWF
Component 2: Community Resilience	USD 33 million	11	Grant	22	Grant, In-kind	NDRMF; NDMA; PDMAs; WWF
Component 3: Coordination, Legislation and Capacity Building	USD 12 million	4	Grant	8	Grant, In-kind	Federal Flood Commission; Provincial Departments
Transversal Component: Coordination, Management, M&E and Audit	USD 10 million	3	Grant	7	Grant, In-kind	WWF; MoWR; MoCC
Indicative total cost (USD)	USD 150 million	USD 50 million		USD 100 million		

C.2. Justification of GCF funding request (max. 1 page)

This project presents a clear example of why funding is needed from the GCF as an international fund that supports innovative approaches to climate adaptation and fosters paradigm shifts, especially in developing countries that lack the means to undertake such urgent interventions.

Funding Constraints

Pakistan already suffers immense losses from climate change impacts and evidence suggests that climate change will have a significant and increasing effect on national GDP if no action is taken. Between 1995 and 2014, climate change cost Pakistan USD 3.9 billion (PPP) in average economic losses annually. Please see 'Needs of Recipient' section in B.3. Combating these effects requires action on both mitigation (reduction of GHG emissions) and adaptation (building resilience in natural and human systems). A comparison of the global cost estimates with the current level of adaptation funding indicates that projected global adaptation needs are to be significantly greater than current investment levels, particularly in vulnerable developing countries like Pakistan. The average costs for annual adaptation and mitigation to climate change for Pakistan were estimated to range annually from more than USD 10 billion to up to USD 32 billion by 2050 (UNDP, 2015; Government of Pakistan, 2017b).

Pakistan remains a resource-constrained economy, dependent on foreign financing in the shape of loans, foreign investment, and grant aid. Pakistan relies predominantly on loans from multilateral banks for infrastructure projects and has often relied on foreign aid to assist in post disaster situations. There is significant investment required to meet the requested budgets for National Flood Protection Plans (NFPPs) - USD 375 million estimated for NFPP IV – and due to insufficient GoP funds, foreign financing is relied on significantly for tackling the impacts of floods and/or investing in flood management initiatives. To highlight the inadequate funding issue, the Federal Flood Commission's Annual Flood Report from 2017 provides data on the significant gap annually between the amount of funding needed and the amount available for the Provinces and Federal Line Agencies for flood protection work. The budget need from the Government's Normal/Emergent Flood Programme by the Provinces and Federal Line Agencies, for 2016-17, for example, was PKR 5.5 billion, while only PKR 267.5 million were released for use (Government of Pakistan, 2017a).

In spite of the country's financial constraints, estimated federal climate-related expenditure was between 5.8 and 7.6 per cent of the total expenditures in the federal budget (UNDP, 2015). This expenditure is expected to increase further, primarily due to the increase in frequency and intensity of climate induced disasters. The budget, however, will still fall short for funding this proposed EbA disaster risk reduction project that inherently has high up-front costs.

The Government of Pakistan, particularly the Ministry of Climate Change (the GCF NDA) has explored various funding options for initiating this concept since the RAM recommendations, but has not been able to secure commitments from

any entities with the requisite level of funding. WWF-Pakistan was subsequently asked to lead concept development, in collaboration with the Government, for GCF funding.

Co-Financing Options

WWF has been discussing co-financing options, project design and implementation strategy with the Government and key development sector stakeholders, e.g. Asian Development Bank (ADB), Development Agency of France (AFD), European Union Delegation in Pakistan, and other bilateral and multilateral agencies. The Government has announced that it will prioritize interventions under this proposed project as a national 'Recharge Pakistan' programme with around USD 50 million in funding from various Government budgets that align with this concept. Around USD 39.9 million has recently been committed as co-financing through the National Flood Protection Plan IV (NFPP IV) budget, by the Federal Flood Commission of the Ministry of Water Resources (letter attached in Annex 8). WWF and Government of Pakistan representatives are also discussing and working on project concept development in-line with Government procedures for further funding (see section C.3 and Annex 3 for details). In addition, a National Disaster Risk Management Fund (NDRMF) has been established (under Pakistan's Companies Ordinance) with an initial investment of USD 250 million from the ADB. The Government, ADB, and NDRMF CEO have highlighted this as an avenue for co-financing interventions that align with NDRMF objectives and the Government's aims for achieving greater impact in the long term through this project.

Private commercial resources, either local or international, are all but absent from climate adaptation investments in rural areas of Pakistan, as is the case in most low-income developing countries. Rural communities in the project areas are too poor to be able to make significant financial contributions to the project. Though flood damages add up to billions of dollars, addressing this through ex-ante investment schemes (e.g. insurance) has thus far proved elusive. Still, this may be an approach to consider for the long-term sustainability of the proposed project and similar projects as well. In addition, public-private partnerships and other blended finance options (e.g. European Union Delegation in Pakistan) are also being explored during the project preparation phase.

C.3. Sustainability and replicability of the project (exit strategy) (max. 1 page)

Sustainability

This proposed project, Recharge Pakistan, is being designed and will be implemented in collaboration with all key Government stakeholders to ensure that country ownership for sustaining and scaling up interventions is guaranteed. It is expected that approximately USD 50 million (as co-financing) will be allocated to address this issue as high priority. In this regard, the Ministries of Climate Change, Water Resources, and Planning Development & Reform have been well integrated during planning discussions, will be involved on-ground during the feasibility assessments, and will support the project proposal development, which will ensure sustainability of the project in the long-term. In addition to this, the Government project development process has been initiated simultaneously through the Ministry of Water Resources. WWF supported the Ministry of Water Resources with development of the 'Recharge Pakistan' project concept clearance proforma, which has been approved by Ministry of Planning Development and Reforms. The Project Concept (PC1) will now be developed through the Provincial Governments of the 4 provinces with target sites, and then collated at the federal level by the Ministry of Water Resources for allocation of Government budget and resources.

The project will address institutional needs that have been voiced by the Government of Pakistan at various fora, and identified under their policies and plans (e.g. the NFPP IV). It will include stakeholders' capacity building, handing over responsibility to the Government of Pakistan for continued function of the Project Steering Committee (PSC), Provincial Advisory Committees, PSC working group, and Provincial Focal Points, and identifying financing schemes to ensure that project interventions are sustained. One of the outcomes of the project is putting the requisite policy and regulatory framework in place to successfully achieve the envisioned impact and ensure long term support and ability to scale up. Further, adopting an inclusive approach, with regular consultation of stakeholders and local communities, means that community ownership is integrated into the project, which will help with sustainability at the local level. The green infrastructure solutions proposed require lower maintenance costs as compared to traditional hard-engineering flood protection and water storage measures, e.g. flood bunds, dams and barrages, which require costly rehabilitation measures due to issues like silt build-up reducing storage capacity. This will ensure that long term financing for sustaining EbA interventions will hence be more feasible for the Government. In addition, community-based natural resource management interventions built into the project will ensure maintenance of most of the EbA and green infrastructure interventions of the project, e.g. de-siltation of community-managed wetlands and diversion channels.

At the national level, other than the 'Recharge Pakistan' project approved by the federal Government, the project's afforestation and watershed management interventions will also align with the Government's 'Plant for Pakistan' and 'Green Pakistan Programmes', which focus on rehabilitating the forests of Pakistan. In addition to this, long-term programmes such as the Sustainable Forest Management and Sustainable Land-use Management Programme can absorb some of the field-based interventions. In Sindh the project will become part of the Indus Ecoregion Steering Committee mandate under the Government of Sindh's aim to address the poverty-environment nexus and contribute to the SDGs. WWF-Pakistan will include EbA introduced under this project in its core business to ensure that the achievements made during this project are not lost. It may also consider aligning other activities in the selected areas to this project. This will ensure knowledge exchange for the benefit of this and other projects.

Replicability

Successfully completed, this approach has great replication potential in other areas of the Indus basin which will help to keep pace with the adverse impacts of climate change in the future. Given the limitations of traditional flood management interventions in other countries, and the high investment requirements for further hard infrastructure, the proposed EbA

approach is gaining favour across the world. Successful project interventions will be showcased to stakeholders in other parts of Pakistan where the approach can be replicated, as well as to decision-makers in other countries to encourage EbA approaches to flood management elsewhere. The major Asian rivers rising from the Himalayas, including Yangtze, Mekong, Ganges, and Indus, support more than one quarter of the world's population and some of the most dynamic economies. Millions of people, however, suffer from flooding and water insecurity in Asia, largely in the river basins around the Himalayas. There are many opportunities to take this approach to other Asian floodplains that also face high flood risks.

This proposed project has a duration of under 10 years for achieving impact at the chosen sites by 2030, but a 30 year vision that extends till 2050 for expanding the EbA solutions to a multitude of suitable sites that have been suggested by Provincial and Federal Government representatives, bilateral and multilateral agencies, and other integrated water resource management and climate change adaptation experts. Out of the many sites suggested during consultations, there are 10 potential sites being studied with the objective of choosing the 6 most suitable sites. Thus, this project is being seen as the first 10 year phase of a potential 30 year programme with at least 2 more 10 year phases that will target a multitude of other suitable sites. The Government of Pakistan and key development stakeholders in the country and region will benefit from preparation of case studies of the most effective, impactful EbA interventions under this project to be replicated. This project will provide critical reinforcement of nature-based solutions as the sustainable, ecosystem-friendly approach to take for climate change adaptation.

To facilitate the replication of the proposed initiatives across other Asian river basins, the project will emphasise documentation and sharing of results and lessons throughout the project life within Pakistan and across the world. WWF, the AE, is in a unique position to transfer lessons from this project as it is active in over 100 countries around the world, and often engaged in fostering ecosystem-based adaptation for management of floods and other climate hazards. WWF can work with government institutions, river basin organizations, multinationals, regional and international development agencies like Asian Development Bank and Mekong River Commission, and others to achieve water security and climate adaptation in these basins. The initiative could make a significant contribution to fostering sustainable water management in large Asian basins and beyond where WWF already has a country presence. Component 3 includes interventions for knowledge exchange and policy recommendations to facilitate replication nationally and internationally.

D. Supporting documents submitted (OPTIONAL)

- Map indicating the location of the project/programme
- Diagram of the theory of change
- Economic and financial model with key assumptions and potential stressed scenarios
- Pre-feasibility study
- Evaluation report of previous project
- Results of environmental and social risk screening

Self-awareness check boxes

Are you aware that the full Funding Proposal and Annexes will require these documents? Yes No

- Feasibility Study
- Environmental and social impact assessment or environmental and social management framework
- Stakeholder consultations at national and project level implementation including with indigenous people if relevant
- Gender assessment and action plan
- Operations and maintenance plan if relevant
- Loan or grant operation manual as appropriate
- Co-financing commitment letters

Are you aware that a funding proposal from an accredited entity without a signed AMA will be reviewed but not sent to the Board for consideration? Yes **(Not Applicable; AMA has been signed.)** No