

# Funding Proposal

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## **FP207: Recharge Pakistan: Building Pakistan's resilience to climate change through Ecosystem-based Adaptation (EbA) and Green Infrastructure for integrated flood risk management**

Pakistan | World Wildlife Fund, Inc. (WWF) | Decision B.36/05

3 August 2023



**GREEN  
CLIMATE  
FUND**

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### *NOTE TO ACCREDITED ENTITIES ON THE USE OF THE FUNDING PROPOSAL TEMPLATE*

- Accredited Entities should provide summary information in the proposal with cross-reference to annexes such as feasibility studies, gender action plan, term sheet, etc.
- Accredited Entities should ensure that annexes provided are consistent with the details provided in the funding proposal. Updates to the funding proposal and/or annexes must be reflected in all relevant documents.
- The total number of pages for the funding proposal (excluding annexes) **should not exceed 60**. Proposals exceeding the prescribed length will not be assessed within the usual service standard time.
- The recommended font is Arial, size 11.
- Under the [GCF Information Disclosure Policy](#), project and programme funding proposals will be disclosed on the GCF website, simultaneous with the submission to the Board, subject to the redaction of any information that may not be disclosed pursuant to the IDP. Accredited Entities are asked to fill out information on disclosure in section G.4.

**Please submit the completed proposal to:**

[fundingproposal@gcfund.org](mailto:fundingproposal@gcfund.org)

**Please use the following name convention for the file name:**

“FP-[Accredited Entity Short Name]-[Country/Region]-[YYYY/MM/DD]”

A. PROJECT/PROGRAMME SUMMARY			
<b>A.1. Project or programme</b>	Project	<b>A.2. Public or private sector</b>	Public
<b>A.3. Request for Proposals (RFP)</b>	<u>Not applicable</u>		
<b>A.4. Result area(s)</b>	<p>Check the applicable <a href="#">GCF result area(s)</a> that the <i>overall</i> proposed project/programme targets below. For each checked result area(s), indicate the estimated percentage of <b>GCF and Co-financers' contribution</b> devoted to it. The total of the percentages when summed should be 100% for GCF and Co-financers' contribution respectively.</p>		
		<b>GCF Contribution</b>	<b>Co-financers' contribution<sup>1</sup></b>
	<b>Mitigation total</b>	%	%
	<input type="checkbox"/> Energy generation and access	%	%
	<input type="checkbox"/> Low-emission transport	%	%
	<input type="checkbox"/> Buildings, cities, industries and appliances	%	%
	<input type="checkbox"/> Forestry and land use	%	%
	<b>Adaptation total</b>	%	%
	<input checked="" type="checkbox"/> Most vulnerable people and communities	16%	42%
	<input type="checkbox"/> Health and well-being, and food and water security	%	%
<input type="checkbox"/> Infrastructure and built environment	%	%	
<input checked="" type="checkbox"/> Ecosystems and ecosystem services	84%	58%	
<b>A.5. Expected mitigation outcome</b>  <i>(Core indicator 1: GHG emissions reduced, avoided or removed / sequestered)</i>	<u>Co-benefit:</u> <ul style="list-style-type: none"> <li>• 26,450 M-Tons annually</li> <li>• 1,037,928 tons of CO2 (over ~40 years)</li> </ul>	<b>A.6. Expected adaptation outcome</b>  <i>(Core indicator 2: direct and indirect beneficiaries reached)</i>	<i>Indicate total number of direct and indirect beneficiaries</i>
			687,336 people (357,414 men and 329,922 women)  0.3% of the total population of ~200 million people.
<b>A.7. Total financing (GCF + co-finance<sup>2</sup>)</b>	77.8 million USD	<b>A.9. Project size</b>	Medium (Up to USD 250 million)
<b>A.8. Total GCF funding requested</b>	66 million USD <i>For multi-country proposals, please fill out annex 17.</i>		

<sup>1</sup> Co-financer's contribution means the financial resources required, whether Public Finance or Private Finance, in addition to the GCF contribution (i.e. GCF financial resources requested by the Accredited Entity) to implement the project or programme described in the funding proposal.

<sup>2</sup> Refer to the [Policy of Co-financing](#) of the GCF.

<b>A.10. Financial instrument(s) requested for the GCF funding</b>	<i>Mark all that apply and provide total amounts. The sum of all total amounts should be consistent with A.8.</i> <input checked="" type="checkbox"/> Grant <span style="margin-left: 200px;"><input type="checkbox"/> Equity</span> <input type="checkbox"/> Loan <span style="margin-left: 150px;"><input type="checkbox"/> Results-based payment</span> <input type="checkbox"/> Guarantee		
<b>A.11. Implementation period</b>	7 years	<b>A.12. Total lifespan</b>	30 years
<b>A.13. Expected date of AE internal approval</b>	June 12 <sup>th</sup> , 1 week ahead of the FP publication date for B.36	<b>A.14. ESS category</b>	<i>Refer to the AE's safeguard policy and <a href="#">GCF ESS Standards</a> to assess your FP category.</i> B
<b>A.15. Has this FP been submitted as a CN before?</b>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	<b>A.16. Has Readiness or PPF support been used to prepare this FP?</b>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
<b>A.17. Is this FP included in the entity work programme?</b>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	<b>A.18. Is this FP included in the country programme?</b>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
<b>A.19. Complementarity and coherence</b>	<i>Does the project/programme complement other climate finance funding (e.g. GEF, AF, CIF, etc.)? If yes, please elaborate in section B.1.</i> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
<b>A.20. Executing Entity information</b>	WWF-Pakistan will be the Executing Entity (EE) for the proposed project. Details of its respective roles and responsibilities during project execution are described in Section B.4 of this Funding Proposal.		

**A.21. Executive summary (max. 750 words, approximately 1.5 pages)**

**Climate Change Problem**

1. Pakistan is facing a period of unprecedented climate-related pressures, having recently experienced a disastrous flood in August 2022 that displaced an estimated 33 million people. The country is the sixth most populous in the world and lies in a mostly arid and semi-arid geographic area prone to recurring large-scale floods, droughts, and landslides. Increasingly severe and frequent floods and droughts caused by climate change are already impacting Pakistan's population, key ecosystems, and economy. With an average per capita water availability of less than 1,000 m<sup>3</sup> per annum<sup>3</sup> Pakistan is one of the most water-stressed in the world. The country is also strongly dependent on water to support its predominantly agriculture-based economy, which accounts for 19% of GDP, 42% of jobs<sup>4</sup>, and 91% of the annual freshwater usage<sup>5</sup>.

<sup>3</sup> National Water Policy, 2018.

<sup>4</sup> Government of Pakistan, 2017.

<sup>5</sup> UNDP, 2016.

2. Observed trends and projected changes in climate under RCP 4.5 show increasing temperatures and greater variability in rainfall patterns. These changes lead to increased instances of droughts, flooding and landslides, which negatively affect ecosystems nationwide and the communities that depend upon their proper functioning for water regulation. The recent 2022 flooding in Pakistan in August/September destroyed 556,000 houses, damaged 1.17 million homes, damaged 2 million acres of crops, resulted in the loss of 755,000 livestock, injured 12,700 people and caused the death of 1,400 people<sup>6,7</sup>. In 2010, severe floods impacted more than 18 million people and caused an estimated US\$10 billion in damages resulting in the design of Recharge Pakistan as a large-scale project response to future climate events. These floods were closely followed by heavy monsoon rains in 2011 that affected 9.7 million people<sup>8</sup>. The impacts of such floods are compounded by longer dry spells and increasingly severe droughts experienced between flood events which make water availability less predictable in Pakistan and exacerbate the country's risk to climate change.
3. The Indus Basin serves as Pakistan's agricultural lifeline, supporting 90% of agricultural production, and is particularly vulnerable to the impacts of climate change. Under future climate change projections, the Indus Basin will experience an increase in rainfall in the higher volume months of July and August, with small decreases in the early parts of the year. In the projected future, these changes in rainfall patterns are expected to increase flood peak intensity, volume, depth and overall velocity, particularly in the upper catchments of the project sites. These changes are further expected to shorten the peak lag time and result in an earlier arrival of the flood peak.
4. Vulnerable communities living in the basin depend on it for reliable water supply and recharge, agricultural production, climate regulation, and other ecosystem benefits. The assessments conducted as part of the Project's Feasibility Study (Annex 2) indicated that the catchments in the Indus Basin of DI Khan and Chakar Lehri present both high levels of ecosystem and community vulnerability to climate change, and opportunity for adaptation benefits through Ecosystem-based Adaptation (EbA) and green infrastructure interventions. For these reasons, four sites in these catchments were selected as the target sites for the project. The project sites of DI Khan and Ramak fall within the DI Khan catchment and the project sites of Chakar Lehri and Manchar fall within the Chakar Lehri catchment.
5. Despite expected increases in annual rainfall, it is projected that rainfall will occur over shorter timeframes, therefore increasing the number of dry spells annually. In comparison to the current climate, the long-term SPEI index as a proxy for drought shows a clear tendency towards drier years over the next century. See Annex 2: Feasibility Study for further details on the site-specific climate and hydrological analyses conducted for the proposed project<sup>9</sup>.
6. Current efforts in Pakistan to manage severe floods and droughts caused by climate change are largely reactive and rely on grey infrastructure to address the impacts of these events on the country's population, economy and ecosystems. This is due to the country's resource and economic constraints, high level of indebtedness, and reliance on intermittent donor financing for disaster recovery, which prevent the Government of Pakistan (GoP) from making proactive investments in flood and drought risk reduction interventions that provide sustainable benefits.
7. In addition to these constraints, Pakistan's current policy and regulatory instruments for water resource management — namely the National Water Policy (2018) and National Adaptation Plan (under development) (NAP), and Provincial Adaptation Plans<sup>10</sup> — do not consider EbA and green infrastructure interventions to help reduce Pakistan's climate vulnerabilities. They also do not account for the critical role of healthy freshwater ecosystems in increasing affected communities' resilience to climate change. There is an urgent need to shift away

<sup>6</sup> OCHA. Pakistan: 2022 Monsoon Floods. Situation Report No. 03. 26 August 2022.

<sup>7</sup> OCHA. Pakistan: 2022 Monsoon Floods. Situation Report No. 05. 9 September 2022.

<sup>8</sup> World Bank Group, Climate Change Knowledge Portal. Available at: <https://climateknowledgeportal.worldbank.org/country/pakistan/vulnerability>

<sup>9</sup> The observational and projected analysis/data is referenced in the relevant sections of Annex 2. These data sources include: i) Station data from the Pakistan Meteorological Department (PMD) for selected stations near project sites. Available at: <https://www.pmd.gov.pk/en/> obtained 25 May 2022, NASA earth exchange global daily downscaled projections (NEX - GDDP)-; ii) <https://www.nasa.gov/nex/gddp>, Global SPEI database -; and iii) <https://spei.csic.es/index.html>. The projected data is based on CORDEX (Christensen OB, Gutowski B & Nikulin G. 2012. CORDEX Archive Design, Version 20/7/2012) and WorldClim version 2.1. Available at: <https://worldclim.org/>

<sup>10</sup> Provincial Adaptation Plans are in the early ideation stages. Evidence generated by the proposed project's EbA and green infrastructure will establish proof of concept for the integration of these interventions into the Provincial Adaptation Plans, which will be done under the project.

from an over-reliance on grey infrastructure interventions, many of which are financially unsustainable because of their high capital and operational costs. They also do not optimize the potential environmental and social benefits of EbA and green infrastructure such as improved infiltration, groundwater recharge and water availability for vulnerable communities. Public sector reform around flood and water resources management is needed which includes EbA and green infrastructure investments and formal procedures which prioritize and diversify public sector solutions to managing floods and droughts in Pakistan. The absence of such a shift in Pakistan's business-as-usual flooding and water resources management approach will continue to exacerbate communities' vulnerability to extreme events caused by climate change such as the recent 2022 floods.

### Proposed Approach

8. Recharge Pakistan is a cornerstone of the Government of Pakistan's vision — as highlighted in its updated 2021 Nationally Determined Contributions (NDCs) — to leverage natural systems to enhance Pakistan's resilience to climate change with the goal of reducing flood and drought risk across the Indus Basin. The project's approach is strongly aligned with the GCF's goal of funding initiatives that catalyse climate change benefits through the creation of enabling environments for climate action, accelerating climate innovation, and funding scalable and replicable adaptation interventions.
9. The project will catalyse transformational change in Pakistan by investing in EbA and green infrastructure interventions at the four project sites in the Indus Basin to reduce the impacts of increasingly severe floods and droughts on vulnerable communities and ecosystems. As the largest investment at the national level to date in an ecosystems-based approach to flood and water resources management, this project will accelerate climate innovation in Pakistan by establishing proofs of concept for EbA and green infrastructure interventions that provide evidence of their cost-effectiveness and efficiency, flood and drought risk reduction benefits, and sustainability. EbA interventions will include the restoration of 14,215 ha of degraded watersheds in DI Khan, restoring 34 km of flow paths, as well as desilting and restoring channels in Ramak Watershed and Manchar Lake. An additional 127 green infrastructure interventions (including recharge basins and retention areas) will be implemented at specific locations in DI Khan, Ramak, Manchar, and Chakar Lehri to maximise the flood reduction benefits to vulnerable communities from these interventions.
10. The implementation of these tangible adaptation interventions will be used as evidence to create an enabling environment for climate action in Pakistan that removes barriers to novel climate solutions through the promotion of integrated strategies, planning and policymaking. Economic valuations of the project's EbA and green infrastructure interventions will demonstrate their cost-effectiveness and efficiency in reducing the impacts of climate change-induced floods and droughts on vulnerable communities and ecosystems in Pakistan. Using this evidence, a National Working Group will be established under the project, chaired by the Ministry of Climate Change (MoCC) and comprised of regulators within the MoWR and its FFC, as well as the relevant Provincial Departments. This National Working Group will lead the development and adoption of updated procedures for Pakistan's key regulations and policies for flood and water resources management — namely the Implementation Framework for the National Water Policy, the National Adaptation Plan (NAP), and Provincial Adaptation Plans of Sindh, Khyber, and Balochistan, and Punjab provinces — on the proper execution of EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan. This will lead to the creation of well documented procedures backed by a rigorous scientific base that enables the GoP to channel future investments into EbA and green infrastructure interventions instead of grey infrastructure only to respond to increasingly severe floods and droughts caused by climate change.
11. Together, project interventions will directly benefit a total of 687,336 people, including 357,414 men (52% of the total population) and 329,922 women (48% of the total population), and will indirectly benefit a total of 7,024,361 people, including 3,652,668 men (52% of total population) and 3,371,693 women (48% of total population) in Pakistan's Indus Basin.

## B. PROJECT/PROGRAMME INFORMATION

### B.1. Climate context (max. 1000 words, approximately 2 pages)

#### Local context

12. Pakistan is characterized by diverse topography, ecosystems, and climate zones. Rich in natural resources, including fertile agricultural lands, natural gas reserves, and mineral deposits, Pakistan faces challenges in balancing competing objectives between economic development and environmental protection. A semi-industrialized country, Pakistan has grown from a primarily agriculture-based to a mostly service-based economy

(with services constituting 49.4% of the Gross Domestic Product — GDP — in 2019). As of 2019 agriculture was still the largest employer, occupying 42.6% of the workforce. By 2013 approximately 29.5% of the population still lived below the national poverty line and by 2018, 12.3% of the population remained undernourished. Pakistan is situated at the western end of the great Indo-Gangetic Plain. Of the total area of the country, about three-fifths consists of rough mountainous terrain and plateaus, and the remaining two-fifths constitutes a wide expanse of level plain<sup>11</sup>. The land can be divided into five major regions: the Himalayan and Karakoram ranges and their subranges; the Hindu Kush and western mountains; the Balochistan plateau; the submontane plateau; and the Indus River plain<sup>12</sup>. The majority of Pakistan's 225.1 million people (2021)<sup>13</sup> live in the Indus River plain, an area prone to severe flooding in July and August. Major earthquakes are also frequent in the mountainous northern and western regions of the country.

13. Climatically, Pakistan lies in a temperate zone and its climate is as varied as the country's topography —generally dry and hot near the coast and along the lowland plains of the Indus River and becoming progressively cooler in the northern uplands and Himalayas (Köppen-Geiger classifications include BWh, BWk, BSh, BSk, Cwa, Cwb, Cfa, Dfa, Dfb, Dsa, Dsb and Dfd)<sup>14</sup>. Four seasons are recognized: i) a cool, dry winter from December to February; ii) a hot, dry spring from March through May; iii) the summer rainy season, also known as the southwest monsoon period, occurring from June to September; and iv) the retreating monsoons from October to November. Average monthly rainfall and temperature range from 6.6 mm in October to 53.4 mm in August, and 9.3 °C in January to 29.7 °C in June, respectively. Most of the country receives very little rainfall, with the exception of the Northern regions, where monsoons can bring upwards of 200 mm a month from July to September (1991–2020 trends)<sup>15</sup>. Inter-annual rainfall varies significantly, often leading to successive patterns of floods and drought. El Niño is a significant influence on climate variability in Pakistan, with anomalies in both temperature<sup>16</sup> and flood frequency and impact<sup>17</sup> correlated with the El Niño cycle<sup>18</sup>.
14. The proposed project will be implemented in areas of the Indus River basin including Dera Ismail (D.I.) Khan in the Khyber Pakhtunkhwa province, and Chakar Lehri in the Balochistan and Sindh provinces (Figure 1). These areas were identified using a three-phase screening mechanism during the development of the Concept Note. The three phases include: i) assessments based on biophysical, socio-economic, and ecological data and information; ii) risk and opportunity assessments based on spatial maps of hazard, vulnerability, exposure and technical feasibility; and iii) suitability assessments based on respective ecosystems. Ecosystem-based adaptation (EbA) and green infrastructure intervention sites within the project sites were selected based on EbA/NbS archetypes (developed in consultation with stakeholders with clear climate objectives, co-benefits and components on preferred intervention types) that were tailored and applied to each selected site. Additional detail on specific sites and their selection is presented in Section 3 of Annex 2.
15. See Annex 2: Feasibility Study for further details on the site-specific climate and hydrological analyses conducted for the proposed project, the results of which are presented in the relevant sections below<sup>19</sup>.

<sup>11</sup> Climate Risk Country Profile: Pakistan (2021): The World Bank Group and the Asian Development Bank. Available at: [https://climateknowledgeportal.worldbank.org/sites/default/files/2021-05/15078-WB\\_Pakistan%20Country%20Profile-WEB.pdf](https://climateknowledgeportal.worldbank.org/sites/default/files/2021-05/15078-WB_Pakistan%20Country%20Profile-WEB.pdf)

<sup>12</sup> Britannica: Pakistan <https://www.britannica.com/place/Pakistan>

<sup>13</sup> World Bank Data <https://data.worldbank.org/indicator/SP.POP.TOTL?locations=PK>

<sup>14</sup> BWh: arid desert – hot and arid; BWk: arid desert – cold and arid; BSh: arid steppe – hot and arid; Cwa: warm temperate – winter dry and hot summer; Cwb: warm temperate – winter dry and warm summer; Cfa: warm temperate – fully humid and hot summer; Dfa: Snow – fully humid and hot summer; Dfb: Snow – fully humid and warm summer; Dsa: Snow – summer dry and hot; Dsb: Snow – dry and warm summer; Dfd: Snow – fully humid and extremely continental. Source: <http://koeppen-geiger.vu-wien.ac.at/present.htm>

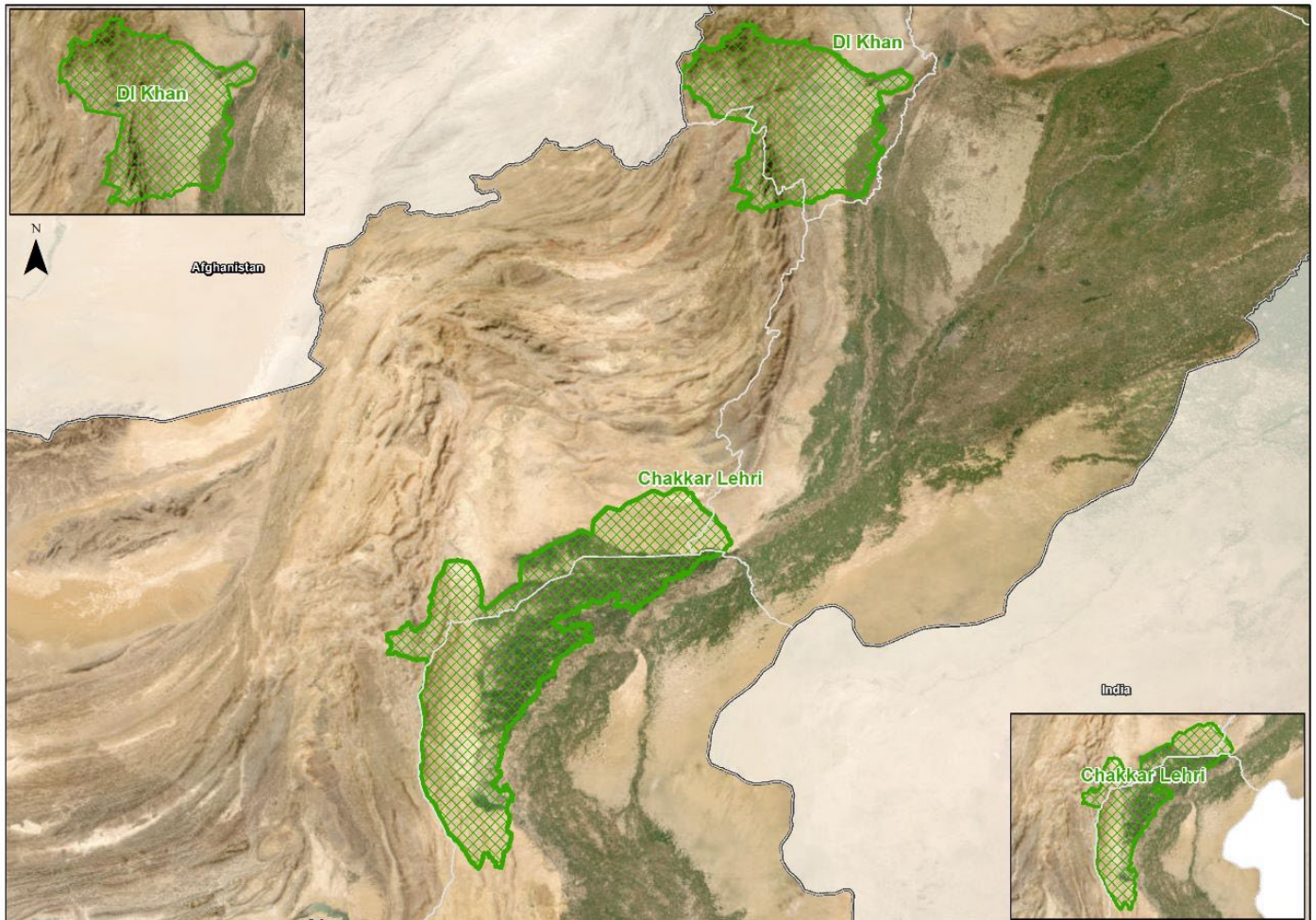
<sup>15</sup> World Bank Group, Climate Knowledge Portal <https://climateknowledgeportal.worldbank.org/country/pakistan>

<sup>16</sup> del Río, S., Iqbal, M.A., Cano-Ortiz, A., Herrero, L., Hassan, A. and Penas, A. (2013). Recent mean temperature trends in Pakistan and links with teleconnection patterns. *International Journal of Climatology*, 33, 277–290. URL: <https://rmets.onlinelibrary.wiley.com/doi/full/10.1002/joc.3423>

<sup>17</sup> Ward, P.J., Jongman, B., Kummu, M., Dettinger, M.D., Weiland, F.C.S. and Winsemius, H.C. (2013). Strong influence of El Niño Southern Oscillation on flood risk around the world. *Proceedings of the National Academy of Sciences*, 111, 15659–15664. URL: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4226082/>

<sup>18</sup> Climate Risk Country Profile: Pakistan (2021): The World Bank Group and the Asian Development Bank. Available at: [https://climateknowledgeportal.worldbank.org/sites/default/files/2021-05/15078-WB\\_Pakistan%20Country%20Profile-WEB.pdf](https://climateknowledgeportal.worldbank.org/sites/default/files/2021-05/15078-WB_Pakistan%20Country%20Profile-WEB.pdf)

<sup>19</sup> The observational and projected analysis/data is referenced in the relevant sections of Annex 2. These data sources include: i) Station data from the Pakistan Meteorological Department (PMD) for selected stations near project sites. Available at: <https://www.pmd.gov.pk/en/> obtained 25 May 2022, NASA earth exchange global dayil downscaled projections (NEX - GDDP); ii) <https://www.nasa.gov/nex/gddp>, Global SPEI database -; and iii) <https://spei.csic.es/index.html>. The projected data is based on CORDEX (Christensen OB, Gutowski B & Nikulin G. 2012. CORDEX Archive Design, Version 20/7/2012) and WorldClim version 2.1. Available at: <https://worldclim.org/>



**Figure 1.** Map of the two catchments in which the project's four sites are located. The project sites of DI Khan and Ramak fall within the DI Khan catchment and the project sites of Chakar Lehri and Manchar fall within the Chakar Lehri catchment.

### Climate change problem<sup>20</sup>

16. Pakistan, the sixth most populous country in the world, lies in a mostly arid and semi-arid geographic area prone to recurring large-scale floods, earthquakes, droughts, and landslides. Much of the economy relies on natural resources, such as river flows from rain and glacial melt for irrigation and hydroelectricity. Over the last century, there have been long-term increases in day and night-time temperatures as well as more varied rainfall totals. Further, among these baselines' changes are an increase in the number of severe extreme events. There has been an increase in the number and severity of flooding events as well as crop and livestock exposure to severe drought events and extreme temperatures. Additionally, there has been a shift away from the "normal" conditions and years tending to be on the upper or lower ranges of the baseline climate ranges making seasonal and medium-term forecasting more challenging. These current climate changes are anticipated to continue and be exacerbated into the future with increased rainfall intensity projected over most months, a concentration of rainfall into a shorter duration, potentially longer dry spells, and more severe drought. The challenges currently faced in Pakistan are therefore expected to only increase under future climate scenarios.<sup>21,22</sup>

17. The projected changes in climate include:

- Temperature increases of 1.4°-3.7°C by the 2060s and 6.0°C by the 2090s, with projected increases higher during winter and in the north<sup>23</sup>.
- Uncertainty about changes to mean annual precipitation, with projections for changes in monthly rainfall ranging from a 20% decrease to a 41% increase by the 2090s<sup>24</sup>.
- Decreased glacier volume and snow cover.
- Increased frequency and intensity of extreme climate events, including floods and droughts.



### Local vulnerability

18. Pakistan holds considerable social vulnerability to disaster. High poverty and malnutrition rates prevail, and many communities and minority groups are marginalized by socio-economic status, location, and political circumstances. Pakistan sits 125th out of 169 countries on the Human Development Index. Pakistan's high exposure to multiple natural hazards and its likely exposure to above average climate changes should be seen in the context of its vulnerability. Over decadal timeframes mortality attributable to natural hazards is dominated by Pakistan's exposure to earthquakes. However, in recent years flooding has also had a very significant impact<sup>25</sup>. This was highlighted in recent years when unusually heavy rainfall during the 2010 monsoon caused the worst flood in Pakistan's history, affecting one-fifth of the country. Approximately 2,000 people were killed, with 12 million homes and 2.2 million hectares of crops damaged or destroyed. This event highlighted the country's vulnerability to flooding in both physical and economic terms. More recently, severe flooding in Pakistan in August/September 2022 destroyed 218,000 houses, damaged 452,000 houses, negatively impacted 2 million acres of crops, resulted in the loss of 794,000 livestock, injured 1,343 people and resulted in the death of 937 people<sup>26</sup>. See additional details on climate change and its impacts in Section B.1. and Annex 2. According to UNISDR, of an estimated US\$ 1.3 billion of average annual losses to natural hazards, around 75% are attributable to floods<sup>27</sup>. GermanWatch put a higher estimate on Pakistan's average annual losses, at US\$3.8 billion<sup>28</sup>. In contrast, the probability of severe meteorological drought in any given year in Pakistan has historically been around 3%, and the consecutive droughts of 1999 and 2000 caused crop failure and mass starvation. Furthermore, during Pakistan's 2015 heatwave, over 65,000 people were hospitalized with heat stroke. Under all climate scenarios, all of these climate impacts are expected to worsen in the future. These effects will be experienced in terms of physical, livelihood, ecosystem, and economic exposure<sup>29</sup>.

- **Agriculture** employs 45% of the workforce in Pakistan, and nearly all arable land is cultivated. The irrigation network is heavily reliant on river systems to feed production. Climate change, such as rising temperatures and extreme weather events, has resulted in devastating crop losses, altered growing seasons, increased pest incidence, and soil erosion. Salinization of land and aquifers as a result of saline intrusion from reduced river flows and rising seas endangers the fertile Indus River plain, which has lost nearly 810,000 ha of arable land and experienced a 40–60% reduction in major crop production in recent years. Livestock production is also highly vulnerable to rising temperatures and drought, which cause heat stress and decreased productivity, as well as decreased animal fodder production and stressed rangelands/water sources<sup>30</sup>.
- In Pakistan's current climate, **water resources** are both a benefit and a threat. Pakistan's water surface resources are heavily reliant on the Indus River as its primary freshwater source. However, the majority of river flows are caused by snow and glacier melt, with the remainder being caused by monsoon rains. Temperature increases are rapidly melting glaciers and reducing winter snowfall, increasing stream base flows and glacial lake outburst floods, as seen in the Passu village (Gilgit-Baltistan region) in 2022. This has happened at least 16 times in 2022 due to heat waves, compared to an average of 5–6 times per year. While this poses a current flood threat and increases baseline flow in the short term, these water resources are not sustainable under current melt conditions, and significantly reduced water levels are expected in the coming decades as glaciers melt. Furthermore, while uncertainty exists, projections indicate that severe drought conditions are becoming more common in already arid and semi-arid areas, with the frequency of severe drought increasing in Pakistan's wetter northern areas. Water scarcity in Pakistan is exacerbated by the country's limited 30-day storage capacity<sup>31</sup>.
- Pakistan's **energy** supply is augmented by hydropower, which accounts for 31% of total generation. Reduced water supplies caused by unreliable or variable rainfall and rising temperatures (and subsequent evaporation), particularly during the summer when cooling demand is highest, have resulted in ongoing power outages and

<sup>20</sup> Climate information and analysis taken from Appendix 2 chapter 1/2/4/7.

<sup>21</sup> ClimateLinks - Climate Risk Profile: Pakistan: <https://www.climatelinks.org/countries/pakistan>

<sup>22</sup> World Bank Group, Climate Change Knowledge Portal: <https://climateknowledgeportal.worldbank.org/country/pakistan>

<sup>23</sup> ClimateLinks - Climate Risk Profile: Pakistan: <https://www.climatelinks.org/countries/pakistan>

<sup>24</sup> Ibid.

<sup>25</sup> Climate Risk Country Profile: Pakistan (2021): The World Bank Group and the Asian Development Bank. Available at: [https://climateknowledgeportal.worldbank.org/sites/default/files/2021-05/15078-WB\\_Pakistan%20Country%20Profile-WEB.pdf](https://climateknowledgeportal.worldbank.org/sites/default/files/2021-05/15078-WB_Pakistan%20Country%20Profile-WEB.pdf)

<sup>26</sup> UN Office for the Coordination of Humanitarian Affairs (OCHA). Pakistan: 2022 Monsoon Floods. Situation Report No. 03. 26 August 2022. Available at: Pakistan: 2022 Monsoon Floods - Situation Report No. 03: As of 26 August 2022 - Pakistan | ReliefWeb.

<sup>27</sup> UNISDR (2014). PreventionWeb: Basic country statistics and indicators. Available at: <https://www.preventionweb.net/countries>

<sup>28</sup> GermanWatch (2017). Global Climate Risk Index 2017. GermanWatch, Bonn. Available at: <https://germanwatch.org/sites/germanwatch.org/files/publication/16411.pdf>

<sup>29</sup> World Bank Group, Climate Change Knowledge Portal: <https://climateknowledgeportal.worldbank.org/country/pakistan/vulnerability>

<sup>30</sup> Ibid.

<sup>31</sup> Ibid.

crippled the economy, with an estimated annual loss of 2% of GDP. It is anticipated that this will be further exacerbated in the future<sup>32</sup>.

- Population **health** is directly linked to observed extreme events and indirectly linked to water and food security vulnerability. Most of Pakistan's population lives along the flood-prone Indus River, and diarrheal disease caused by contaminated water is a leading cause of morbidity and mortality. In 2010, unprecedented monsoon rainfall flooded 20% of the country, affecting 21 million people and causing infectious disease outbreaks and diarrheal illness due to contaminated drinking water and unsanitary conditions in makeshift camps. Heatstroke is more likely in hot weather, as was the case in 2015 when an unprecedented heat wave with temperatures as high as 49°C killed over 1,200 people in Karachi. Climate risks to food security, such as crop loss/failure and water stress, have implications for malnutrition, which is already severe in Pakistan, with nearly half of all children suffering from malnutrition<sup>33</sup>.
- **Poverty and inequality**. Many of the climate changes projected are likely to disproportionately affect the poorest groups in society. Heavy manual labour jobs are commonly among the lowest paid whilst also being most at risk of productivity losses due to heat stress<sup>34</sup>. Poorer businesses are least able to afford air conditioning, an increasing need given the projected increase in cooling days, and poorer farmers and communities are least able to afford local water storage, irrigation infrastructure, and technologies for adaptation. The high temperature increases projected for Pakistan present particular challenges in a nation where the agricultural sector remains the largest employer. Only 17.5% of the people below the poverty line in Pakistan are in urban areas<sup>35</sup>. Rural groupings include those who are owners of small farms (20%), those who are landless farmers (10%) and agricultural laborers (12%) all of whom are likely to be among the most affected by the above pressures<sup>36</sup>.
- The level of climate change impacts and coping strategies of populations depends heavily on their socio-economic status, socio-cultural norms, access to resources, poverty as well as **gender**. Research has also provided more evidence that the effects are not gender neutral, as women and children are among the highest risk groups. Key factors that account for the differences between women's and men's vulnerability to climate change risks include: gender-based differences in time use; access to assets and credit, treatment by formal institutions, which can constrain women's opportunities, limited access to policy discussions and decision making, and a lack of sex-disaggregated data for policy change<sup>37</sup>. See Annex 8 Gender Assessment and Action Plan for an analysis of the current conditions for women and vulnerable groups in the Indus Basin and the proposed approach to reduce their climate vulnerability.
- Countries in South Asia, including Pakistan, will experience an estimated 17–36 million internal climate migrants by 2050 as a result of slow-onset climate changes. Under all scenarios, the poorest and most climate-vulnerable communities are likely to be hardest hit. Without significant adaptation action, beyond 2050 the climate-induced **migration** rate is likely to accelerate considerably. It is expected that 'hotspots' of in and out-migration are likely to form. The large majority of migrants are expected to come from communities dependent on drought- and flood-vulnerable rain-fed croplands for their livelihoods<sup>38</sup>.

#### Observed climate change and noted impacts

19. Climate change is already occurring in Pakistan. Temperatures are estimated to have risen by 0.57°C over the twentieth century, with recent warming accelerating by 0.47°C between 1961 and 2007. These increases are most noticeable in the winter and post-monsoon months of November to February. The southern regions of the country are experiencing the most warming. As maximum temperatures have risen, there has also been an increase in the frequency of heat wave days.

<sup>32</sup> Ibid.

<sup>33</sup> Ibid.

<sup>34</sup> Kjellstrom, T., Briggs, D., Freyberg, C., Lemke, B., Otto, M., Hyatt, O. (2016). Heat, human performance, and occupational health: A key issue for the assessment of global climate change impacts. *Annual Review of Public Health*: 37: 97–112. Available at: <https://www.annualreviews.org/doi/abs/10.1146/annurev-publhealth-032315-021740>

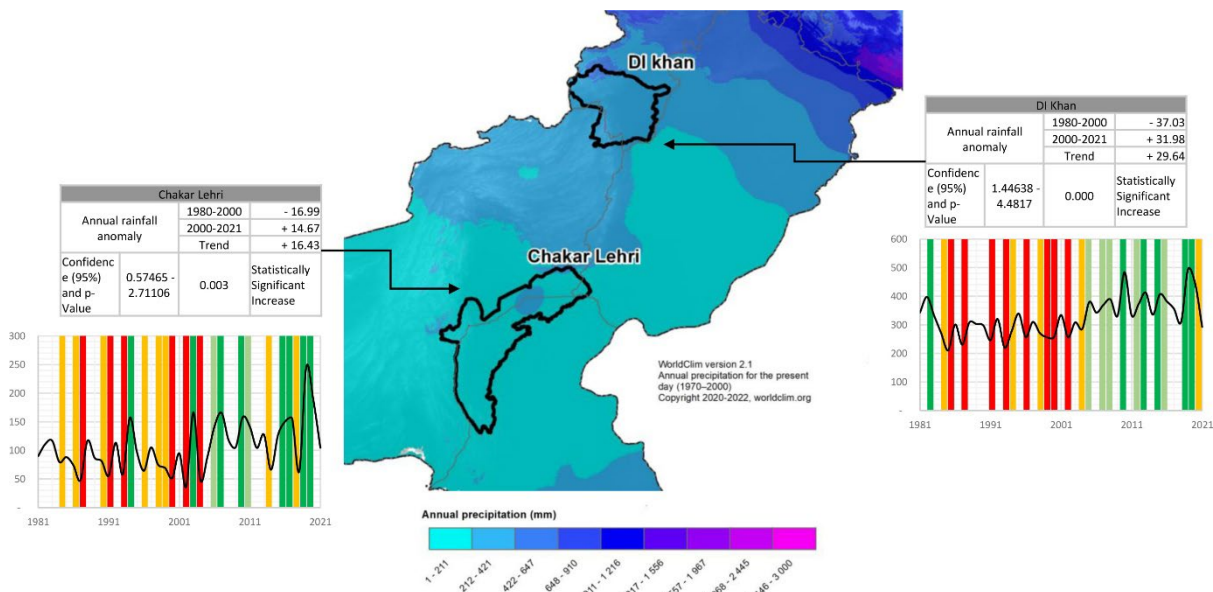
<sup>35</sup> Ahmed, S., Gautam, M. (2013) Agriculture and water policy: Towards sustainable inclusive growth. World Bank Policy Paper Series. Available at: <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/570291468083332554/agriculture-and-water-policy-toward-sustainable-inclusive-growth>

<sup>36</sup> Climate Risk Country Profile: Pakistan (2021): The World Bank Group and the Asian Development Bank. Available at: [https://climateknowledgeportal.worldbank.org/sites/default/files/2021-05/15078-WB\\_Pakistan%20Country%20Profile-WEB.pdf](https://climateknowledgeportal.worldbank.org/sites/default/files/2021-05/15078-WB_Pakistan%20Country%20Profile-WEB.pdf)

<sup>37</sup> World Bank Group (2016). Gender Equality, Poverty Reduction, and Inclusive Growth. Available at: <http://documents1.worldbank.org/curated/en/820851467992505410/pdf/102114-REVISED-PUBLIC-WBG-Gender-Strategy.pdf>

<sup>38</sup> Rigaud, K., de Sherbinin, A., Jones, B., Bergmann, J., Clement, V., Ober, K., Schewe, J., Adamo, S., McClusker, B., Heuser, S., Midgley, A. (2018). Groundswell: Preparing for internal climate migration. World Bank Group, Washington DC. URL: <https://openknowledge.worldbank.org/handle/10986/29461>

20. Precipitation in Pakistan's historical profile is significantly more complex. Both the annual volumes and the SPEI drought indexes show long term oscillations. The early twentieth century saw a prolonged decline in annual rainfall, but since 1960, there has been a slight increase. This overall trend conceals significant sub-national variation. Since 1960, mean rainfall in Pakistan's arid plains and coastal belt has decreased by 10% to 15%. The majority of other regions have seen a slight increase, both during the monsoon and dry seasons. Since 1960, the number of heavy rainfall events has increased, with the nine heaviest rains recorded in 24 hours occurring in 2010.
21. Rainfall trends dating back to the 1980s show general increases in recent years (since 2000) compared to the lower volume years of the 1980s and 1990s (Figure 2). While there is interannual variability, there are clusters of dry years in the 1990s, some of which are consecutive, as well as clusters of wetter years in the 2000s, especially in the 2010s. These trends of +30 mm per decade are statistically significant over this time frame, but longer timeframes indicate an oscillation of rainfall characteristics.

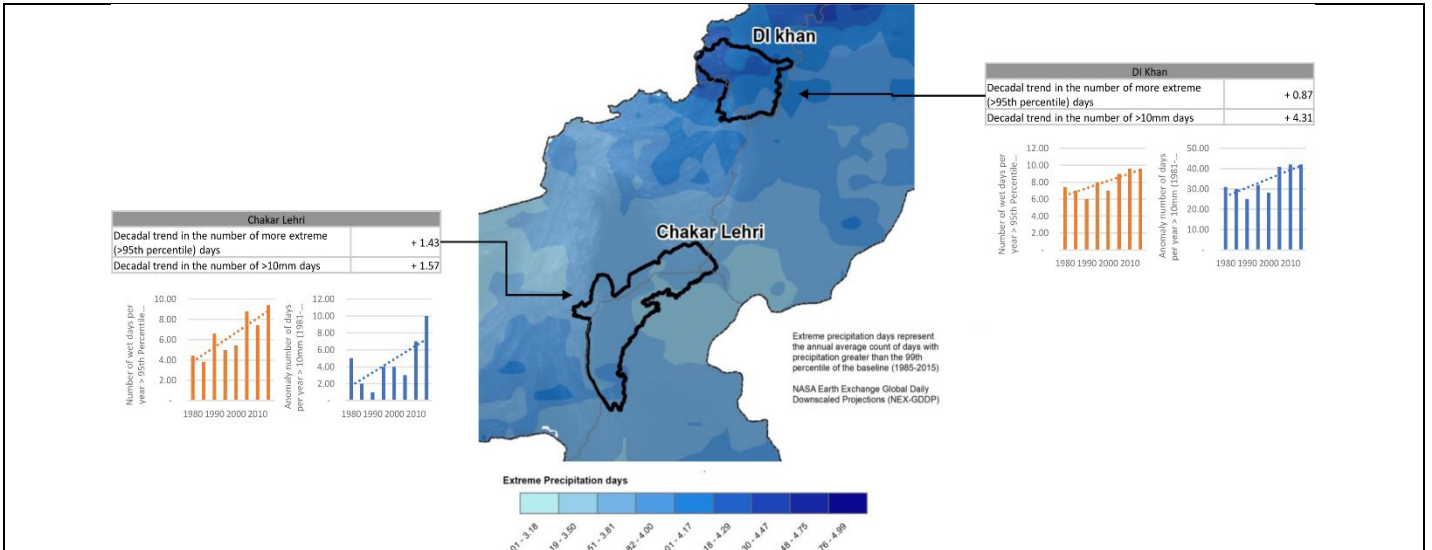


**Figure 2.** Observational annual rainfall climate 1985-2015 (map), longitudinal rainfall (line) and rainfall classification (bars) – dry year <1.0 standard deviation (red), dry year <0.5 standard deviation (orange), wet year >0.5 standard deviation (light green), wet year >1.0 standard deviation (green) for DI Khan and Chakar Lehri.<sup>39,40</sup>

22. There are more extreme rainfall events in the northern and eastern parts of the country, and fewer in the southern and western parts of the country (Figure 3). This corresponds to the spatial patterns of the observed annual rainfall volumes. The observational record shows that the number of days exceeding their local 95<sup>th</sup> percentile daily volume per year has increased over time. There is also an increase in the number of days with more than 10 mm of rain in 24 hours. Both are indicators of larger-scale events that could result in flooding.

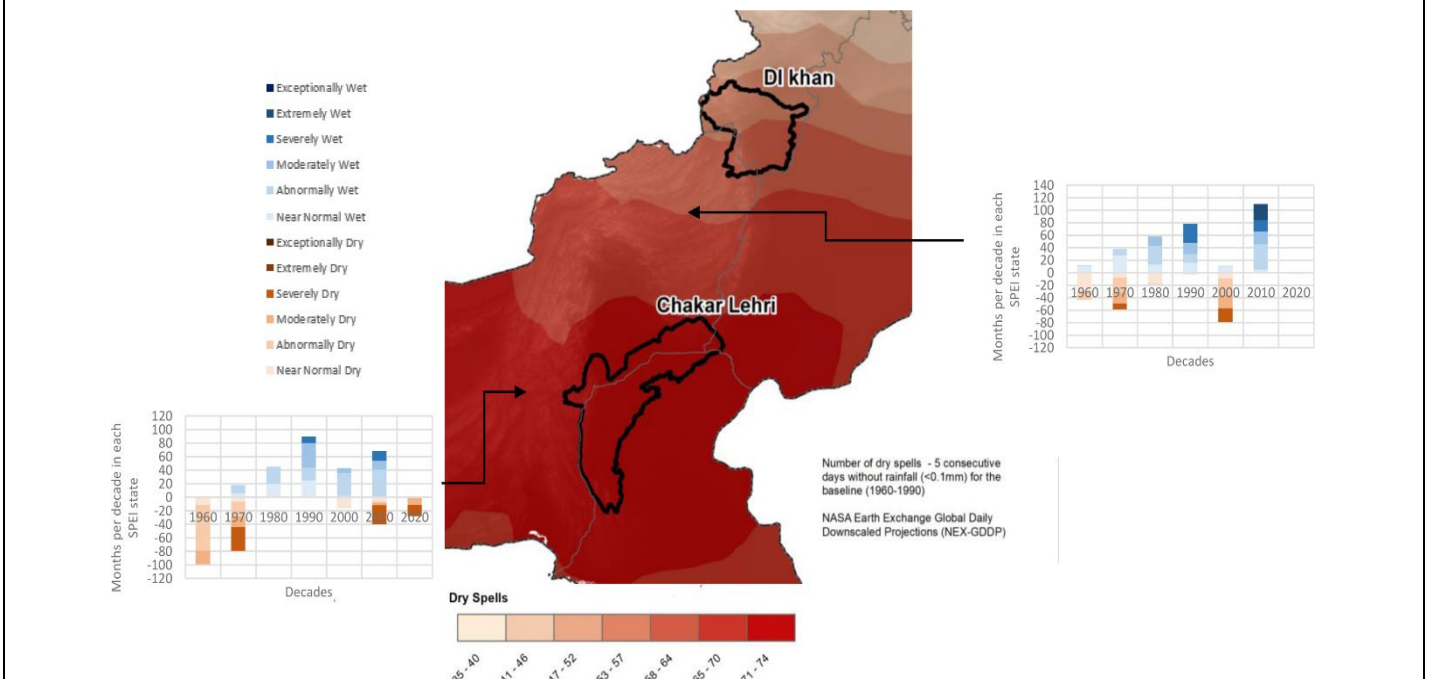
<sup>39</sup> Station data from the Pakistan Meteorological Department (PMD) for selected stations near project site, <https://www.pmd.gov.pk/en/> obtained 25 May 2022

<sup>40</sup> Raster data obtained from WorldClim version 2.1 - <https://worldclim.org/>



**Figure 3.** Observational annual extreme rainfall days 1985-2015 (map), change in the number of days exceeding 95<sup>th</sup> percentile rainfall (orange column graph) and change in the number of days exceeding 10mm (blue column graph) for DI Khan and Chakar Lehri.<sup>41,42</sup>

23. There are numerous dry spells (5 consecutive dry days) across the country, with the majority concentrated in the south and fewer in the north (Figure 4). This is reflected in lower annual rainfall volumes in the south and higher volumes in the north. The 48-month SPEI classification shows a time-dependent oscillation in the leaning of wet and dry years. The earlier parts of the record have a more even distribution of wet and dry months in each decade. When we look at recent decades, we see that there are strong leanings one way or the other, and the decade is less balanced than previously noted. There is also a decrease in the number of months within the normal SPEI range, indicating that the index is becoming more extreme in one direction or the other. The more recent decades have also shown a trend toward wet years, though there are still some dry months.

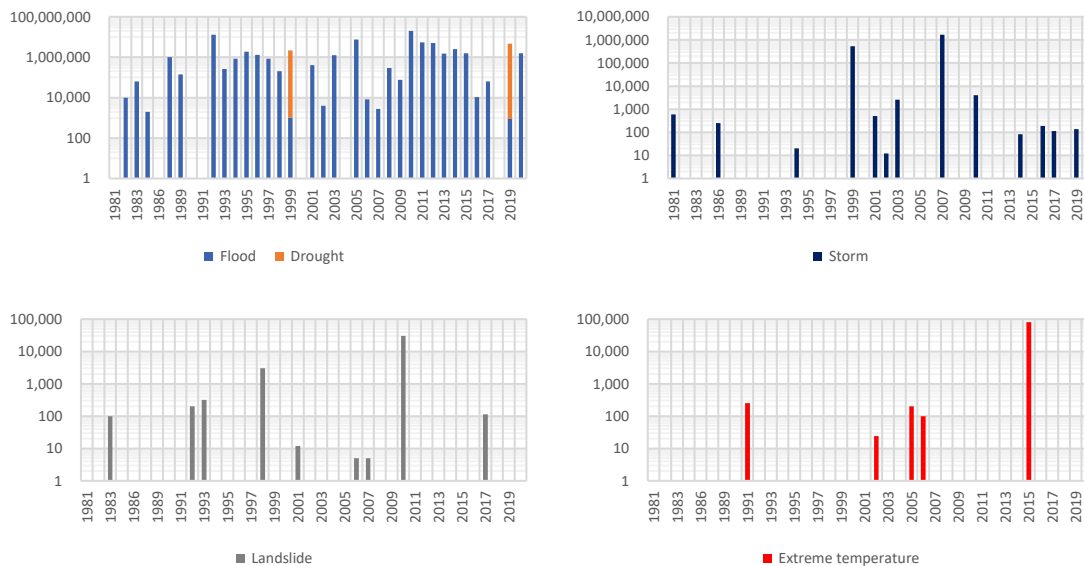


<sup>41</sup> Station data from the Pakistan Meteorological Department (PMD) for selected stations near project site: <https://www.pmd.gov.pk/en/> obtained 25 May 2022

<sup>42</sup> Historical Raster data obtained from WorldClim version 2.1: <https://worldclim.org/>

**Figure 4.** Observational annual dry spells 1985-2015 (map), change in monthly SPEI classification representing drought index for DI Khan and Chakar Lehri.<sup>43,44</sup>

24. On the ground, these climate changes have had a significant impact and these natural disasters, which already disrupt people's lives and the economy, are expected to become more frequent and intense (Figure 5). Flooding is the most serious threat to most people and is rated at 8.9 out of 10 in the INFORM 2019 Index for Risk Management for Pakistan of risk. In 2010, floods affected 20 million people and caused an estimated US\$10 billion in damage. They were followed in 2011 by heavy monsoon rains that affected 9.7 million people. In recent years, this trend has affected an increasing number of people. A significant number of people are also affected by droughts, ranked at 5.1 out of 10, though the distinction between being affected by drought and living in arid conditions is difficult to draw. Storm events' impacts have also grown over time, with more people affected in recent years. There is no clear trend in the changes associated with landslides; however, as seen in the 2010 events, there is a correlation between landslides and flooding events. It is reasonable to expect increased flooding activity to result in increased rainfall-induced landslides.



**Figure 5.** Number of people affected from hydro-meteorological hazards in Pakistan (1980-2020) for flood and drought (top left), storms (top right), landslides (bottom left), and extreme temperatures (bottom right).

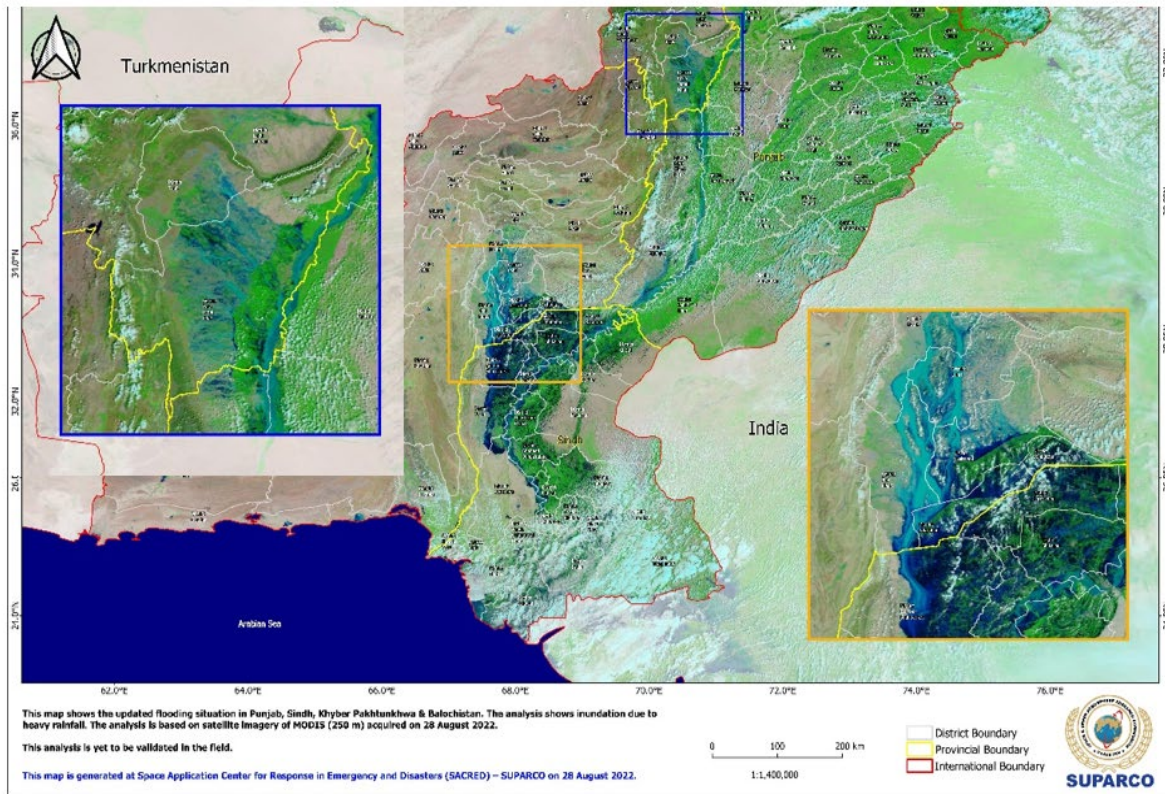
25. The 2010 “super-floods” mentioned above inundated large swaths of Pakistan, resulting in the displacement of more than 20 million people. This flood event was called one of the worst humanitarian disasters ever experienced by the country. Twelve years later, in 2022, an even more significant massive flooding event caused by monsoon rains, resulted in such devastation that United Nations Secretary-General Antonio Guterres referred to the inundation as being at an “epochal level”<sup>45</sup>. The 2010 floods began in late July, resulting from heavy monsoon rains in Khyber Pakhtunkhwa, Sindh, and parts of Balochistan. Approximately 20% of the land area of Pakistan and over 20 million people were affected. Total loss of lives stood at 1,985 with Sindh the worst hit, followed by Punjab. The 2022 floods, by comparison, have affected a larger proportion of Pakistan with over 33 million people affected (Figure 6). About 81 districts in Sindh, Punjab, Balochistan, and Khyber Pakhtunkhwa have been officially notified as ‘calamity hit’ with close to 1,400 dead since June 2022, according to data released by the National Disaster Management Authority (NDMA)<sup>46</sup>. 2022’s monsoon season and subsequent flooding are unprecedented in comparison to the disasters of 2010. The consequences of the 2022 floods are far-reaching and unprecedented as they have engendered the imminent threat of food insecurity, water-borne diseases, malnutrition, and social unrest in Pakistan.

<sup>43</sup> Raster data obtained from NASA earth exchange global daily downscaled projections (NEX - GDDP) - <https://www.nasa.gov/nex/gddp>

<sup>44</sup> SPEI data obtained from Global SPEI database - <https://spei.csic.es/index.html>

<sup>45</sup> Aljazeera, Are catastrophic floods Pakistan's new normal? <https://www.aljazeera.com/news/2022/9/1/pakistans-floods-what-caused-the-floods>

<sup>46</sup> ProPakistani, 2010 vs 2022: Which Flood Wreaked More Havoc in Pakistan <https://propakistani.pk/2022/09/13/in-numbers-how-damages-due-to-2022-floods-compare-to-2010-floods/>



**Figure 6.** Updated flooding situation in Punjab, Sindh, Khyber Pakhtunkhwa and Balochistan (28 August 2022).

26. The quantification of the damages from extreme hydrometeorological events is difficult to assess, however estimates for the period 1900-2020 are provided from the Emergency Events Database (EM-DAT) in Table 1.

**Table 1.** Summary of Natural hydro-meteorological Hazards in Pakistan from 1900 to 2020.

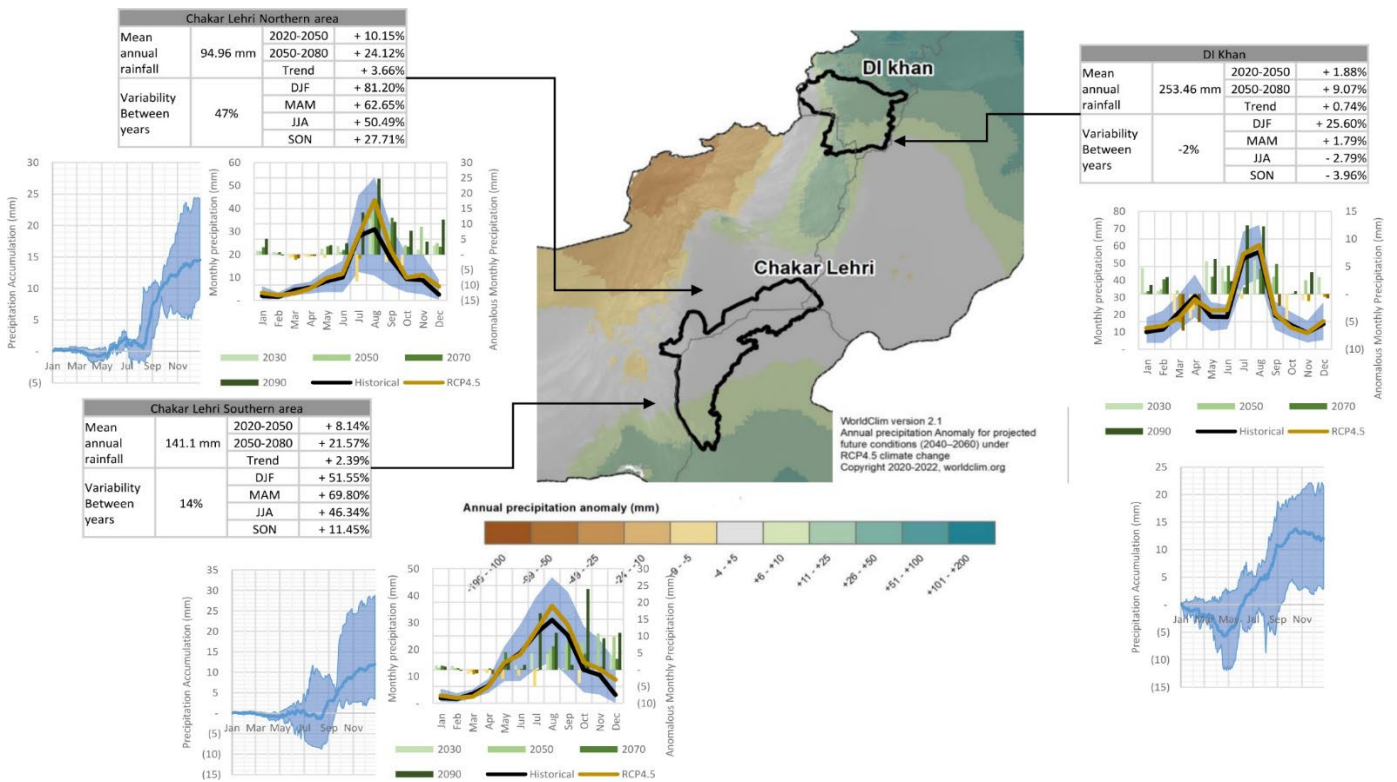
	Total Deaths	Total Affected	Total Damage ('000 US\$)
Drought	143	2 200 000	247 000
Heat wave	2 936	80 600	18 000
Flash flood	3 590	22 114 300	10 184 100
Riverine flood	9 229	34 967 400	9 727 000
Other flood	5 286	23 863 300	2 670 000
Landslide	222	29 700	18 000
Mudslide	16	-	-
Convective storm	402	1 900	-
Tropical cyclone	11 555	2 599 900	1 715 000
Other storms	184	3 000	-

Projected climate baseline and extremes

27. Pakistan is already an arid/semi-arid country prone to recurring large-scale floods, droughts, and landslides, and future climate conditions are expected to exacerbate these effects. Over the different scenarios from the 1986-2005 baseline, Pakistan is expected to warm faster than the global average, with increases ranging from 1.3°C to 4.7°C by the 2060s and up to 6.0°C by 2090. There is also spatial uncertainty in Pakistan's rainfall, with models predicting decreases ranging from 20% to 41% by 2090. However, there is an increase in the likelihood of drought, increased evapotranspiration, and higher temperatures. There is also an increase in the frequency and intensity of extreme climate events, such as higher rainfall days, rainfall intensity, flooding, and the duration and intensity of heat waves. The number of people affected by extreme river flooding is expected to rise by 5 million between 2035 and 2044.

By 2070-2100, sea levels are expected to rise by 30-80 cm, exposing an additional 1 million people to coastal flooding<sup>47</sup>.

28. The project focuses on the two catchments of the Indus River basin: DI Khan, and Chakar Lehri. Climate assessments were conducted in these areas to assess future climate exposure. Because of the size of the Chakar Lehri catchment, different climate change signals may be present. The evaluation was divided into two parts: northern and southern.
29. Rainfall patterns vary spatially, with a decrease in the far west and patches of northern areas and an increase in the southern and central northern areas (Figure 7). While each catchment has a different seasonal character, most locations see an increase in the July/August months, with small decreases in the early parts of the year resulting in a potential focusing of rainfall into these already higher volume months. This is visible in the accumulation anomaly, which shows small decreases in early-onset rainfall volumes before volumes increase mid-year and end with positive accumulation in the studied areas. Total rainfall volume increases less in the years 2020-2050 than in the years 2050-2080. The December-January-February season also sees the greatest increase in rainfall variability, implying that rainfall cessation volumes will be more volatile.



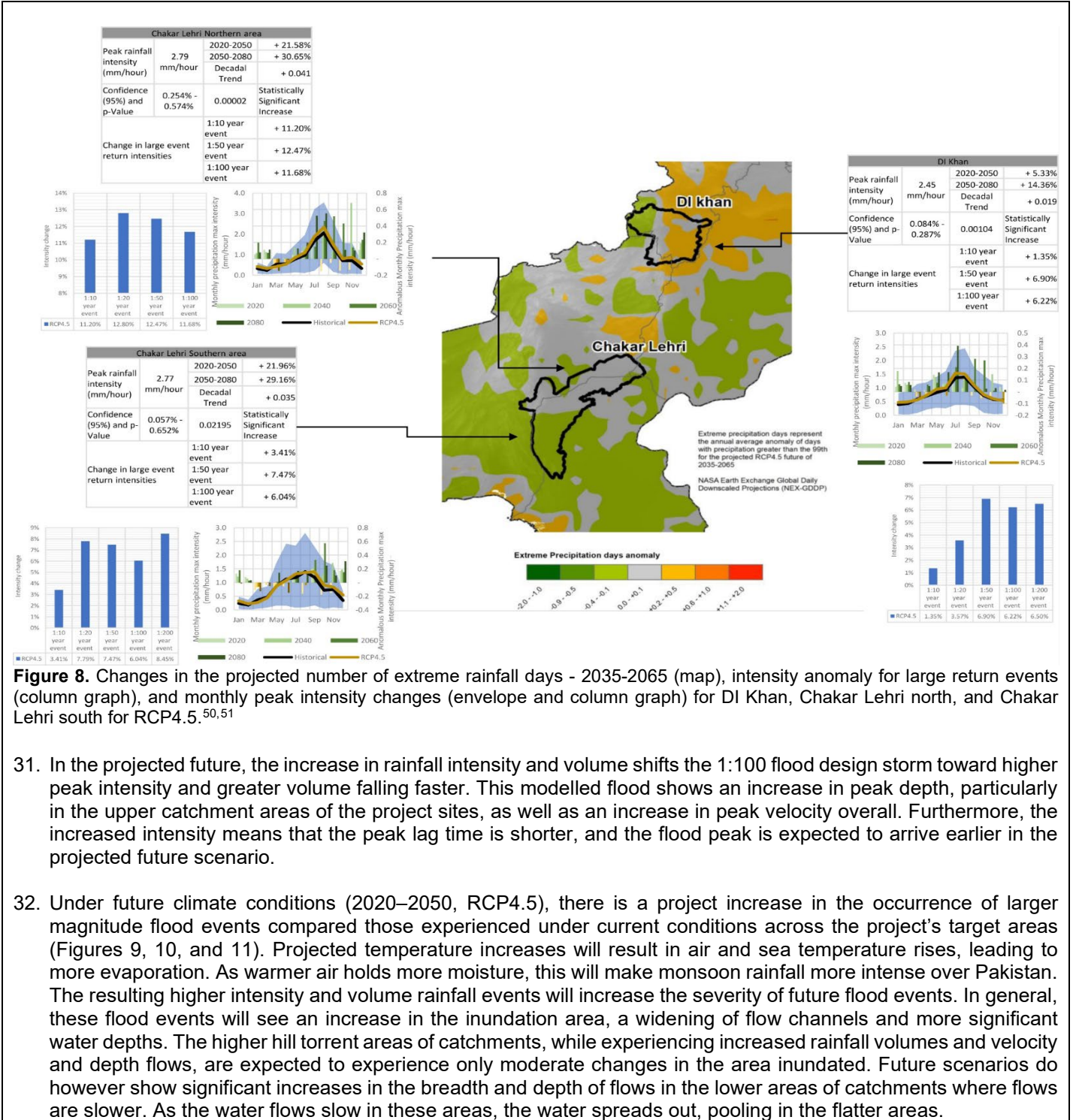
**Figure 7.** Changes in projected annual rainfall - 2040-2060 (map), monthly rainfall anomaly (envelope and column graph), and daily rainfall accumulation (envelope graph) for DI Khan, Chakar Lehri north, and Chakar Lehri south for RCP4.5.<sup>48,49</sup>

30. The observed concentration of rainfall in the mid-late part of the year, combined with the projected increase in temperature, results in more atmospheric moisture and increased convective activity (Figure 8). The number of extreme rainfall days is increasing, primarily in northern parts of the country where ocean mitigation is less effective. The number of extreme rainfall days decreases very slightly in the southern areas. However, there is an increase in average peak hourly rainfall intensity in most locations, with the focus once again being on the July/August months. There is also an increase in the early part of the year, but it is milder compared to the later part of the year. The increased intensity of rainfall also increases the magnitude of large flood return events in all locations.

<sup>47</sup> World Bank Group, Climate Change Knowledge Portal [https://climateknowledgeportal.worldbank.org/sites/default/files/2021-05/15078-WB\\_Pakistan%20Country%20Profile-WEB.pdf](https://climateknowledgeportal.worldbank.org/sites/default/files/2021-05/15078-WB_Pakistan%20Country%20Profile-WEB.pdf)

<sup>48</sup> Christensen OB, Gutowski B & Nikulin G. 2012. CORDEX Archive Design, version 20/7/2012

<sup>49</sup> Projected Raster data obtained from WorldClim version 2.1 - <https://worldclim.org/>

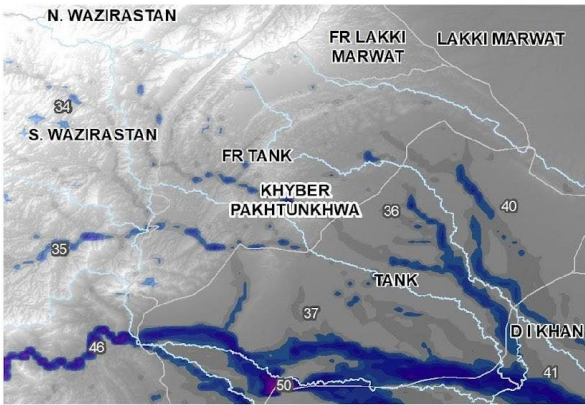


31. In the projected future, the increase in rainfall intensity and volume shifts the 1:100 flood design storm toward higher peak intensity and greater volume falling faster. This modelled flood shows an increase in peak depth, particularly in the upper catchment areas of the project sites, as well as an increase in peak velocity overall. Furthermore, the increased intensity means that the peak lag time is shorter, and the flood peak is expected to arrive earlier in the projected future scenario.
32. Under future climate conditions (2020–2050, RCP4.5), there is a project increase in the occurrence of larger magnitude flood events compared those experienced under current conditions across the project’s target areas (Figures 9, 10, and 11). Projected temperature increases will result in air and sea temperature rises, leading to more evaporation. As warmer air holds more moisture, this will make monsoon rainfall more intense over Pakistan. The resulting higher intensity and volume rainfall events will increase the severity of future flood events. In general, these flood events will see an increase in the inundation area, a widening of flow channels and more significant water depths. The higher hill torrent areas of catchments, while experiencing increased rainfall volumes and velocity and depth flows, are expected to experience only moderate changes in the area inundated. Future scenarios do however show significant increases in the breadth and depth of flows in the lower areas of catchments where flows are slower. As the water flows slow in these areas, the water spreads out, pooling in the flatter areas.

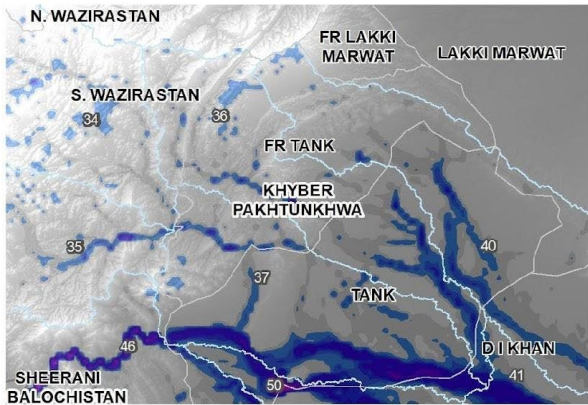
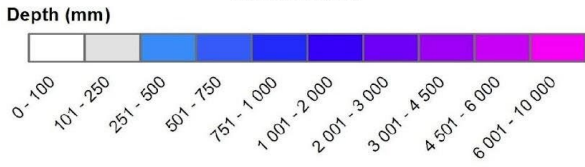
<sup>50</sup> Christensen OB, Gutowski B & Nikulin G. 2012. CORDEX Archive Design, version 20/7/2012

<sup>51</sup> Projected Raster data obtained from WorldClim version 2.1 - <https://worldclim.org/>

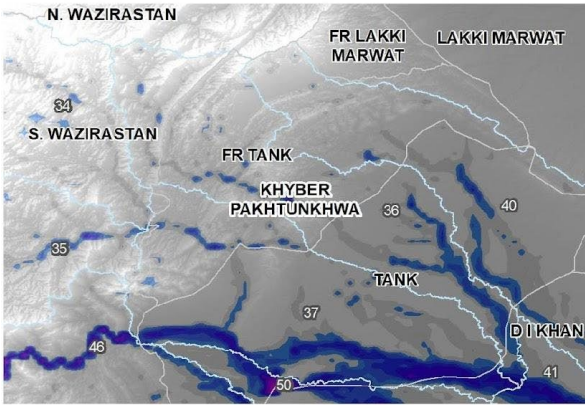
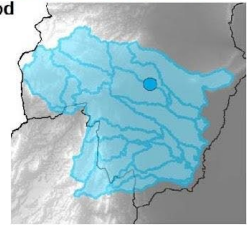




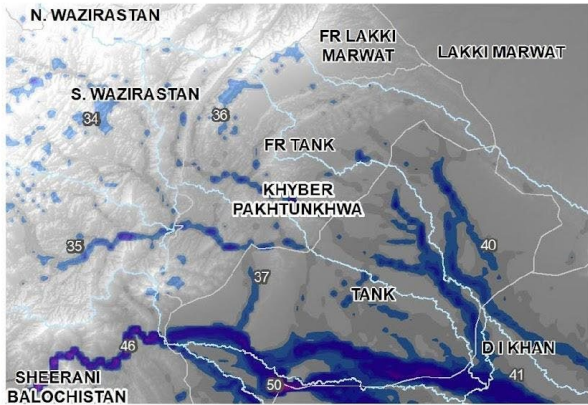
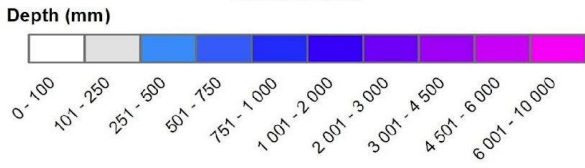
**Present Flood**



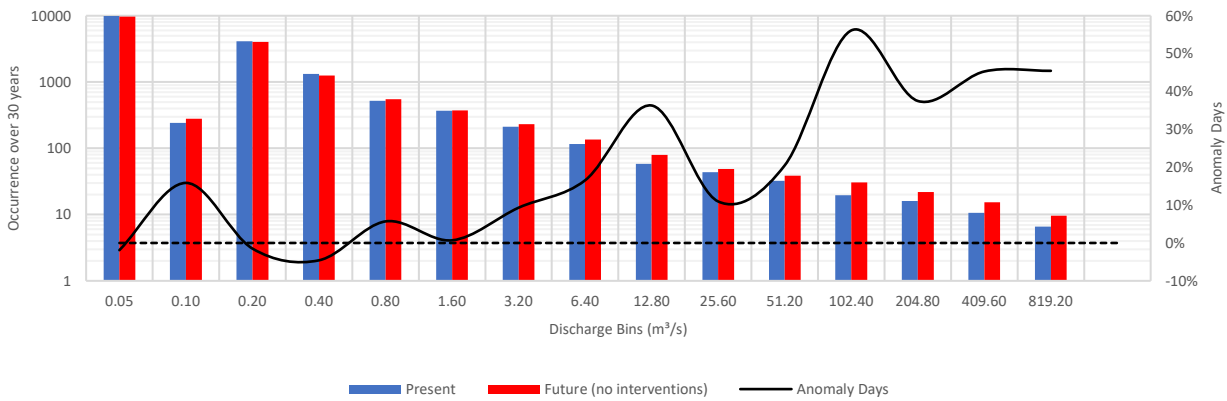
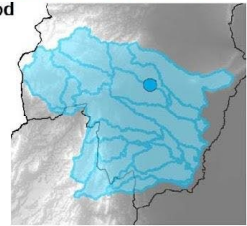
**Future Flood**



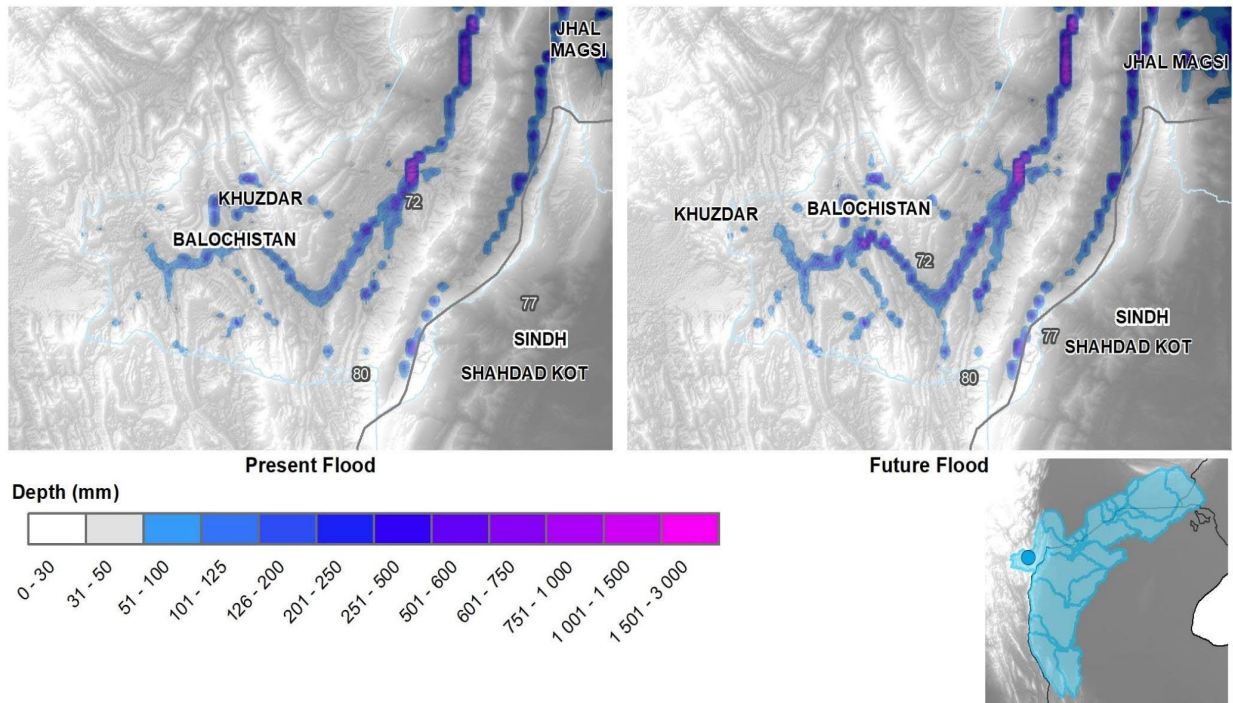
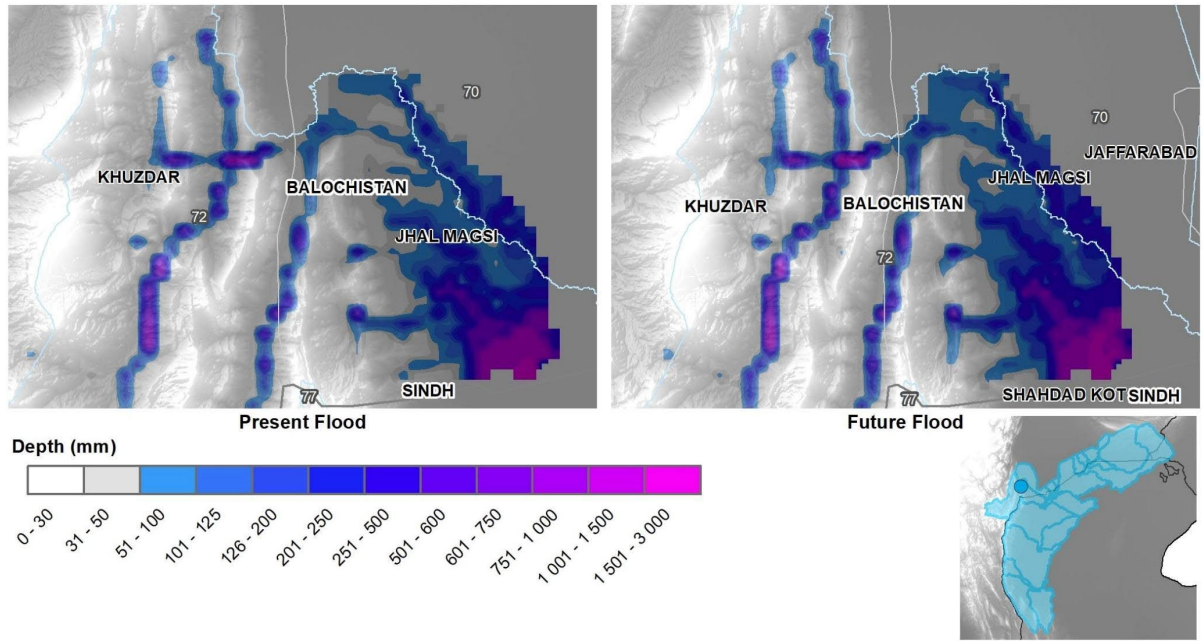
**Present Flood**



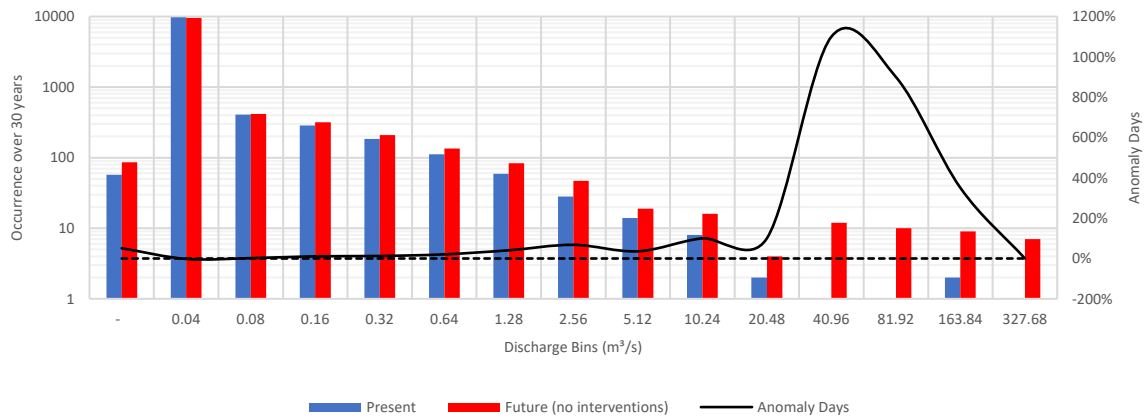
**Future Flood**



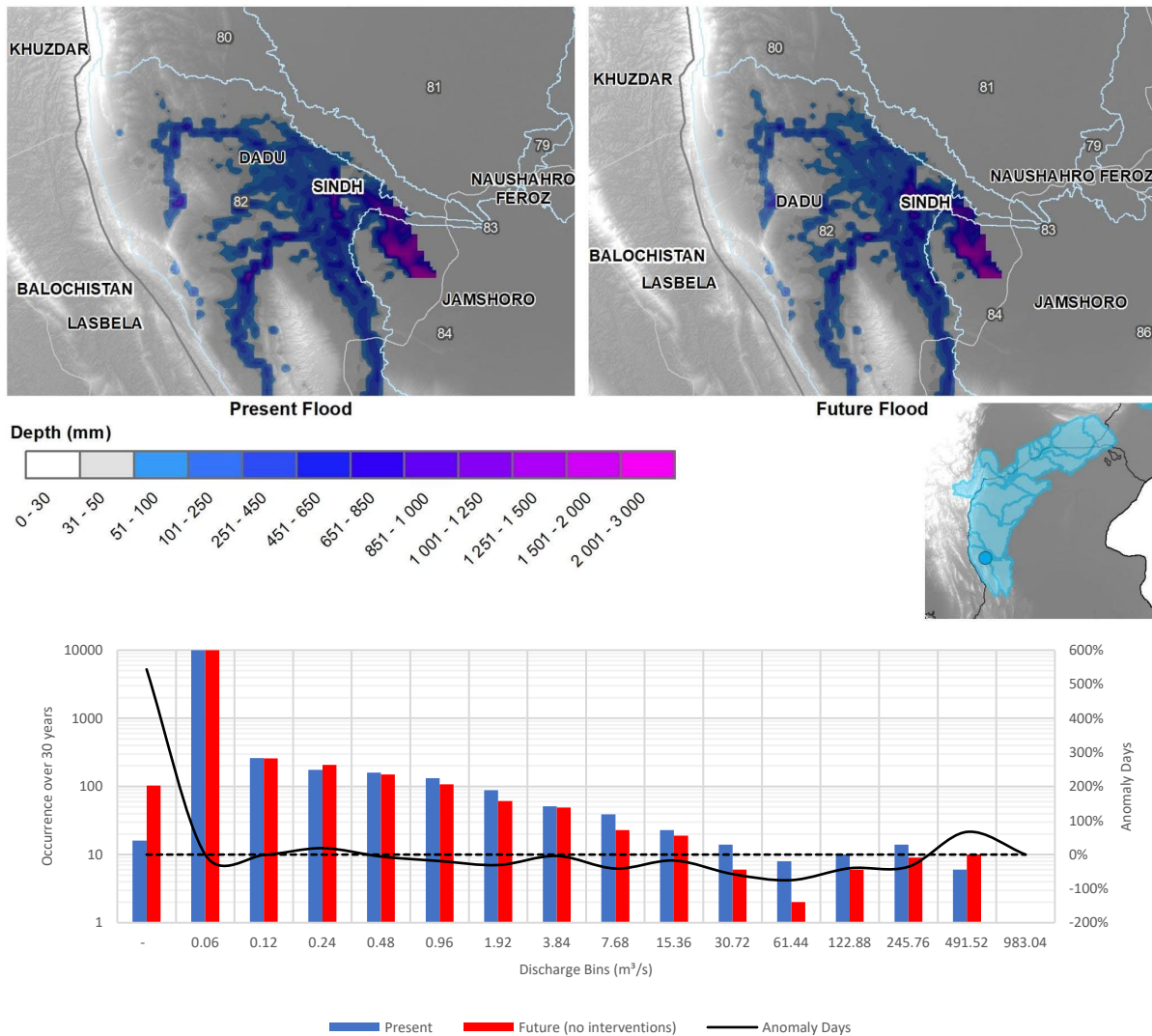
**Figure 9.** Flood inundation under current climate conditions (left) and future projected (2020-2050 RCP4.5) climate change conditions (right) for the northern areas of DI Khan (top), and southern areas of DI Khan (middle), and average hydrograph histogram of present and future flood discharge events and occurrence anomaly (bottom).<sup>52</sup>



<sup>52</sup> Output of RRI modelling



**Figure 10.** Flood inundation under current climate conditions (left) and future projected (2020-2050 RCP4.5) climate change conditions (right) for Balochistan northern areas (top) and Balochistan southern areas (middle) at the discharge outlet assessment point, and average hydrograph histogram of present and future flood discharge events and occurrence anomaly (bottom).<sup>53</sup>

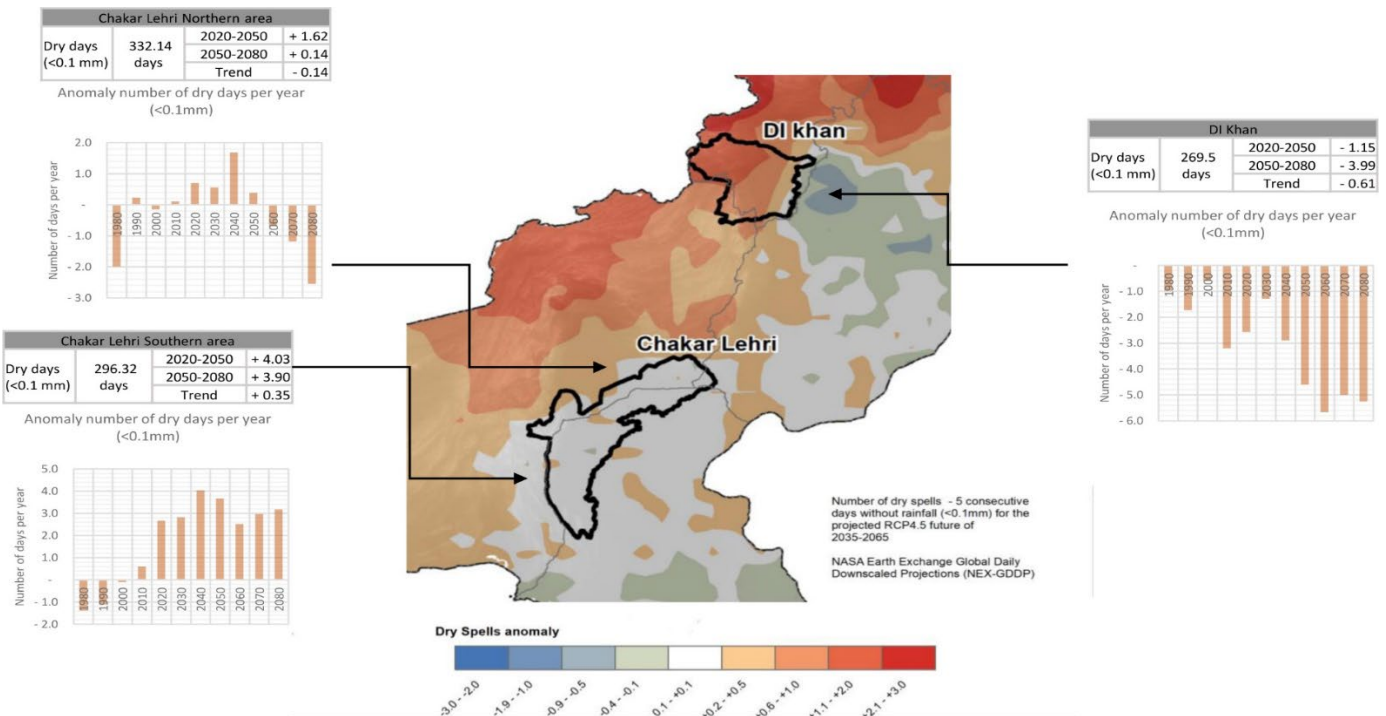


**Figure 11.** Flood inundation under current climate conditions (left) and future projected (2020-2050 RCP4.5) climate change conditions (right) for Manchar, and average hydrograph histogram of present and future flood discharge events and occurrence anomaly (bottom).<sup>54</sup>

<sup>53</sup> Output of RRI modelling

<sup>54</sup> Output of RRI modelling

33. Despite expected but variable increases in annual rainfall, there is a focus of rainfall in shorter timeframes and thus an increase in the number of dry spells per year (Figure 12). This is most noticeable in the north, but there is a positive anomaly running northeast to the southwest. The number of dry spells in the eastern, far northern, and southern areas decreases slightly each year. However, this is only true in the medium-term projected future; there is significant uncertainty near the end-of-the-century scenario. The locations show an annual change in dry days ranging from -1.15 to +4.03. In comparison to the current climate, the long-term SPEI index as a proxy for drought shows a very clear tendency toward negative (dry) years. Droughts are expected to become more severe and frequent across the globe over the next century.

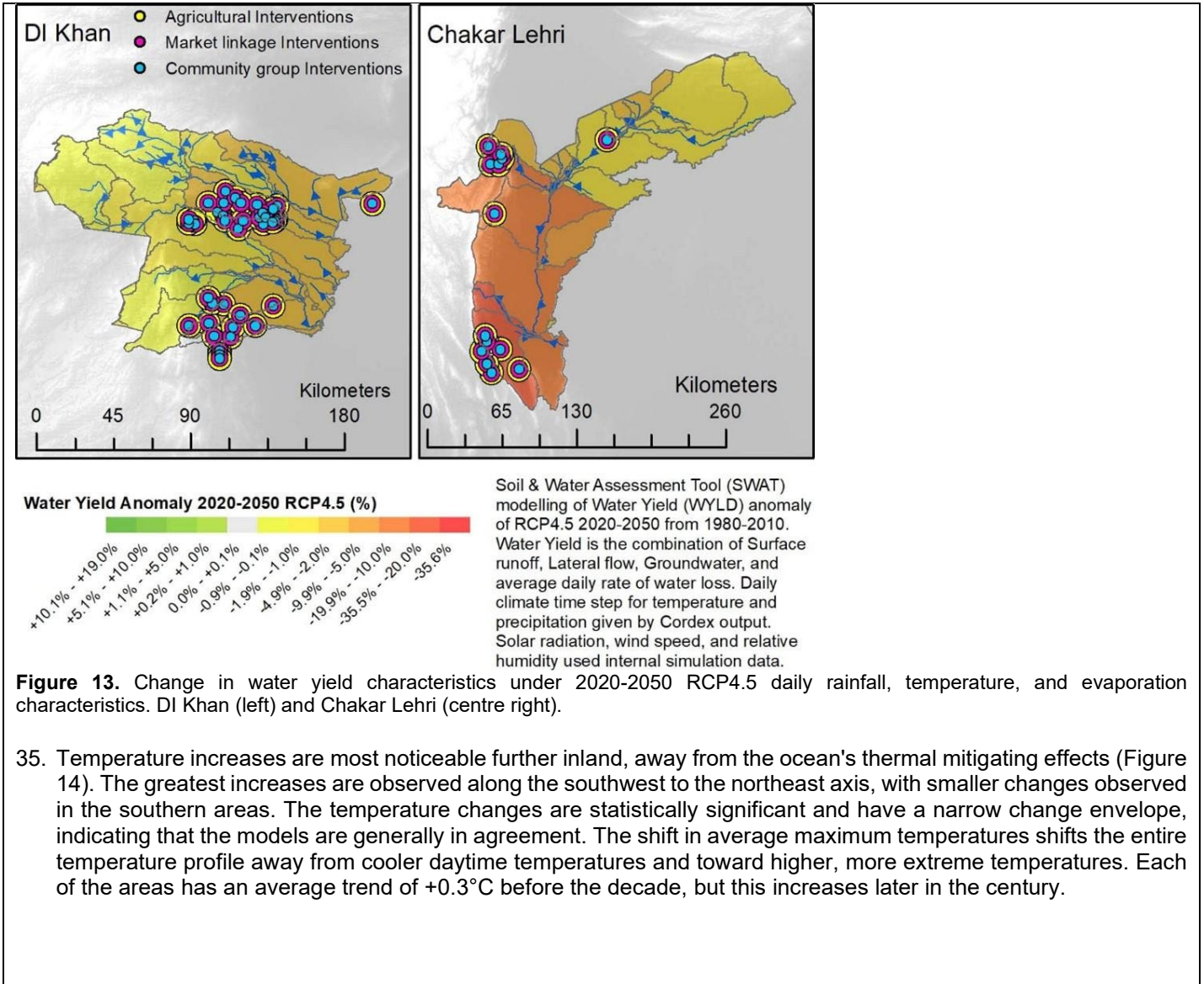


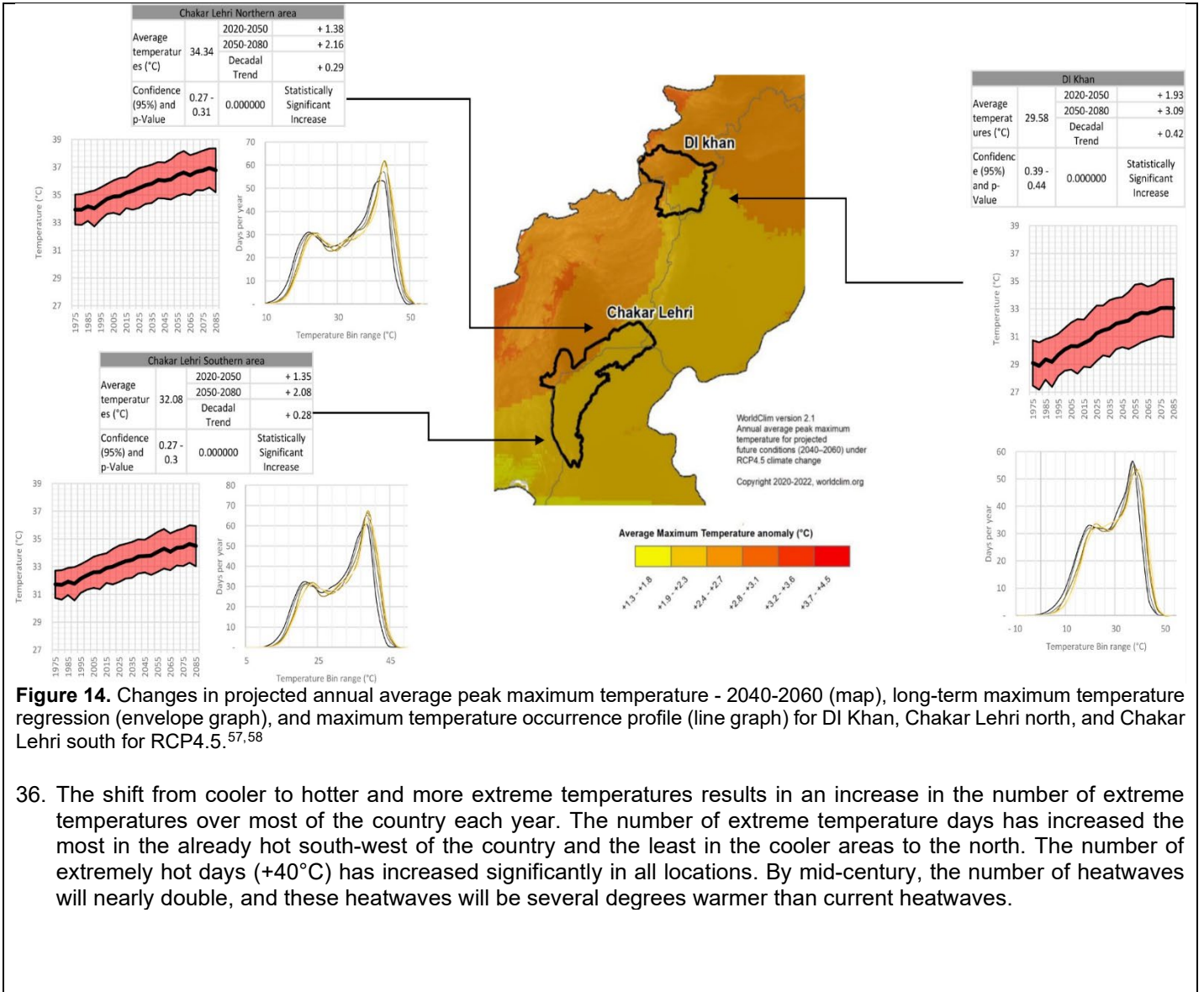
**Figure 12.** Changes in the projected number of dry spells - 2035-2065 (map), decadal anomaly number of dry days annually (column graph), and long-term SPEI (standardized evapotranspiration index) (line graph) for DI Khan, Chakar Lehri north, and Chakar Lehri south for RCP4.5.<sup>55,56</sup>

34. The projected future shows variable annual rainfall volume, but more concentrated rainfall with longer dry spells and more dry days per year (Figure 13). Furthermore, an increase in maximum and minimum temperatures, as well as an increase in evaporation and evapotranspiration, affects surface runoff, lateral flow, groundwater, and the average daily rate of water loss. For RCP4.5 2020-2050, there is a general decrease in water yield, particularly in the lower reaches of the catchments, compared to 1980-2010 values.

<sup>55</sup> Christensen OB, Gutowski B & Nikulin G. 2012. CORDEX Archive Design, version 20/7/2012

<sup>56</sup> Projected Raster data obtained from WorldClim version 2.1 - <https://worldclim.org/>



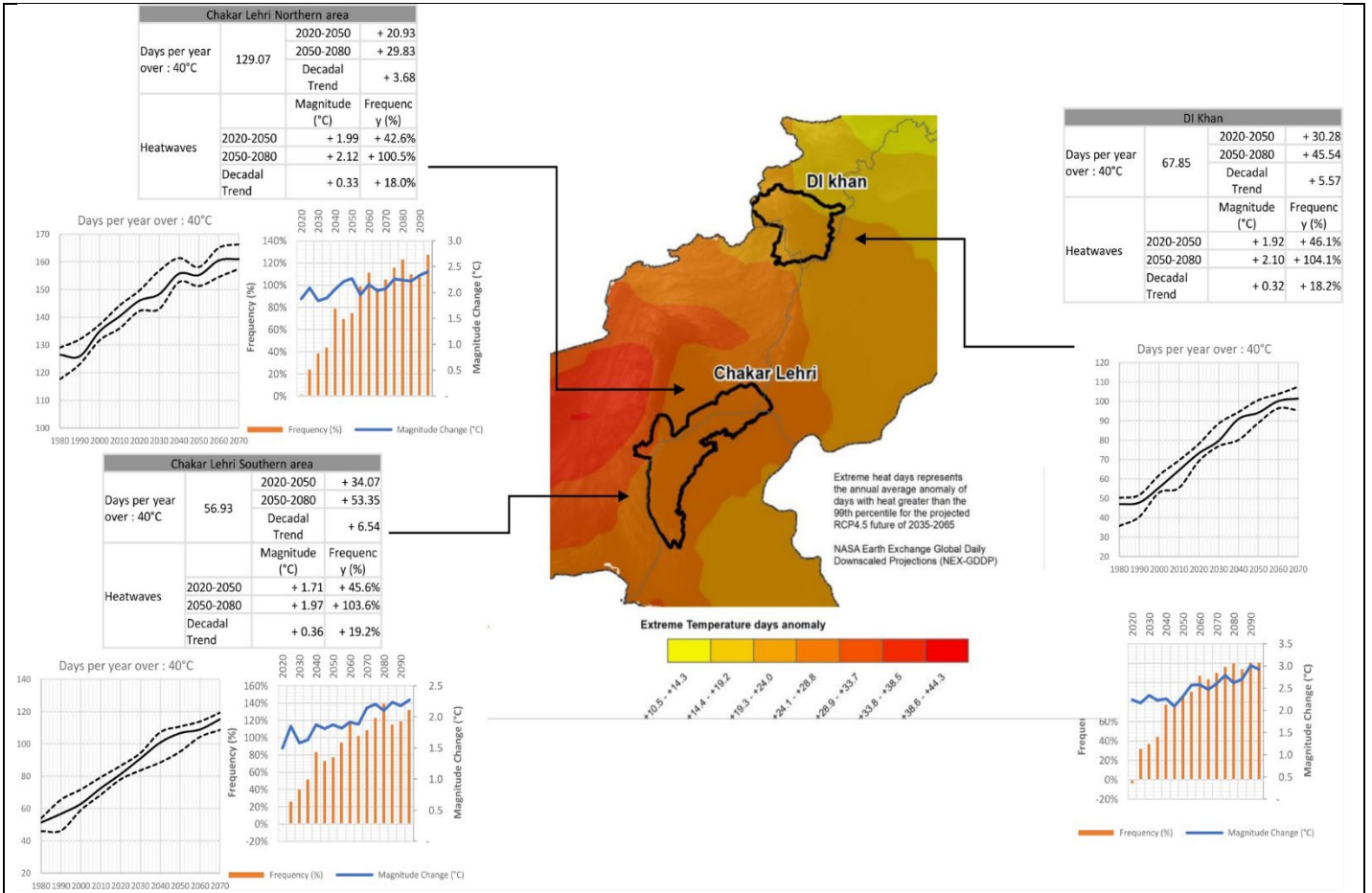


**Figure 14.** Changes in projected annual average peak maximum temperature - 2040-2060 (map), long-term maximum temperature regression (envelope graph), and maximum temperature occurrence profile (line graph) for DI Khan, Chakar Lehri north, and Chakar Lehri south for RCP4.5.<sup>57,58</sup>

36. The shift from cooler to hotter and more extreme temperatures results in an increase in the number of extreme temperatures over most of the country each year. The number of extreme temperature days has increased the most in the already hot south-west of the country and the least in the cooler areas to the north. The number of extremely hot days (+40°C) has increased significantly in all locations. By mid-century, the number of heatwaves will nearly double, and these heatwaves will be several degrees warmer than current heatwaves.

<sup>57</sup> Christensen OB, Gutowski B & Nikulin G. 2012. CORDEX Archive Design, version 20/7/2012

<sup>58</sup> ProjectedRaster data obtained from WorldClim version 2.1 - <https://worldclim.org/>

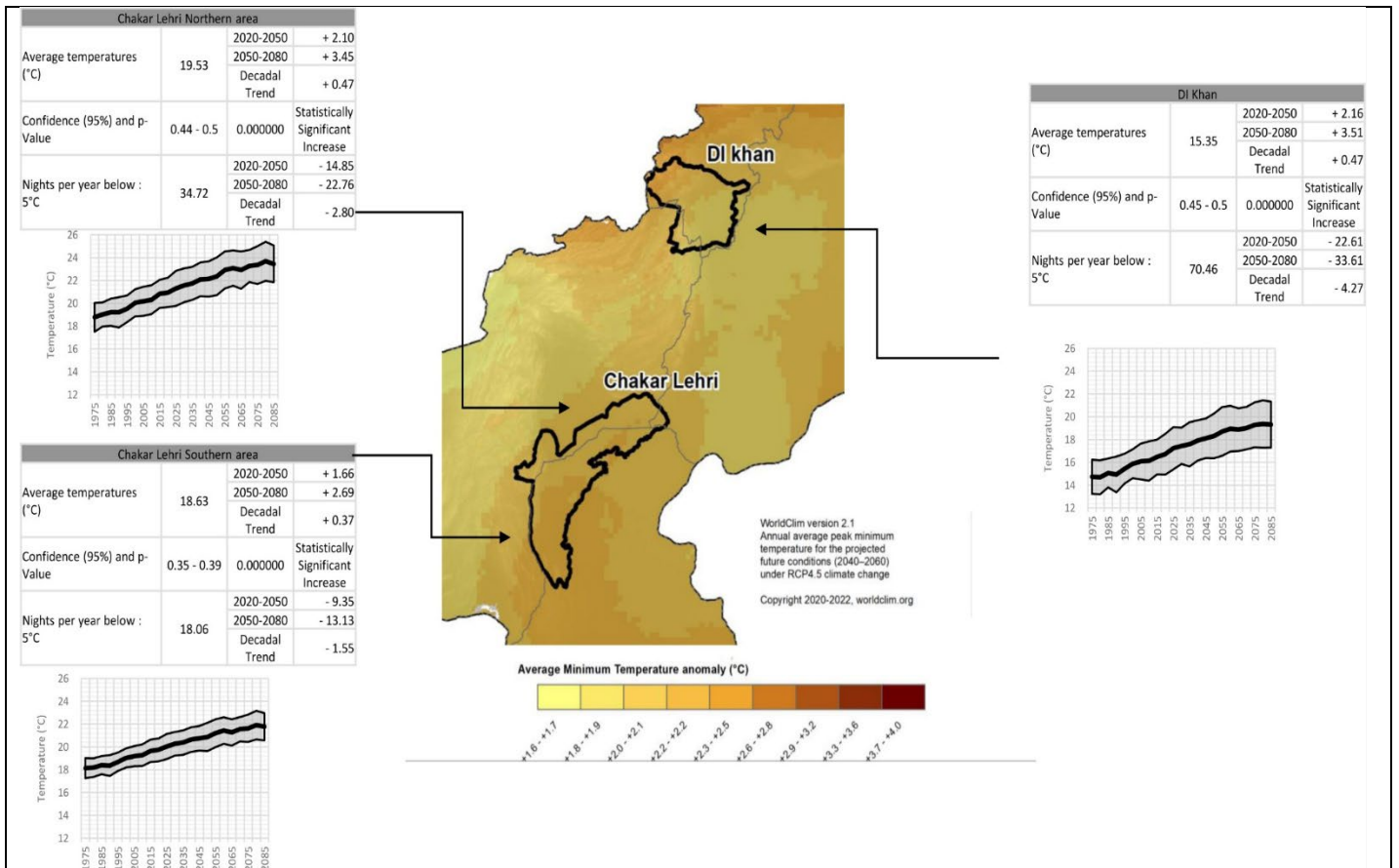


**Figure 15.** Changes in projected extreme heat days - 2035-2065 (map), number of days over 40°C (line graph), and heatwave frequency and magnitude changes (line and column graph) for DI Khan, Chakar Lehri north, and Chakar Lehri south for RCP4.5.<sup>59,60</sup>

37. There is a larger increase in minimum temperatures to the northeast, which is the coldest part of the country, and a smaller increase to the southwest (Figure 16). The increases seen in maximum temperatures are also seen in minimum temperatures, with near linear increases over the next century and majority model agreement. The rate of increase of minimum temperatures, on the other hand, is greater than that of maximum temperatures. While both maximum and minimum temperatures are rising, the fact that minimum temperatures are rising faster results in a reduction in the diurnal range. This will change the country's thermal interchange character.

<sup>59</sup> Christensen OB, Gutowski B & Nikulin G. 2012. CORDEX Archive Design, version 20/7/2012

<sup>60</sup> Projected Raster data obtained from WorldClim version 2.1 - <https://worldclim.org/>



**Figure 16.** Changes in projected annual average peak minimum temperature - 2040-2060 (map), long-term minimum temperature regression (envelope graph) for DI Khan, Chakar Lehri north, and Chakar Lehri south for RCP4.5.<sup>61,62</sup>

Most likely scenario without any climate action

38. Current climatic conditions in Pakistan indicate an increase in temperatures, with projected changes indicating that this trend will continue in the future. There will most likely be an increase in the number of severe heat waves, similar to those observed in 2015 and 2022, but more frequently and potentially with greater magnitude. Evaporation and evapotranspiration will most likely increase, further drying out arid and semi-arid areas, especially given the uncertainty of future rainfall trends. This will increase the likelihood of more severe dry months occurring more frequently. This would exacerbate the current drought's impacts and increase the frequency in occurrence and length of extreme droughts in the future.
39. Long-term cyclical annual rainfall trends are visible in Pakistan's current climatic conditions. The rainfall forecast is currently uncertain. While some models predict generally increased rainfall, there is a lot of variability in these. Rainfall is expected to remain highly variable, with the effects of multiple wet and dry years compounding. There is also a trend toward departing from the current "normal" rainfall volumes and SPEI month. This variability is likely to exacerbate drought potential, especially given the likelihood of increased maximum and minimum temperatures and extremely severe heating events.
40. The observed and projected rainfall intensities have both increased, a trend which is expected to continue. Rainfall will most likely concentrate during peak times, increasing the likelihood of large volume and high-intensity rainfall events, as was the case in 2010, resulting in major floods causing wide-reaching environmental, social and economic impacts. Return events of this type, and the floods associated with them, are more likely to occur in the future.
41. The climate impacts mentioned, particularly rainfall changes and the associated droughts and floods, will likely further expose natural resource-based sectors, particularly the most vulnerable poor and minority groups — such as those living in the flood- and drought-vulnerable Indus River Valley. If no cost-effective and sustainable

<sup>61</sup> Christensen OB, Gutowski B & Nikulin G. 2012. CORDEX Archive Design, version 20/7/2012

<sup>62</sup> ProjectedRaster data obtained from WorldClim version 2.1 - <https://worldclim.org/>



adaptation solutions, such as EbA, are implemented to strengthen the climate-resilience of vulnerable rural communities and the ecosystems that they depend on for their lives and livelihoods, the costs of the impacts on floods and droughts will continue to increase exponentially. These will include loss of life, infrastructural damages, loss of livestock, damage to and loss of crops, and reduced ecosystem integrity, ultimately worsening socio-economic conditions and increasing the vulnerability of Pakistan's most poor.

**Adaptation solution**

42. To respond to the impacts of increasingly severe floods and droughts on ecosystems and vulnerable communities in Pakistan, it is necessary to implement an integrated approach to watershed management. This approach should prioritise the use of EbA and green infrastructure interventions above the current paradigm of using grey interventions (such as dams) reactively to address the impacts of floods and droughts on vulnerable communities and ecosystems. Feasible and effective interventions under the proposed adaptation solution that will address past, present and expected future behaviour of the climate indicators described above are presented in Table 2 below. Barriers to the proposed adaptation solution and the project's approach to addressing them are presented in Section B.2.

43. The EbA and green infrastructure interventions selected by the project are inherently 'no-regret' approaches, focusing on maximizing positive and minimizing negative aspects of nature-based strategies and options for adaptation to floods and droughts. Such options will not worsen vulnerabilities to climate change, increase adaptive capacities and will have a positive impact on livelihoods and ecosystems regardless of the how the climate changes. The project has been designed (see Section B.3. and Annex 2 of detailed intervention designs) to avoid environmental, sociocultural, and economic maladaptation. *Environmental maladaptation* is prevented by activities that: i) avoid degradation that causes negative effects *in situ*; ii) avoid displacing pressures onto other environments (neighbouring areas or areas that are connected ecologically or socio-economically); iii) support the protective role of ecosystems against current and future climate-related hazards; iv) integrate uncertainties concerning climate change impacts and the reaction of ecosystem; and v) set the primary purpose as being to promote adaptation to climate-related changes rather than to reduce greenhouse gas emissions. *Sociocultural maladaptation* will be prevented by activities that: i) start from local social characteristics and cultural values that could have an influence on risks and environmental dynamics; ii) consider and develop local skills and knowledge related to climate-related hazards and the environment; and iii) call on new skills that the community is capable of acquiring. *Economic maladaptation* will be prevented by activities that: i) Promote the reduction of socio-economic inequalities; ii) support the relative diversification of economic and/or subsistence activities; and iii) integrate any potential changes in economic and subsistence activities resulting from climate change.

**Table 2.** Project EbA and green infrastructure approaches that will address droughts and floods (more detail is presented in Annex 2).

Climate change indicator	Adaptation intervention	Adaptation benefits
Flooding	Restoration of riverine vegetation	<ul style="list-style-type: none"> <li>Reduced peak stream flow<sup>63,64</sup></li> <li>Reduced flood peaks and related damages to land, agriculture and infrastructure<sup>65,66,67,68</sup></li> <li>Reduced soil erosion<sup>69</sup></li> </ul>

<sup>63</sup> Vouk, I., Pilechi, V., Provan, M. and Murphy, E. (2021). Nature-Based Solutions for Coastal and Riverine Flood and Erosion Risk Management. csagroup.org. Available from [https://www.researchgate.net/publication/355649746\\_Nature\\_Based\\_Solutions\\_for\\_Coastal\\_and\\_Riverine\\_Flood\\_and\\_Erosion\\_Risk\\_Management](https://www.researchgate.net/publication/355649746_Nature_Based_Solutions_for_Coastal_and_Riverine_Flood_and_Erosion_Risk_Management)

<sup>64</sup> Evaristo, J. McDonnell, J.J (2019). Global analysis of stream flow response to forest management. Nature. 10.1038/s41586-019-1306-0, 570(7762). 455-461

<sup>65</sup> United Kingdom Eddleston Water (n.d). River restoration for natural flood management in Eddleston Water. Available from <https://casesstudies.naturebasedsolutionsinitiative.org/casestudy/river-restoration-for-natural-flood-management-nfm-in-eddleston-water-scotland/pdf/>

<sup>66</sup> Smith, A. and Chausson. A. (2021) Nature-based Solutions in UK Climate Adaptation Policy. A report prepared by the Nature-based Solutions Initiative at the University of Oxford for WWF-UK and RSPB. Available at: <https://www.rspb.org.uk/globalassets/downloads/policy-briefings/nature-based-solutions-adaption-report.pdf>

<sup>67</sup> Nisbet, T. (n.d).Case study 27. Investigating the Impacts of Upland Land Use Management on Flood Risk at Pontbren, Wales. Available from <https://www.gov.uk/flood-and-coastal-erosion-risk-management-research-reports/working-with-natural-processes-to-reduce-flood-risk#case-studies>

<sup>68</sup> Thomas, H. And Nisbet, T. (n.d) .Case study 28. Investigating the impact of floodplain woodland on flood flows in the River Cary catchment, Somerset. Available from: <https://www.gov.uk/flood-and-coastal-erosion-risk-management-research-reports/working-with-natural-processes-to-reduce-flood-risk#case-studies>

<sup>69</sup> Karlen, D. L., Stott, D. E., Cambardella, C. A., Kremer, R. J., & McCarty, G. W. (2014). Surface soil quality in five Midwestern cropland conservation effects assessment project watersheds. Journal of Soil and Water Conservation, 69,393–401. <https://doi.org/10.2489/jswc.69.5.39>

	Flow path restoration	<ul style="list-style-type: none"> <li>● River height reduction during flood peaks resulting in reduced damages to land, agriculture and infrastructure<sup>70</sup></li> <li>● Reduced flood peak magnitude and time<sup>71</sup></li> <li>● Reduced surface water runoff<sup>72</sup></li> </ul>
	De-siltation of flow paths and wetlands	<ul style="list-style-type: none"> <li>● Decrease in rate and volume of stormwater runoff, reducing the threat of damage to land, agriculture and infrastructure during extreme rainfall events<sup>73</sup></li> </ul>
	Embankments (rock detention structures)	<ul style="list-style-type: none"> <li>● Reduction in peak flows during rainfall events<sup>74,75</sup></li> <li>● Reduced sediment deposition</li> </ul>
	Constructed embankments	<ul style="list-style-type: none"> <li>● Flood peak reduction and flood-risk prevention<sup>76,77</sup></li> <li>● Floodwater retention and diversion<sup>78</sup></li> </ul>
<b>Drought</b>	Restoration of riverine vegetation	<ul style="list-style-type: none"> <li>● Improved wetland water inflows and reduced losses<sup>79</sup></li> </ul>
	Flow path restoration	<ul style="list-style-type: none"> <li>● Reduction in drought severity by improving basal flows of rivers<sup>80</sup></li> <li>● Increase in water table and river flow stability and discharge<sup>81</sup></li> </ul>
	Embankments (rock detention structures)	<ul style="list-style-type: none"> <li>● Increase in total runoff<sup>82</sup></li> <li>● Extension of summer base flows and flow volume</li> <li>● Increased water tables and natural restoration of downstream wetlands<sup>83</sup></li> </ul>

#### Related projects/interventions

44. Considerable baseline investments are being made through public expenditure and donor-funded initiatives to increase the resilience of Pakistan's vulnerable communities to the impacts of climate change. Lessons learned and best practices from these investments have been incorporated into the design of the proposed project to replicate successful techniques and ensure that there is complementarity between the project and existing actions. The most relevant baseline projects that will be complemented by the proposed project are presented in Table 3 below, with further projects and information provided in Annex 2.

<sup>70</sup> Climate – Adapt (2021). Room for the River Waal – protecting the city of Nijmegen. Available from [https://climate-adapt.eea.europa.eu/metadata/case-studies/room-for-the-river-waal-2013-protecting-the-city-of-nijmegen/#adapt\\_options\\_anchor](https://climate-adapt.eea.europa.eu/metadata/case-studies/room-for-the-river-waal-2013-protecting-the-city-of-nijmegen/#adapt_options_anchor)

<sup>71</sup> Addy, S, Holden, M and Sargeant, L (n.d). Case study 1. New Forest LIFE III Project. Available from <https://www.gov.uk/flood-and-coastal-erosion-risk-management-research-reports/working-with-natural-processes-to-reduce-flood-risk#case-studies>

<sup>72</sup> Vouk, L., Pilechi, V., Provan, M. and Murphy, E. (2021). Nature-Based Solutions for Coastal and Riverine Flood and Erosion Risk Management. csagroup.org. Available from [https://www.researchgate.net/publication/355649746\\_NatureBased\\_Solutions\\_for\\_Coastal\\_and\\_Riverine\\_Flood\\_and\\_Erosion\\_Risk\\_Management](https://www.researchgate.net/publication/355649746_NatureBased_Solutions_for_Coastal_and_Riverine_Flood_and_Erosion_Risk_Management)

<sup>73</sup> Feibel, S. (2022). Removing Sediment to Restore Wetlands Clears Revenue Paths. Available from <https://www.conservationfinancenetwork.org/2022/01/24/removing-sediment-to-restore-wetlands-clears-revenue-paths>

<sup>74</sup> Norman, L. M. (2020). Ecosystem Services of Riparian Restoration: A Review of Rock Detention Structures in the Madrean Archipelago Ecoregion. Air Soil 28% more flow volume per area in the treated watershed compared to the untreated watershed. Water Res. 13. 117862212094633. doi: 10.1177/117862212094633

<sup>75</sup> USGS, (2022). Re-greening a dryland watershed. Available from <https://www.usgs.gov/media/videos/re-greening-dryland-watershed>

<sup>76</sup> Serra-Llobet, A., Jaehrig, S.C., Geist, J., Kondolf, G.M., Damm, C., Scholz, M., Lund, J., Opperman, J.J., Yarnell, S.M., Pawley, A., Shader, E., Cain, J., Zingraff-Hamed, A., Grantham, T.G., Eisenstein, W. and Schmitt, R. (2022). Restoring Rivers and Floodplains for Habitat and Flood Risk Reduction: Experiences in Multi-Benefit Floodplain Management from California and Germany. Front. Environ. Sci. 16. Available from <https://www.miragenews.com/flood-risk-reduction-with-multiple-benefits-775685>

<sup>77</sup> McIlwrath, C. (2016). Case study 10. Padgate Brook River Restoration – part of the Warrington FRM Scheme. Available from <https://thefloodhub.co.uk/wp-content/uploads/2018/09/WWNP-Case-Study-10-Padgate-Brook.pdf>.

<sup>78</sup> Climate Adapt (2021). Lower Danube green corridor: floodplain restoration for flood protection. Available from [https://climate-adapt.eea.europa.eu/metadata/case-studies/lower-danube-green-corridor-floodplain-restoration-for-flood-protection/#adapt\\_options\\_anchor](https://climate-adapt.eea.europa.eu/metadata/case-studies/lower-danube-green-corridor-floodplain-restoration-for-flood-protection/#adapt_options_anchor)

<sup>79</sup> Construction 21 Luxembourg. (2019). Changyuan River Wetland Natural Park (China - Qixian, Shanxi). Available from <https://www.construction21.org/luxembourg/data/exports/pdf/changyuan-river-wetland-natural-park-china-qixian-shanxi.pdf>

<sup>80</sup> Wen, L., Rogers, K. Ling, J. (2011). The impacts of river regulation and water diversion on the hydrological drought characteristics in the Lower Murrumbidgee River, Australia. Journal of Hydrology 405(4-5). 1099-1100

<sup>81</sup> Hejran, H. Mitusov, A. and Azami, A. (2021). Syako Karez recharge and flood control dam in Logar province, Afghanistan. Earth Sciences. 15 (191). 61-63

<sup>82</sup> Norman, L.M., Brinkerhoff, F., Gwilliam, E., Guertin, D.P., Callegary, J., Goodrich, D.C., Nagler, P.L., Gray, F., (2016). Hydrologic Response of Streams Restored with Check Dams in the Chiricahua Mountains, Arizona. River Res. Applic. 32, 519–527. <https://doi.org/10.1002/rra.2895>

<sup>83</sup> Borderlands Restoration Network (2022). Cuenca Los Ojos Foundation. Available from <https://www.borderlandsrestoration.org/cuenca-los-ojos.html>

**Table 3.** Summary of the most relevant past and ongoing projects and investments that will be complemented by the proposed project.

Project	Description	Status
<p><u>Scaling-up of glacial lake outburst flood (GLOF) risk reduction in Northern Pakistan.</u> 2015—2022. USD 37.5m. Category B.</p>	<p>The objective of the project is to empower communities to identify and manage the risks associated with GLOFs and other related impacts of climate change and to strengthen the public service systems to lower the risks of GLOF-related climate disasters. Focused geographical boundaries are Gilgit-Baltistan (GB) and Khyber Pakhtunkhwa. The project is building 250 engineering structures including dams, ponds, spillways, tree plantations, and drainage to reduce the risks of GLOF from 33 glacial lakes. The project also includes the development of disaster management policies and introducing weather monitoring stations, flood gauges, hydrological modelling, and early-warning systems.</p>	<p>It is a GCF-funded adaptation project and is being implemented by UNDP. This project is benefiting 696,342 direct and 28.5m indirect beneficiaries.</p>
<p><u>Transforming the Indus basin with climate resilience agriculture and water management.</u> 2019—2026. USD 47.7m. Category B.</p>	<p>The major objective is to transform agriculture in the Indus basin by increasing resilience among the most vulnerable farmers and strengthening the government's capacity to support their communities to adapt to climate change. This project is building farmers' climate resilience through skills development, and knowledge, and supporting them on technological fronts for creating a wider enabling environment for continuous adaptation. It will see the impact of climate change on agriculture and water management in selected basins through the modelling of climate change scenarios for Pakistan.</p> <p>While there is no overlap in geographies and participating stakeholders between the proposed project and this existing GCF-funded project, lessons from this ongoing project such as efficient and effective ways to drive public sector reform and sustainable and cost-effective climate-resilient agricultural techniques will be of value and used to inform the implementation of relevant activities under Components 2 and 3 of the proposed project. Additionally, the proposed project's PSC will support the PMU to, among others, maintain complementarity between the proposed project and this ongoing GCF-funded project, including through coordinating with the FAO-led project's PMU to ensure lessons learned from the impacts of the 2022 floods on their project's implementation are transferred to the proposed project's PMU from the first year of project implementation.</p>	<p>It is a GCF-funded adaptation project and is being implemented by FAO. This project is benefiting 1.3m direct and 16m indirect beneficiaries in 5 districts of Punjab (Muzaffargarh, DG Khan, Khanewal, Lodhran, Multan) and 3 districts of Sindh (Sanghar, Badin, Umerkot)<sup>84</sup>.</p>
<p>Living Indus Initiative</p>	<p>Under the Living Indus Initiative, 25 high-impact projects/programmes have been identified through a series of extensive consultations with senior policy makers and experts; academic, civil society, business and technical specialists. The overall objective of the initiative is to revitalize and restore the ecosystem functioning of the Indus Basin under future climate change conditions using primarily EbA and nature-based solutions.</p> <p>The proposed project is identified as a main contributor to the Living Indus Initiative's objective of improving the resilience of the Indus Basin through its focus on implementing EbA and green infrastructure interventions to reduce the increasing impacts of floods and droughts on the basin and most vulnerable groups that depend on it. The close link between the proposed project and the Living Indus Initiative will enhance country ownership, facilitate the</p>	<p>This initiative is ongoing, developed jointly by the Ministry of Climate Change (MoCC) and United Nations in Pakistan under a directive of the Prime Minister's Committee on Climate Change, and led by the MoCC (NDA). The initiative is intended to serve as a strategic framework for Pakistan, coordinating all climate change adaptation work focused on enhancing the resilience of the country's Indus Basin.</p>

	NDA and provincial government agencies in ensuring inter-alignment of related initiatives, and reduce potential for overlaps or redundancies in future proposals to the GCF or other sources of climate finance.	
<u>Balochistan small-scale irrigation project (BSSIP).</u> 2008—2014. USD 25m.	In 2008, the World Bank funded a project in Balochistan to increase groundwater availability for farmers, restore water storage, develop small-scale irrigation schemes, and strengthen the capacities of farmers. BSSIP, implemented by the Government of Balochistan, restored around 15 groundwater aquifers (Karez systems), raising productivity levels by 40% and crop intensity by 25% and allowing farmers to produce crops throughout the year. BSSIP did not only focus on improving the existing Karez and channels but also provided flood protection and associated structures such as small storage tanks and flow diversions.	It is a World Bank-funded adaptation project and is being implemented by Balochistan Irrigation Department. This small-scale project brought significant large-scale benefits to Balochistan and built the resilience of farmers and water users against climate-related disasters.
<u>Economic transformation initiative – Gilgit-Baltistan</u> <sup>85</sup> . 2015—2022. USD 120.15m.	The objectives of the IFAD initiative are to increase the agricultural production of 100,000 farmers <sup>86</sup> by introducing high-value crops and linking them to local markets, developing irrigation schemes, organizing smallholder farmers into producers' groups, and formulating value chain development.	The International Fund of Agricultural Development (IFAD) is supporting an initiative in Gilgit-Baltistan for the economic growth of the region. Total beneficiaries are 100,000.
<u>The US—Pakistan partnership for agricultural market development (AMD).</u> 2014—2019.	It is focused to support the development of Pakistan's commercial agriculture. The programme aimed to improve the quality and efficiency of production for agricultural/livestock products (mango, citrus, meat, high-value/off-season vegetables) in Pakistan by providing training and matching grants to encourage innovation and private-sector investment. The programme also facilitated the increased demand for Pakistani agricultural products and fostered supply-demand synergies between producers and buyers.	It is a USAID-funded programme and was implemented by <u>CNFA</u> . This project created 25,477 new full-time employment opportunities and contributed to strong GDP growth.
<u>Water for livelihoods (W4L).</u> 2011—2017. USD 11.8m.	It was implemented in Khyber Pakhtunkhwa and the tribal area (FATA) <sup>87</sup> of Pakistan. The project aimed to achieve institutional and legal reforms to eliminate constraints of inefficient water management and introduce better protection of regional water resources, mainly for agriculture and human consumption. The focus of the project was to promote dialogue among stakeholders to achieve an effective, equitable, and efficient use of water resources on a local level based on the Integrated Water Resource Management (IWRM) approach. The project was not supposed to implement the activities, but it supported many actors (local authorities, water user' associations, and governmental line departments) by building their capacities so that they were able to implement several activities/interventions which increased their access to water and protected them from climate-related disasters.	The Swiss Agency for Development and Cooperation (SDC) funded this project and was implemented by Inter cooperation (IC). Total beneficiaries were 22,484.
<u>Watershed rehabilitation and irrigation improvement: Demonstrating in Pakistan and disseminating the best</u>	The objective of this project was to promote better management of land and water resources. The project led to the dissemination of information on efficient water consumption which enabled farmers to adopt sustainable agricultural production techniques to store and use water resources effectively in the context of climate change.	It was implemented in Sindh supported by the International Center for Agricultural Research in Dry Areas (ICARDA) and the United States Department of Agriculture (USDA) and implemented by the Institute of Water Resources Engineering and Management (IWREM).

<sup>84</sup> FAO, Inception workshop held to launch the "Transforming the Indus Basin with Climate Resilient Agriculture and Water Management" Project in Sindh and Punjab, <https://www.fao.org/pakistan/news/detail-events/en/c/1304449/>

<sup>85</sup> IFAD, <https://www.ifad.org/en/web/operations/-/economic-transformation-initiative-gilgit-baltistan-eti-gb->

<sup>86</sup> Economic Transformation Initiative, <https://www.etiqb.com.pk>

<sup>87</sup> Karak, D.I. Khan, Chitral, Tank, Lower Dir in Khyber Pakhtunkhwa; FR D.I. Khan in the FATA.

<p><u>technologies to help rural farmers.</u> 2011—2016. USD3.3m.</p>		
<p><u>Australian Water Programme for Pakistan.</u> 2016—2021. AUD15m.</p>	<p>A 15-million-Australian-dollars programme on water management was launched by the Australian Government to improve water management and boost agricultural productivity in Pakistan<sup>88</sup>. In this regard, the Australian Government's Centre for International Agricultural Research (ACIAR) had worked with the Pakistan Council for Water Research in Water Resources (PCRWR), Pakistan Agricultural Research Council (PARC), provincial agriculture and livestock departments, universities, and research institutes to address technical, social, economic and policy constraints, which hinder the growth of the agriculture sector. Moreover, the Australian scientists from the Commonwealth Scientific and Industrial Research Organization (CSIRO) also worked with the Ministry of Water and Power to build their capacity for efficient water management. The programme also included a component on groundwater management<sup>89</sup>, which is a step toward more effective groundwater use for social, economic, and environmental benefits. This component aims to build the capacity of researchers, farmers, farming communities, and relevant government and non-government agencies to improve groundwater management in ways that enhance farming family livelihoods in Pakistan. It is designed to provide an enabling environment for communities to participate in the research process and to develop socially acceptable solutions. It is implemented in three provinces of Pakistan (Balochistan, Sindh, and Punjab).</p>	<p>It was implemented by many public-sector Pakistani actors.</p>
<p><u>Disaster and climate resilience improvement project (DCRiP).</u> 2015—2019. USD125m.</p>	<p>DCRiP funded by the World Bank, aimed to build resilience through the restoration of [critical] flood protection infrastructure and strengthen government capacity to manage disasters and climate variability, for instance, upgrading hydro-meteorological observation network and associated flood early warning systems; restoring flood protection infrastructure; enhancing physical resilience and upgrading flood management systems; emergency response.</p>	<p>It was implemented by Punjab Agriculture and Irrigation Departments.</p>
<p><u>Sindh resilience project (SRP).</u> 2016—2024. USD100m.</p>	<p>It aims to mitigate flood and drought risks in selected vulnerable regions of Sindh while strengthening the capacity of provincial institutes to manage natural disasters. The project plans to improve resilience by improving embankments at vulnerable sites along the Indus River for protection against riverine floods, as well as the construction of small recharge dams and gravity weirs for addressing drought and flash-flood risks. The project would also support the improvement and upgrading of modelling facilities at the Irrigation Research Institute (IRI), river morphology studies, floodplain mapping, groundwater assessment studies, etc. Currently, several civil works, institutional capacity, and hydrological modelling are under process.</p>	<p>Funded by the World Bank. The implementing agencies are Sindh Irrigation Department (SID) and Provincial Disaster Management Authority (PDMA), Sindh.</p>
<p><u>Development of national flood</u></p>	<p>It focuses on integrated water management with equal emphasis on measures other than flood protection works, for instance, improved rules of reservoir operation, flood</p>	<p>Funded by the Pakistani government (Ministry of Water Resources) and</p>

<sup>88</sup> Daily Pakistan, Australia launches \$15 million fund for water management in Pakistan [Press release](#) dated 31.01.2017.

<sup>89</sup> Improving ground water management to enhance agriculture and farming livelihoods in Pakistan, <https://www.pcrwr.gov.pk/ACIAR/watermanagement/index.php?readmore=read>

<p><u>protection plan-IV (NFPP-IV).</u></p>	<p>forecasting and early warning system, flood risk zoning and proofing for disaster- and climate-related insurance, water management at catchment level, disaster risk reduction and management, etc.</p>	<p>NDRMF and being implemented by the Federal Flood Commission of Pakistan.</p>
<p><u>Ten billion trees tsunami programme: up-scaling of green Pakistan programme.</u> 2019—2023. ~USD700m.</p>	<p>The overall objective of this programme is to revive forest and wildlife resources in Pakistan, conserve protected areas, and encourage eco-tourism, community engagement, and job creation. The project has created 84,609 green jobs to date.</p> <p>A consortium including WWF-Pakistan, IUCN and FAO has been established to conduct third-party monitoring of this baseline initiative. As part of its monitoring work, the consortium has developed Silvo-Ecological Zones for the entire country, including a list of best suited native species for each zone. This list will be used to directly inform the selection of species for plantation under the proposed project. The consortium also developed a detailed monitoring and evaluation methodology, which will be used by the proposed project's M&amp;E staff for monitoring the proposed project's achievements of its afforestation targets (including how these targets contribute to the targets under this baseline initiative) and measuring the adaptation impact of its interventions.</p>	<p>It is being primarily implemented by the Ministry of Climate Change along with provincial forest and wildlife departments. UNEP is supporting the implementation of this initiative.</p>
<p><u>Mainstreaming Climate Change Adaptation through Water Resource Management in Leather Industrial Zone Development.</u> 2015—2019. USD3.3 million GEF grant and USD14.7 million in co-financing.</p>	<p>This project focuses on reducing vulnerability and building resilience through the integration of climate change adaptation into urban development in Pakistan. The main components of the project include: i) mainstreaming adaptation into urban and rural development planning; ii) capacity building of targeted communities and leather business owners; iii) supporting sustainable water use by leather industries in the Sialkot Tannery Zone and demonstrating improved wastewater treatment. The proposed project will benefit from lessons generated by this GEF-funded project around effective implementation of water resources management solutions implemented in the Sialkot Tannery Zone.</p>	<p>This GEF-funded project was approved for implementation in 2015. The Implementing Agency is UNIDO and the Executing Agencies included Sialkot Tannery Association Guarantee Ltd (STAGL) (Lead Executing Partner) District Government Sialkot, Irrigation and Environment Departments, Provincial Government Punjab.</p>
<p><u>Enhance community, local and national-level urban climate change resilience to water scarcity, caused by floods and droughts in Rawalpindi and Nowshera, Pakistan.</u> 2020—2023. USD 6 million.</p>	<p>This baseline project focuses on addressing the impacts of floods and droughts on people living in urban areas in the cities of Rawalpindi and Nowshera. The project comprises three components, namely: i) enhance community- and household-level flood resilient water harvesting facilities; ii) enhance city- and district-level water harvesting facilities in public buildings and on water storages in public gardens, as well as develop district/city-level tools for improved planning and response to the impacts of climate change; and iii) strengthen national and provincial-level capacity to guide/direct city-level development considering climate change and disaster risks and impacts.</p> <p>Lessons learned from this baseline project, particularly related to efficient and effective use of water storage systems, will be used to inform the implementation of the proposed project as the relevant information becomes available.</p>	<p>This is an AF-funded project currently under implementation by MoCC, and supported by UN-Habitat, relevant provincial and municipal government actors, as well as NGOs and CBOs.</p>
<p><u>Reducing Risks and Vulnerabilities from Glacier Lake Outburst Floods in Northern Pakistan.</u></p>	<p>This baseline project focuses on reducing the risks and vulnerabilities from glacial lake outburst floods (GLOFs) and snow-melt flash floods in Northern Pakistan. Its main objectives are to develop the human and technical capacity of public institutions and vulnerable communities in Northern Pakistan to understand and address immediate</p>	<p>This project was funded by the Adaptation Fund (AF) and completed in 2015. It was led by Pakistan's Ministry of Environment.</p>

<p>2011—2015. USD3.9 million.</p>	<p>GLOF risks, including through policy, strengthening knowledge and information sharing, and implementing community-based GLOF risk management in vulnerable mountain valleys of Northern Pakistan. While the focus of this baseline project is different to the proposed project, lessons learned on effective strategies for community-based adaptation work will be drawn from during the implementation of the proposed project.</p>	
<p><u>Water resource accountability in Pakistan (WRAP)</u>. 2021—2026. £15m.</p>	<p>To improve water governance and management issues in Pakistan to be able to adapt to changing climate while ensuring environmental sustainability with a focus on collaboration and engagement with provinces, research, and academia.</p>	<p>Funded by FCDO. £5m component on water governance is being implemented by IWMI. £5m component on nature-based solutions is being implemented by WWF.</p>

### B.2 (a). Theory of change narrative and diagram (max. 1500 words, approximately 3 pages plus diagram)

#### Impact: Paradigm shift

45. **IF:** EbA and green infrastructure interventions are implemented in the Indus basin and are supported by corresponding changes in the National Water Policy, the National Adaption Plan and Provincial Adaptation Plans, this will operationalize EbA and green infrastructure integration in future adaptation interventions by the Government of Pakistan. Furthermore, if targeted communities are engaged in ecosystem restoration and management practices that align with these interventions, planning and regulations, **THEN:** vulnerable communities in the Indus Basin will benefit from additional protection to floods and droughts through additional EbA and green infrastructure interventions, national and provincial governments will have the necessary regulations and planning documents in place to sustain these interventions and operationalise future EbA and green infrastructure measures, and community businesses and livelihood practices will be better suited to withstand future climate threats **BECAUSE:** the project will address the above mentioned barriers by convincing key stakeholders of the benefits and cost-effectiveness of EbA and green infrastructure, by fostering an enabling environment for public sector reform for flood and drought prevention, and by strengthening government and community capacity to enhance resilience of key ecosystems and vulnerable communities to climate change impacts like frequent and severe floods and droughts.

#### Target communities

46. The proposed project will target local communities, including small-scale farmers, living in four project sites in the Indus Basin, namely the DI Khan Watershed, Ramak Watershed, Chakar Lehri Watershed, and Manchar Lake and Watershed. The people living in these areas are particularly vulnerable to the impacts of climate change-induced floods and droughts, which are already negatively affecting their water and livelihood security.

#### Outcomes and co-benefits

47. The project will achieve the following outcomes:

48. Outcome 1: EbA and green infrastructure interventions with improved community-led management reduce flood risk and enhance the climate resilience of the most vulnerable people in Pakistan's Indus Basin will be achieved by i) implementing EbA interventions to reduce flood impacts on populations close to the intervention sites and people living downstream through enhanced ecosystem services such as slowing of flood waters delays in flood peak onset, and increased access to water during drought periods, while downstream communities will benefit from the slowing of upstream velocity and delayed peak flood; ii) implementing green infrastructure interventions to reduce flood impacts on nearby communities and ecosystems by reducing soil erosion and river sedimentation, diverting and reducing the velocity of intense flows in the hill torrents away from nearby villages located in the floodplain, and increasing infiltration and groundwater recharge; and iii) providing organization and capacity development to Community-Based Organisations (CBOs) and creating Water User Groups and Community Watch and Ward systems to support community-based natural resource management and water supply and flood attenuation services provided by EbA interventions implemented floodplains and watersheds, empower communities to responsibly manage the ecosystems they rely on.

49. Outcome 2: Enabling environment for climate action that has new procedures for implementing EbA and green infrastructure interventions for flood and water resources management in Pakistan will be achieved by using the

evidence of the effectiveness and efficiency of EbA and green infrastructure interventions in enhancing flood and water resources management generated under Outcome 1 to expand Pakistan's regulations and policies for flood and water resources management through updated procedures that prioritise EbA and green infrastructure interventions. This will be supported by strengthening the capacity of national and sub-national staff, as well as community leaders/representatives, to apply the updated procedures. The outcome of this work will enable the GoP to channel future investments into EbA and green infrastructure interventions and replicate similar adaptation strategies in other flood- and drought prone areas in Pakistan to those demonstrated under the proposed project.

50. Outcome 3: Enhanced resilience of community livelihoods in the Indus Basin will be achieved by training communities and smallholder farmers on how to enhance existing agricultural practices, prevalent across the Indus Basin, to better withstand current and future climate change scenarios through improved irrigation practices to conserve water, soil management to enhance yields and reduce agricultural expansion, and introducing new crop varieties which require less water and can withstand more extreme temperatures caused by climate change. Additionally, new opportunities for sustainable enterprises will be supported to provide alternative revenue generating opportunities for communities in the Indus Basin and reduce ecosystem degradation from traditional livelihoods directly dependent on natural resources. Project pipeline sourcing, incubation, and technical assistance to environmentally sustainable businesses will help reduce ecosystem degradation and increase revenue generation for businesses and families.

51. The project will achieve the following co-benefits, with additional co-benefits described in Section D.3 of this Funding Proposal:

- Co-benefit 1: GHG emission reduction from ecosystem restoration and improved ecosystem management. This co-benefit will be achieved by restoring 14,215 ha of degraded agro-ecological landscapes in watersheds (under Activity 1.1.1). These mitigation co-benefits are described in further detail in Section D.1 of this Funding Proposal.
- Co-benefit 2: Improved biodiversity as a result of the project's EbA and green infrastructure interventions. This will include: i) increases in migratory birds' population at Manchar Lake; increases in migratory birds' population at Indus Game Reserve (D.I Khan); ii) increases in fish species richness and abundance/Macro-invertebrates species richness; iii) increases in population abundance of the Indus River Dolphin (EN); iv) increases in population abundance of freshwater turtles (hard-shelled and soft-shelled turtles); and v) the contribution of the project's EbA and green infrastructure interventions towards the designation and nomination of restoration sites as sites of global ecological important such as Man and Biosphere Reserve and Ramsar Sites.
- Co-benefit 3: New jobs created and related new skills developed through the implementation of the project's EbA and green infrastructure interventions.

### **Outputs and activities**

52. The project will deliver the following outputs through the associated activities:

53. Output 1.1: EbA interventions implemented to restore floodplain and watershed ecosystems will be achieved by restoring 14,215 ha of degraded agro-ecological landscapes in watersheds in DI Khan (Activity 1.1.1) and rehabilitating degraded wetlands, flow paths, and channels in Ramak Watershed and Manchar Watershed/Lake (Activity 1.1.2). Improving the management of the Indus Basin's existing ecosystems and restoring their function through EbA and green infrastructure interventions is critical to enhance the resilience of these ecosystems and secure the flood and drought risk reduction benefits they provide to communities living in the basin. The interventions under Output 1.1 will enhance ecosystem functioning and the delivery of goods and services to vulnerable communities living in the Indus Basin and secure their livelihoods.

54. Output 1.2: Green infrastructure interventions established in Pakistan's Indus Basin will be achieved by designing and implementing 127 green infrastructure interventions to reduce the impacts of flooding on communities living in the four project sites in the Indus Basin, namely the DI Khan Watershed, Ramak Watershed, Chakar Lehri Watershed, and Manchar Lake and Watershed (Activity 1.2.1). Green infrastructure interventions such as storage ponds, embankments, and gabion bunds will be developed to complement the EbA interventions (under Output 1.1) to create new water diversion and storage capacities in the Indus Basin to enhance existing ecosystems' capacities to regulate water and reduce flooding and drought risk.

55. Output 1.3: Strengthened community-based natural resource management to support water supply and flood attenuation services provided by EbA interventions implemented in floodplains and watersheds will be achieved by: i) strengthening the capacity of CBOs to adopt EbA and green infrastructure interventions and undertake climate-resilient community-based natural resource management (Activity 1.3.1); and ii) strengthening communities'



knowledge and awareness of climate change impacts and the benefits of the project's EbA and green infrastructure interventions (Activity 1.3.2).

56. Outputs 1.1, 1.2 and 1.3 contribute directly to achieving Outcome 1 described above.
57. Output 2.1: Evidence base to support the adoption of EbA and green infrastructure interventions by the Government of Pakistan will be achieved by conducting economic valuations of the project's EbA and green infrastructure interventions (under Outputs 1.1 and 1.2) to demonstrate their cost-effectiveness and efficiency in reducing the impacts of climate change-induced floods and droughts on vulnerable communities and ecosystems in Pakistan (Activity 2.1.1). This evidence-base will then be used to inform the development and dissemination of an evidence report to national and provincial government for implementing EbA and green infrastructure interventions in response to flooding and droughts in Pakistan (Activity 2.1.2).
58. Output 2.2: Updated procedures for implementing EbA and green infrastructure in Pakistan will be achieved by using the evidence generated under Output 2.1 to develop and adopt updated procedures for Pakistan's key regulations and policies for flood and water resources management — namely the Implementation Framework for the National Water Policy, the National Adaptation Plan (NAP), and Provincial Adaptation Plans of Sindh, Khyber, and Balochistan, and Punjab provinces — on the proper execution of EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan. This will remove barriers to novel climate solutions through the promotion of integrated strategies, planning and policymaking, and lead to the creation of well documented procedures backed by a rigorous scientific base that enables the GoP to channel future investments into EbA and green infrastructure interventions instead of grey infrastructure only to respond to increasingly severe floods and droughts caused by climate change. A National Working Group established under the project will lead this process (Activity 2.2.1). The National Working Group will be chaired by the Ministry of Climate Change (MoCC) and comprised of regulators within the MoWR and its FFC, as well as the relevant Provincial Departments.
59. Output 2.3: Strengthened capacity for implementing EbA and green infrastructure interventions in the Indus Basin for flood risk and water resources management will be achieved by strengthening the capacity of national and sub-national staff, as well as community leaders/representatives (under Activity 2.3.1), to apply the updated procedures under Activity 2.2.1 and implement, operate and maintain EbA and green infrastructure interventions for flood and water resources management. This will ensure national and subnational policy makers and community leaders have sufficient capacity to effectively implement and manage EbA and green infrastructure interventions in future government-led initiatives.
60. Outputs 2.1, 2.2 and 2.3 contribute directly to achieving Outcome 2 described above.
61. Output 3.1: Pipeline of feasible climate-resilient businesses will be achieved through WWF-Pakistan leveraging its experience developing pipeline businesses for the Dutch Fund for Climate and Development (DFCD) to provide incubation services to 7 small local businesses already identified to help them access debt and equity finance from the DFCD and other investors. This will contribute to the project's efforts to enhance community resilience by providing important case studies for business models which create positive environmental impacts while creating economic resilience for vulnerable communities and business owners (Activity 3.1.1).
62. Output 3.2: Improved climate-resilient livelihoods among vulnerable target communities will be achieved by implementing community-based adaptation interventions to increase the climate resilience of the most vulnerable smallholder farmers in the project sites, including through the adoption of climate-resilient agricultural inputs (e.g., drought-resilient crop varieties), enhanced capacity and regular access to improved extension services for implementing resilient and sustainable irrigation and soil management techniques, and improved access to 20,250 m<sup>3</sup> of additional water from new water storage tanks. This will optimise on-farm water efficiency and support agricultural production under increasingly severe drought conditions.
63. Outputs 3.1, 3.2 contribute directly to achieving Outcome 3 described above.

### **Barriers to the adaptation solution**

64. Barrier 1: Lack of proof of concepts for EbA and green infrastructure as viable adaptation interventions in Pakistan.  
The GoP's current regulations and policies for flood and water resources management do not consider EbA and green infrastructure interventions and the country has limited capacity to finance the establishment of these interventions through domestic public sector financing. There is therefore little evidence of EbA and green infrastructure interventions being used as cost-effective climate change adaptation interventions that also provide

a wide variety of environmental and social benefits (e.g., GHG emissions avoidance/reduction benefits and the protection of agricultural land houses from floods and droughts). This leads to the GoP being trapped in the reactive use of grey infrastructure, which often needs to be financed through international donors and foreign aid, to assist in post-disaster situations, including for flood and drought recovery.

65. Barrier 2: EbA and green infrastructure interventions are not included in Pakistan's National Water Policy, NAP, and Provincial Adaptation Plans. There are currently no planning arrangements in the Indus Basin for dealing with increasing instances of flooding and drought brought on by climate change. Following the passage of the National Water Policy in 2018, there has been no operationalization of the policy's objective in Pakistan's four Provinces. The Implementation Framework of the National Water Policy, NAP, and Provincial Adaptation Plans for Sindh, Punjab, Balochistan, and Khyber do not consider EbA and green infrastructure and prioritize the use of grey infrastructure interventions. As a result, the country remains locked into managing floods and droughts reactively with grey infrastructure interventions, which do not optimize potential environmental and social benefits, and are financially unsustainable because of their high capital and operational costs and low adaptive capacity over the long term. To effectively reduce climate change risk under future scenarios, the Government of Pakistan must formulate integrated water management plans which combine grey infrastructure solutions with improved freshwater ecosystem management to maximize risk reduction benefits for communities and conserve the Indus Basin so critical to Pakistan's overall productivity.
66. Barrier 3: Inadequate technical capacity across government and communities for implementing EbA and green infrastructure interventions in Pakistan. Government staff in the MoWR and its Executive Department the FFC, the MoCC, relevant Provincial Departments such as the Provincial Departments of Irrigation, Forestry and Agriculture and Provincial Disaster Management Authority (PDMA) do not have sufficient technical and institutional capacity to implement, monitor, operate and maintain EbA and green infrastructure interventions. These capacity constraints also extend to communities who are often involved in the operations and maintenance of infrastructure initiatives through the relevant provincial governments. Because of these limitations, there is a limited knowledge and understanding of the benefits of EbA and green infrastructure for flood and water resources management and how to shift away from the current paradigm of using grey infrastructure reactively to address climate change impacts such as floods and droughts.
67. Barrier 4: Limited access to finance among the most vulnerable communities and micro-, small- and medium-enterprises (MSMEs) for climate-resilient, sustainable businesses. There are few institutions and resources available in Pakistan to incentivise and assist the development of enterprises and bankable projects which help enhance ecosystem functions and contribute to Pakistan's economic development. Sustainable businesses currently need to overcome challenging regulatory requirements and processes with limited access to resources and technical support. While there is strong interest among development banks and lending institutions to invest in bankable projects, they are often unwilling to provide the necessary upfront financing to support earlier stage business development needs. There have been past efforts to try and promote community based sustainable enterprise in the Indus Basin, but these efforts are challenged to design the necessary financial instruments to package these businesses to help reach a scale sufficient to attract development banks or institutional investors. Assistance projects have also typically focused on market assessments and business identification efforts and less on the actual technical assistance, incubation services, and access to finance.
68. Barrier 5: Current land use practices and livelihoods do not consider climate risk. Communities in the Indus Basin currently rely on traditional land use practices to sustain their livelihoods, including farming and cattle raising, and often fail to account for the changing water dynamics with increased instances of flooding and drought brought on by climate change. These traditional practices have often relied on the conversion of ecosystems or the extraction of natural resources to support agrarian livelihoods. Communities in the Indus Basin are often unaware of the climate change impacts (e.g., increasingly severe floods and droughts) they will likely face in the future and opportunities for reducing these impacts through improved ecosystem management and stewardship. Communities also often lack the extension services and support needed to successfully adopt alternative livelihood practices, such as drought resistant crop cultivation and do not yet consider the benefits of these alternative practices as means to reduce household and community vulnerability to climate change.

#### Assumptions

69. Key assumptions are listed below, with more detailed notes and assumptions presented as required in Section E: Logical Framework.
- Communities are committed and have sufficient incentives to reduce their increasing vulnerability to threats from flooding and drought to engage with and sustain project activities.

- The Government of Pakistan maintains its commitment to mainstream EbA and green infrastructure solutions to climate change within its national climate change strategy.
- Climate change projections remain stable and/or predictable and climate change impacts are adequately addressed by interventions of this project.

#### **Market failure and absence of financing in respect to CSA**

70. Regarding Output 3.2, 84% of the total investment of US\$1,369,605 for the output is directed at the provision of TA and training which is in the scope of grant financing. A detailed explanation on the need for grant funding for the remaining US\$222,600 (related to the provision of CSA inputs) of the total investment for Output 3.2 can be found below.

#### **Crops and market entry**

71. Smallholder farmers in Pakistan cultivate a diverse range of crops that vary depending on the region and climate. Commonly grown crops include wheat, rice, cotton, sugarcane, maize, and vegetables such as tomatoes, onions, and potatoes<sup>90</sup>. The smallholder farmers targeted under the project primarily grow crops such as wheat, rice and vegetables primarily for subsistence and household use. In the years where there is a surplus yield, this surplus is sold in the open local markets, however, this is not representative of a bankable income stream because in some years meeting subsistence needs is challenging. Additionally, due to limited access to resources such as transportation and storage facilities, many smallholder farmers in Pakistan face challenges in effectively marketing their produce and often receive low prices for their crops<sup>91</sup>. As a result, their ability to engage in commercial agriculture is limited and producing primarily for subsistence and household consumption to support household food security.

#### **Financial challenges for small holders**

72. In Pakistan, banks do not provide loans to smallholders for climate-smart agriculture related interventions to demonstrate or pilot on the ground. Traditional loaning facilities primarily focus on financial products that cover procurement of equipment and farm machinery such as tractors and harvesters. Smallholders struggle to avail these traditional financial products due to pledging requirements in the form of land, which often times is estimated to be less than half of its existing market value. Financial literacy is also a challenge that smallholder farmers face, as filling loaning applications is a task that requires significant understanding of financial jargon and being able to demonstrate positive cashflows.

73. According to an analysis conducted by FAO of nine countries, including countries from South Asia, limited financial literacy, collateral, credit history, and few alternative sources of income are common obstacles faced by smallholders when attempting to secure financing for improving productivity and adopting sustainable farming practices<sup>92</sup>. A farm level analysis that studies the demand for credit by smallholder farmers in Sindh, Pakistan found that small-scale farmers have low access to agricultural credit as compared to landlord farmers due to lack of collateral, low-income level and their less landholding size<sup>93</sup>. GCF FP 108 states that “some 63–85 percent of farmers are smallholders, predominantly tenant farmers. Around 70 percent of these individuals are women, and about 43 percent are managing landholdings of less than one hectare”.

74. **Limited Access to Credit and Finance:** Smallholder farmers in Pakistan often face difficulties in accessing credit and finance to invest in climate-smart agriculture practices. They may not have collateral to secure loans or may not meet the requirements of lending institutions. Even when credit is available, high interest rates and short repayment periods make it difficult for farmers to invest in long-term projects.

#### **Additional Financial Challenges for CSA**

75. Smallholders do not have sufficient funds to adopt new climate resilient agriculture practices. These smallholders already struggle to cover their daily expenses and lack the necessary capital to purchase relevant inputs for planting and harvesting climate resilient crops. There are several studies that highlight the lack of collateral as a significant challenge for farmers in accessing loans for climate-smart agriculture. According to a report by FAO, smallholder farmers encounter considerable challenges when seeking financial support for sustainable farming practices due to their insufficient credit history and collateral. The report highlighted that lack of access to finance can limit the

<sup>90</sup> [Climate-Smart Agriculture in Pakistan](#)

<sup>91</sup> [Smallholder access to markets in Pakistan](#)

<sup>92</sup> [The economic lives of smallholder farmers: An analysis based on household data from nine countries \(FAO, 2015\)](#)

<sup>93</sup> [Determinants of demand for credit by smallholder farmers: a farm level analysis based on survey in Sindh, Pakistan](#)

adoption of climate-smart agriculture practices, which can in turn limit the ability of smallholders to adapt to the impact of climate change<sup>94</sup>.

76. For smallholders to adopt climate-smart agriculture practices, a strong business case that demonstrates cost savings and profitability at farm level needs to be demonstrated. For this, pilot projects need to be funded by grant financing to raise awareness around the financial benefits of climate-smart agriculture, allowing farmers to see first-hand the positive impacts. A study conducted by the International Fund for Agricultural Development (IFAD) found that grants are the predominant financial instrument used for small-scale agriculture climate finance, providing 50% of finance committed. This is because small-scale producers face significant obstacles in accessing loans due to a lack of collateral and limited land tenure rights. In addition, grants for capacity building allow to bridge the knowledge gap for the adoption of climate smart agricultural practices by small-scale producers and can contribute as a de-risking or first-loss tranches to blended finance instruments to catalyse private investments<sup>95</sup>. Thus, grant-funded pilot projects allow for de-risking the adoption of climate-smart agriculture practices and provides the technical support and handholding for farmers to transitions towards this new approach to farming.
77. Lack of support from financial institutions are a major concern for smallholder farmers who need access to credit and finance to invest in climate-smart agriculture practices. Without affordable loans or other financial incentives, farmers may not have the means to purchase the inputs and technologies required for climate-smart agriculture, such as drought-resistant seeds and efficient irrigation systems. It is important for financial institutions to recognize the potential of climate-smart agriculture practices and offer financial products and services that incentivize and support smallholder farmers to adopt these practices. This can include offering preferential loans, grants, or other financial support to farmers who implement climate-smart agriculture practices. By doing so, financial institutions can contribute to building a more climate-resilient and sustainable agricultural sector in Pakistan.
78. In addition, financial institutions may not fully understand the benefits of climate-smart agriculture practices, or the risks associated with climate change. They may not see these practices as profitable or may view them as too risky, particularly in the short term. This lack of understanding can result in a lack of investment in climate-smart agriculture practices, further hindering their adoption among smallholder farmers in Pakistan. There is a need for more research and data on the costs and benefits of climate-smart agriculture practices. In sum, smallholder farmers in Pakistan face the following financial challenges to climate-smart agriculture:
- 1. High Upfront Costs:** The upfront costs of inputs and technologies required for climate-smart agriculture, such as drought-resistant seeds, efficient irrigation systems, and weather monitoring tools, can be prohibitively expensive for smallholder farmers in Pakistan. These costs can make it difficult for farmers to invest in climate-smart agriculture practices, especially when they are already struggling to make ends meet.
  - 2. Lack of Market Opportunities:** Even if smallholder farmers in Pakistan invest in climate-smart agriculture practices, they may struggle to find markets for their products and services. Climate-smart agriculture products, such as organic and sustainable produce, can be niche and may not be in high demand. Farmers may also lack the knowledge and skills to access and navigate markets, limiting their ability to make a profit.
79. There are several technical challenges that inhibit smallholder farmers in Pakistan's agricultural sector from adopting and implementing a shift toward more climate-resilient and sustainable agricultural practices. These conditions are highlighted in GCF FP 108 (*Transforming the Indus Basin with Climate-resilient Agriculture and Water Management*), which confirms that smallholders are most vulnerable to the impacts of climate change due to their lack of assets to buffer shocks and their limited access to the information, new technologies, finance and government services needed to undertake adaptive actions.
80. Specifically, smallholder farmers in Pakistan face the following challenges to adopt climate-smart agriculture:
- 1. Limited Technical Knowledge and Skills:** Many smallholder farmers in Pakistan lack the technical knowledge and skills required to implement climate-smart agriculture practices. They may not know how to select and plant drought-resistant crops, how to use efficient irrigation systems, or how to use weather monitoring tools. This lack of technical knowledge and skills limits their ability to implement effective climate-smart agriculture practices.
  - 2. Inadequate Access to Information and Extension Services:** Smallholder farmers in Pakistan may not have access to information and extension services on climate-smart agriculture practices and technologies. This limits their ability to learn about new practices and technologies that could help them adapt to climate change.

<sup>94</sup> [The State of Food and Agriculture: Climate Change, Agriculture And Food Security \(FAO, 2016\)](#)

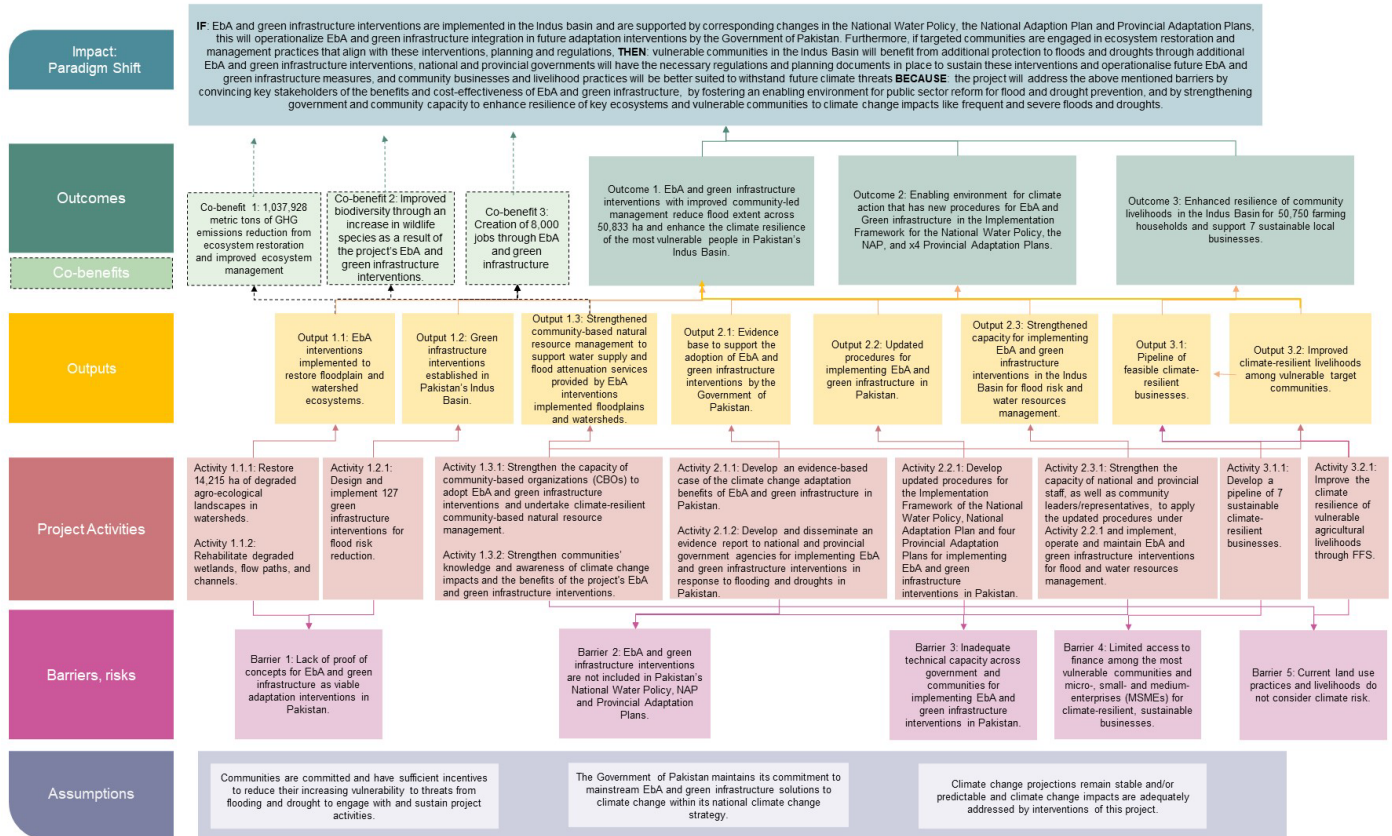
<sup>95</sup> [Examining the Climate Finance Gap for Small-Scale Agriculture \(IFAD, 2020\)](#)

Extension services that are available may not be accessible to all farmers or may not be tailored to the specific needs of smallholder farmers.

3. **Access to Inputs:** Small holders do not have access to key inputs that they could deploy on their lands to target the impacts of increasing heat and rainfall extremes on crop productivity in existing farmlands, including micro-irrigation, rainwater harvesting and climate resilient seeds.
81. Therefore, shifting agricultural practices among smallholder farmers in Pakistan that better equips these vulnerable populations to cope with the challenges of climate change requires:
    1. **Building the capacity of farmers by providing training and technical assistance** on climate-smart agriculture practices. This helps farmers improve their technical knowledge and skills and increases their openness to and confidence in adopting new practices.
    2. **Demonstrating climate-smart agriculture practices** through on-farm trials and demonstrations. On-farm demonstrations move climate smart agriculture from knowledge into practice. The live setting facilitates adoption by small holder farmers because it shows how the practices are operationalized and produced in the same setting in which the small holder will be applying the practices. In this way, on-farm demonstrations “derisk” adoption by the farmer as they can see the concrete benefits of these practices firsthand and encourage them to adopt these practices on their own farms.
    3. **Linking farmers to bio-inputs, such as drought-resistant seeds, bio-fertilizers, and bio-pesticides.** This helps farmers access the inputs they need to implement climate-smart agriculture practices.
  82. Under the proposed project, a total of US\$1,528,910 will be channeled towards improving climate-resilient livelihoods among vulnerable communities in Pakistan (Output 3.2). Regarding points 1 and 2 above, promoting climate-smart agriculture practices among smallholder farmers, building the capacity of farmers by providing training and technical assistance on climate-smart agriculture practices, and demonstrating climate-smart agriculture practices through on-farm trials and demonstrations are interventions frequently mainstreamed across many donor-funded and development projects to address the technical and financial challenges face to adopt these climate-resilient practices on their own and without grant support.
  83. These traditional grant funded activities total US\$1,306,310, or 85% of the activity total, distributed to staff, consultant, travel, workshop communications and convening costs as detailed in Annex 4.
  84. GCF grant funds will be used to directly address the technical challenges faced by smallholder farmers in the project’s sites in Pakistan’s Indus Basin by strengthening the capacity of small-scale farmers and people dependent on agriculture on climate-resilient agriculture and sustainable practices through a Farmer Field School (FFS) approach whereby training sessions are conducted over an entire crop season. This will involve: i) the development of province-specific curriculum, training modules, and workplans for Climate-Smart FFSs by WWF-Pakistan, supported by Technical Assistance (TA) provided by international and local experts; ii) providing training through the FFS on improved climate resilience of soil management practices and introducing on-farm best management practices for improved soil conservation and productivity; and iii) mobilize women participation in the implementation and adoption of project activities under Output 3.2, as specified in Annex 8: Gender Assessment and Action Plan. Specifically, WWF-Pakistan will work with relevant local government departments to provide training and technical capacity building of local women to adopt gender-responsive climate-resilient/alternative livelihoods under Output 3.2 that will enhance rural income generation opportunities, agricultural productivity, livelihood security, and sustainable rural development.
  85. Grant funding is required to enable the implementation of these activities focused on delivering technical assistance and extension services to the most vulnerable agricultural communities and smallholder farmers in the project’s sites.
  86. The remaining US\$222,600 (15% of the total investment) will be used to: i) improve the water efficiency of farming through improved farm management and irrigation systems by providing farmers the required components and inputs — e.g., drip irrigation, sub surface irrigation systems, and tunnel farming and greenhouses; ii) introduce drought-resistant crop varieties, including the provision of seed varieties to participating farmers; and iii) provide 15 water storage tanks on communal land for public access for vulnerable agricultural communities across the three provinces (Sindh, Balochistan and Khyber Pakhtunkhwa).

**Overcoming Barriers to Achieve Impact**

87. The project will achieve these benefits through three interconnected components, described in detail in Section B.3. Table 4 articulates which project activities and sub-activities have been designed to address the described barriers and achieve the Theory of Change presented in Figure 17 below.



**Figure 17.** Theory of Change diagram.

**Overcoming Barriers to Achieve Impact**

88. To address Barrier 1, the project will invest US\$64 million in implementing EbA and green infrastructure interventions on the ground in four sites in the Indus Basin to reduce the impacts of increasingly severe floods and droughts on vulnerable communities and ecosystems. This investment will accelerate climate innovation in Pakistan by establishing proofs of concept for EbA and green infrastructure interventions that provide evidence of their cost-effectiveness and efficiency, flood and drought risk reduction benefits, and sustainability. Overall, these interventions will enhance the resilience of a total of 7,711,697 people (687,337 direct beneficiaries and 7,024,361 indirect beneficiaries) to floods and droughts, while simultaneously delivering the co-benefits of reduced/avoided GHG emissions, improved biodiversity through safeguarding habitats for a variety of species, particularly migratory birds, and creating job opportunities for 8,000 people through local community involvement on a permanent, part-time or temporary (e.g., daily) basis in the implementation, operations and maintenance of the EbA and green infrastructure interventions.

89. Barrier 2 will be addressed by expanding Pakistan's regulations and policies for flood and water resources management from relying only on grey infrastructure to address the threats of floods and droughts to prioritising EbA and green infrastructure interventions. This will be achieved through a step-wise approach. An economic valuation of the project's EbA and green infrastructure interventions will be undertaken which will include monitoring and analysis of these interventions' cost-effectiveness and efficiency in reducing the impacts of climate change-induced floods and droughts on vulnerable communities and ecosystems in Pakistan, and developing an evidence report of their adaptation benefits to initiate public sector reform in flood and water resources management at the national and provincial levels in Pakistan. Using this evidence, a National Working Group will be established under the project, chaired by the MoCC and comprised of regulators within the MoWR (including FFC) and the relevant Provincial Departments. This working group will lead the development and adoption of updated procedures for Pakistan's key regulations and policies for flood and water resources management — namely the Implementation

Framework for the National Water Policy, the NAP, and the Provincial Adaptation Plans of Sindh, Khyber, and Balochistan, and Punjab provinces — on the proper execution of EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan.

90. The project will address Barrier 3 by securing the uptake and application of these updated procedures by national and provincial government involved in flood and water resources management in Pakistan. This will be achieved by training project planners and technical staff within the MoCC, MoWR (including FFC), and Provincial Departments of Irrigation, Agriculture, and Forestry on the requirements of the updated procedures and how to apply these procedures in the design and implementation of EbA and green infrastructure interventions in future country-driven projects. Technical staff and community representatives will also be trained on effective and efficient procedures for implementing, monitoring, operating and maintaining these interventions to enable them to maximise their flood and drought risk reduction potential over the long term.
91. To address Barrier 4, WWF-Pakistan will leverage its experience developing pipeline businesses for the Dutch Fund for Climate and Development (DFCD) to will provide incubation services to 7 small local businesses already identified to help them access debt and equity finance from the DFCD and other investors. Supporting sustainable enterprises provides a signal that business models can contribute to ecosystem and community resilience and generate revenues. Assistance to these businesses is intended to incentivize additional sustainable business development and help launch the creation of an investment market in sustainable enterprises.
92. To address Barrier 5, the project will support the adoption of EbA and green infrastructure interventions and implementation of climate-resilient land use practices at the basin level. This will be achieved by establishing operational agreements between 8 CBOs and the Provincial Departments of Forestry for the provinces of Punjab, Sindh, Khyber Pakhtunkhwa and Balochistan which meet the requirements of the updated procedures for the Implementation Framework of the National Water Policy, the NAP, and the four Provincial Adaptation Plans, as well as assign specific operation, maintenance, and stewardship roles among communities and Provincial Departments of Forestry for implementing and maintaining the EbA and green infrastructure interventions. Technical assistance will also be provided to CBOs so that they are adequately equipped to undertake sustainable ecosystem management practices, including maintenance and monitoring of wetlands, floodplains, flood bypasses and washlands, watersheds and community plantations. Operating agreements will also be established between farmer groups and the Provincial Departments of Agriculture in the same four provinces which define extension services for the use of improved irrigation systems, alternance crop varieties, and farm management practices to encourage participation and sustainability.

**Table 4.** Project outputs, activities and sub-activities mapped against the barriers they are designed to address.<sup>96</sup>

Barrier	Output	Project activity	Project sub-activity
Barrier 1: Lack of proof of concepts for EbA and green infrastructure as viable adaptation interventions in Pakistan.	Output 1.1: EbA interventions implemented to restore floodplain and watershed ecosystems.	Activity 1.1.1: Restore 14,215 ha of degraded agro-ecological landscapes in watersheds.	Sub-activity 1.1.1.1: Restore 14,215 ha of degraded riverine ecosystems in D.I. Khan.
		Activity 1.1.2: Rehabilitate degraded wetlands, flow paths, and channels.	Sub-Activity 1.1.2.1: Excavate 264 m of flow paths in Badri Village, Ramak, to restore the natural hydrology of connected wetlands. Sub-Activity 1.1.2.2: De-silt the 2 ha Badri Pond in the Ramak wetlands to enhance its water-holding capacity. Sub-Activity 1.1.2.3: Enhance and reinforce 410 m of embankments in Badri Village to reduce erosion. Sub-Activity 1.1.2.4: Excavate 4,000 m of flow paths in Paniala Village to restore natural hydrology of Karez Systems (surface and subsurface natural channels).

<sup>96</sup> Further details of interventions are provided in Section B.3 of the Funding Proposal and Section 11.2 of Annex 2.

	<p>Output 1.2: Green infrastructure interventions established in Pakistan's Indus Basin.</p>	<p>Activity 1.2.1: Design and implement 127 green infrastructure interventions for flood risk reduction.</p>	<p>Sub-Activity 1.1.2.5: Excavate 30,000 m of flow paths in the existing water channels of Manchar Lake to restore the natural hydrology of the 25,000 ha Manchar Wetland.</p> <p>Sub-Activity 1.2.1.1: Design the green infrastructure measures.</p> <p>Sub-Activity 1.2.1.2: Build 9 flood protection embankments.</p> <p>Sub-Activity 1.2.1.3: Build 7 flood dispersal embankments.</p> <p>Sub-Activity 1.2.1.4: Build 45 gabion bunds.</p> <p>Sub-Activity 1.2.1.5: Build 42 small retention areas.</p> <p>Sub-Activity 1.2.1.6: Build 9 large retention areas.</p> <p>Sub-Activity 1.2.1.7: Build 15 recharge basins.</p>
<p>Barrier 2: EbA and green infrastructure interventions are not included in Pakistan's National Water Policy, NAP, and Provincial Adaptation Plans.</p>	<p>Output 2.1: Evidence base to support the adoption of EbA and green infrastructure interventions by the Government of Pakistan.</p>	<p>Activity 2.1.1: Develop an evidence-based case of the climate change adaptation benefits of EbA and green infrastructure in Pakistan.</p> <p>Activity 2.1.2: Develop and disseminate an evidence report to national and provincial government agencies for implementing EbA and green infrastructure interventions in response to flooding and droughts in Pakistan.</p>	<p>Sub-Activity 2.1.1.1: Prepare baselines and indicators for the biophysical benefits of EbA and green infrastructure on ecosystems and their flood attenuation and water resource-related services.</p> <p>Sub-Activity 2.1.1.2: Monitor the biophysical benefits of EbA and green infrastructure on ecosystems and their flood attenuation and water resource-related services using the baselines and indicators prepared under Sub-activity 2.1.1.1.</p> <p>Sub-Activity 2.1.1.3: Conduct an economic valuation of the benefits of EbA and green infrastructure on ecosystems and their flood attenuation and water resource-related services.</p> <p>Sub-Activity 2.1.1.4: Identify additional opportunities and sites at the national level across Pakistan for scaling up and replicating the project's EbA and green infrastructure interventions for flood risk and water resource management.</p> <p>Sub-Activity 2.1.1.5: Collate and store the data and information generated under 2.1.1.1–2.1.1.4.</p> <p>Sub-activity 2.1.2.1: Prepare an evidence report on the use and benefits of EbA and green infrastructure interventions in response to flooding and droughts in Pakistan.</p> <p>Sub-activity 2.1.2.2: Disseminate the evidence report developed under Sub-activity 2.1.2.1 to national and provincial planners and regulators involved in flood and water resources management, as well as academic and research institutions.</p>



	<p>Output 2.2: Updated procedures for implementing EbA and green infrastructure in Pakistan.</p>	<p>Activity 2.2.1: Develop updated procedures for the Implementation Framework of the National Water Policy, National Adaptation Plan and four Provincial Adaptation Plans for implementing EbA and green infrastructure interventions in Pakistan.</p>	<p>Sub-Activity 2.2.1.1: Establish a National Working Group to develop and adopt updated procedures for using EbA and green infrastructure interventions in flood and water resources management in Pakistan.</p> <p>Sub-Activity 2.2.1.2: Review the Implementation Framework of the National Water Policy, National Adaptation Plan and four Provincial Adaptation Plans for the four provinces of Khyber Pakhtunkhwa, Punjab, Balochistan and Sindh to identify entry points for EbA and green infrastructure as cost-effective adaptation interventions for addressing floods and droughts.</p> <p>Sub-Activity 2.2.1.3: Draft updated procedures for the Implementation Framework of the National Water Policy, National Adaptation Plan, and four Provincial Adaptation Plans on the proper execution of EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan.</p> <p>Sub-Activity 2.2.1.4: Validate the updated procedures within the National Working Group for adoption into the Implementation Framework of the National Water Policy, National Adaptation Plan, and four Provincial Adaptation Plans.</p>
<p>Barrier 3: Inadequate technical capacity across government and communities for implementing EbA and green infrastructure interventions in Pakistan.</p>	<p>Output 2.3: Strengthened capacity for implementing EbA and green infrastructure interventions in the Indus Basin for flood risk and water resources management.</p>	<p>Activity 2.3.1: Strengthen the capacity of national and provincial staff, as well as community leaders/representatives, to apply the updated procedures under Activity 2.2.1 and implement, operate and maintain EbA and green infrastructure interventions for flood and water resources management.</p>	<p>Sub-Activity 2.3.1.1: Train and raise awareness of national and sub-national policymakers and planners on the contents and application of the updated procedures developed under Activity 2.2.1.</p> <p>Sub-Activity 2.3.1.2: Train national and sub-national technical staff on the implementation, monitoring, operations, and maintenance of EbA and green infrastructure interventions.</p> <p>Sub-Activity 2.3.1.3: Train local community leaders/representatives on EbA and green infrastructure interventions and their benefits, as well as on the implementation, monitoring, operations, and maintenance of these interventions.</p>
<p>Barrier 4: Limited access to finance among the most vulnerable communities and micro-, small- and medium- enterprises (MSMEs) for climate-resilient, sustainable businesses.</p>	<p>Output 3.1: Pipeline of feasible climate-resilient businesses.</p>	<p>Activity 3.1.1: Develop a pipeline of 7 sustainable climate-resilient businesses.</p>	<p>Sub-Activity 3.1.1.1: Build on the initial study completed by WWF-Pakistan identifying bankable project opportunities in the Indus Basin in the agriculture, forestry, and water and sanitation sectors.</p> <p>Sub-Activity 3.1.1.2: Formulate technical assistance and business development plans for shortlisted climate-resilient DFCD businesses.</p> <p>Sub-Activity 3.1.1.3: Assist Bankable enterprises with financial close within the DFCD funding window (loaning application, investment pitch preparation, etc.).</p>

Barrier 5: Current land use practices and livelihoods do not consider climate risk.	Output 1.3: Strengthened community-based natural resource management to support water supply and flood attenuation services provided by EbA interventions implemented in floodplains and watersheds.	Activity 1.3.1: Strengthen the capacity of CBOs to adopt EbA and green infrastructure interventions and undertake climate-resilient community-based natural resource management.	<p>Sub-Activity 1.3.1.1: Strengthen CBOs to adopt EbA and green infrastructure interventions and implement community-based natural resource management.</p> <p>Sub-Activity 1.3.1.2: Organize Water User Groups (WUGs) under CBOs and build their capacity for improved water resources management.</p> <p>Sub-Activity 1.3.1.3: Establish community-based watch and ward systems under CBOs to protect the project's EbA and green infrastructure interventions from degradation.</p>
		Activity 1.3.2: Strengthen communities' knowledge and awareness of climate change impacts and the benefits of the project's EbA and green infrastructure interventions.	<p>Sub-Activity 1.3.2.1: Consult with tribal elders to support the sensitization of the project's adaptation interventions in beneficiary communities.</p> <p>Sub-Activity 1.3.2.2: Develop and implement awareness-raising campaigns for target communities to increase their knowledge and awareness of climate change impacts and the benefits of the project's EbA and green infrastructure interventions.</p>
	Output 3.2: Improved climate-resilient livelihoods among vulnerable target communities.	Activity 3.2.1: Improve the climate resilience of vulnerable agricultural livelihoods.	<p>Sub-Activity 3.2.1.1: Strengthen the capacity of small-scale farmers and people dependent on agriculture on climate-resilient agriculture and sustainable practices.</p> <p>Sub-Activity 3.2.1.2: Improve the water efficiency of farming through improved farm management and irrigation systems.</p> <p>Sub-Activity 3.2.1.3: Introduce drought-resistant crop varieties.</p> <p>Sub-Activity 3.2.1.4: Improve the climate resilience of soil management practices.</p> <p>Sub-Activity 3.2.1.5: Provide water storage tanks to vulnerable agricultural communities.</p>

**B.2 (b). Outcome mapping to GCF results areas and co-benefit categorization**

93. Project outcomes:

- Outcome 1: EbA and green infrastructure interventions with improved community-led management reduce flood risk and enhance the climate resilience of the most vulnerable people in Pakistan's Indus Basin.
- Outcome 2: Enabling environment for climate action that has new procedures for implementing EbA and green infrastructure interventions for flood and water resources management in Pakistan.
- Outcome 3: Enhanced resilience of community livelihoods in the Indus Basin.

Outcome number	GCF Mitigation Results Area (MRA 1-4)				GCF Adaptation Results Area (ARA 1-4)			
	MRA 1 Energy generation and access	MRA 2 Low-emission transport	MRA 3 Building, cities, industries, appliances	MRA 4 Forestry and land use	ARA 1 Most vulnerable people and communities	ARA 2 Health, well-being, food and water security	ARA 3 Infrastructure and built environment	ARA 4 Ecosystems and ecosystem services
Outcome 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Outcome 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outcome 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

94. Project co-benefits:

- Co-benefit 1: GHG emission reduction from ecosystem restoration and improved ecosystem management
- Co-benefit 2: Improved biodiversity through an increase in the population of migratory birds in Manchar Lake
- Co-benefit 3: New jobs created through the project's EbA and green infrastructure interventions

Co-benefit number	Co-benefit					
	Environmenta l	Social	Economic	Gender	Adaptation	Mitigation
Co-benefit 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Co-benefit 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Co-benefit 3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**B.3. Project/programme description (max. 2500 words, approximately 5 pages)**

95. The objective of the proposed project is to transform Pakistan's approach to flood and water resources management, which is underpinned by the reactive use of costly grey infrastructure interventions to address climate change impacts such as floods and droughts. Because these climate change impacts are surpassing the country's existing water infrastructure's capacity to prevent large scale economic damages and loss of human life, Pakistan will become increasingly vulnerable to climate change in the future in the absence of urgent adaptation.

96. The project will achieve transformational change in Pakistan's approach to flood and water resources management by investing US\$64 million in implementing EbA and green infrastructure interventions on the ground in four project sites in the Indus Basin, namely the DI Khan Watershed, Ramak Watershed, Chakar Lehri Watershed, and Manchar (Lake and Watershed). Specific interventions and sites were selected through detailed feasibility assessments, which included climate threat analysis and community needs assessments — conducted via stakeholder consultations and qualitative and quantitative analyses (see Annex 2: Feasibility Study). The assessments identified areas highly vulnerable to flooding and/or drought, as well as interventions with the highest demonstrable capacity to generate climate change adaptation benefits for at-risk communities.

97. EbA interventions will target highly valuable freshwater and terrestrial ecosystems in the Indus Basin that play a critical role in regulating and providing water for downstream communities, and reducing flooding and landslide risks, with critical co-benefits in conserving globally unique biodiversity and capturing GHG emissions. These interventions will include the restoration of 14,215 ha of degraded watersheds in DI Khan, restoring 34km of flow paths, as well as desilting and restoring channels in Ramak Watershed and Manchar Lake. These interventions will reduce flood impacts on people living near the intervention sites by slowing down flood waters, as well as provide increased access to water to communities during drought periods. In addition, 127 green infrastructure interventions (including recharge basins and retention areas) will be implemented at specific locations in DI Khan, Ramak, Manchar, Chakar Lehri to protect nearby communities from flooding by reducing soil erosion and river sedimentation, diverting and reducing the velocity of intense flows in the hill torrents away from nearby villages located in the floodplain, and increasing infiltration and groundwater recharge.

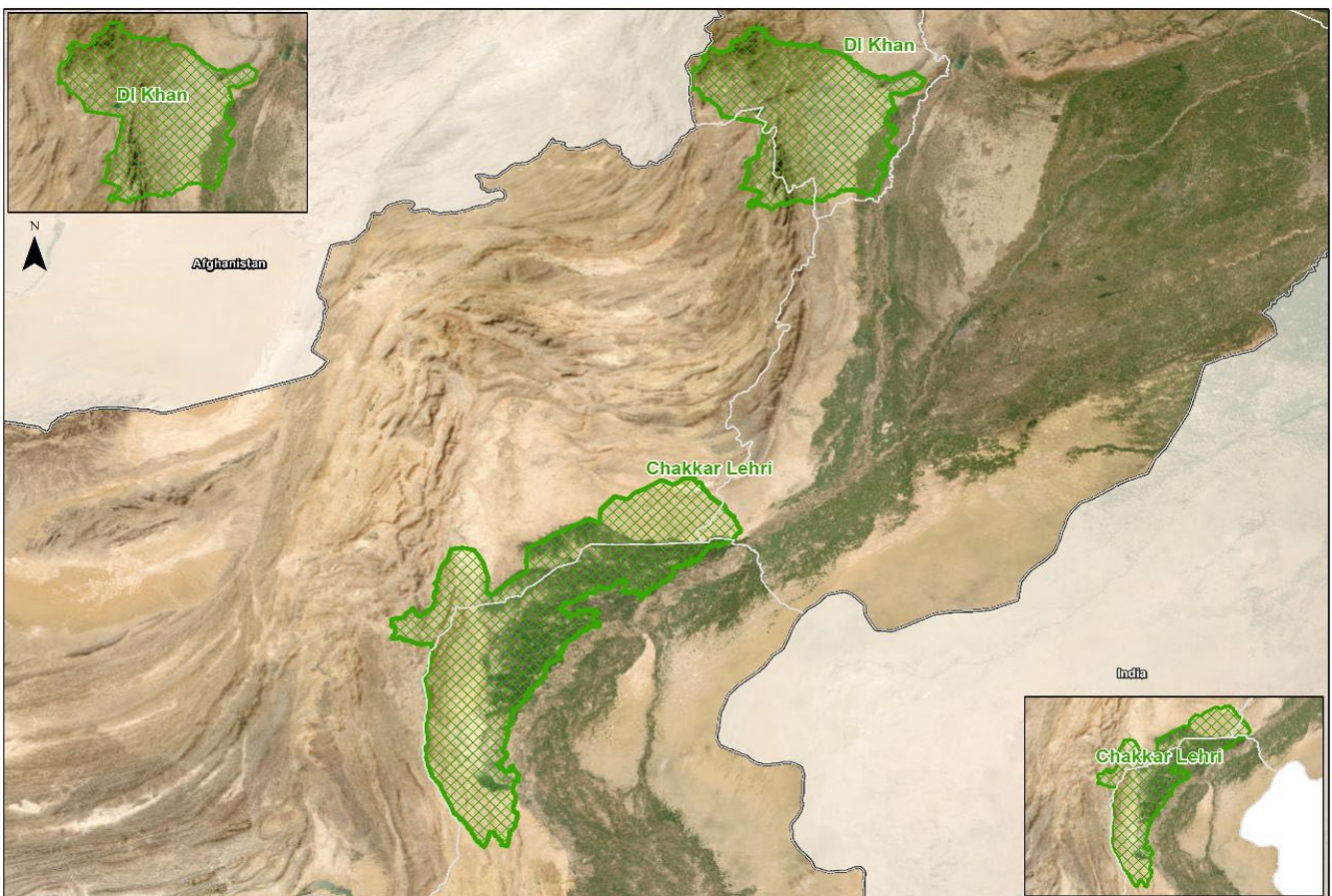
98. The investment into these EbA and green infrastructure interventions will accelerate climate innovation in Pakistan by establishing proofs of concept for EbA and green infrastructure interventions that provide evidence of their cost-effectiveness and efficiency, flood and drought risk reduction benefits, and sustainability. This evidence will be used to create an enabling environment for climate action in Pakistan that removes barriers to novel climate solutions through promoting integrated strategies, planning and policymaking. Specifically, a National Working Group will be established under the project, chaired by the MoCC and comprised of regulators within the MoWR (including FFC) and the relevant Provincial Departments. This working group will lead the development and adoption of updated procedures for implementing EbA and green infrastructure interventions to address the threats of floods and droughts in Pakistan. These procedures will enable the GoP to channel future investments into EbA and green

infrastructure interventions instead of grey infrastructure to respond to increasingly severe floods and droughts caused by climate change.

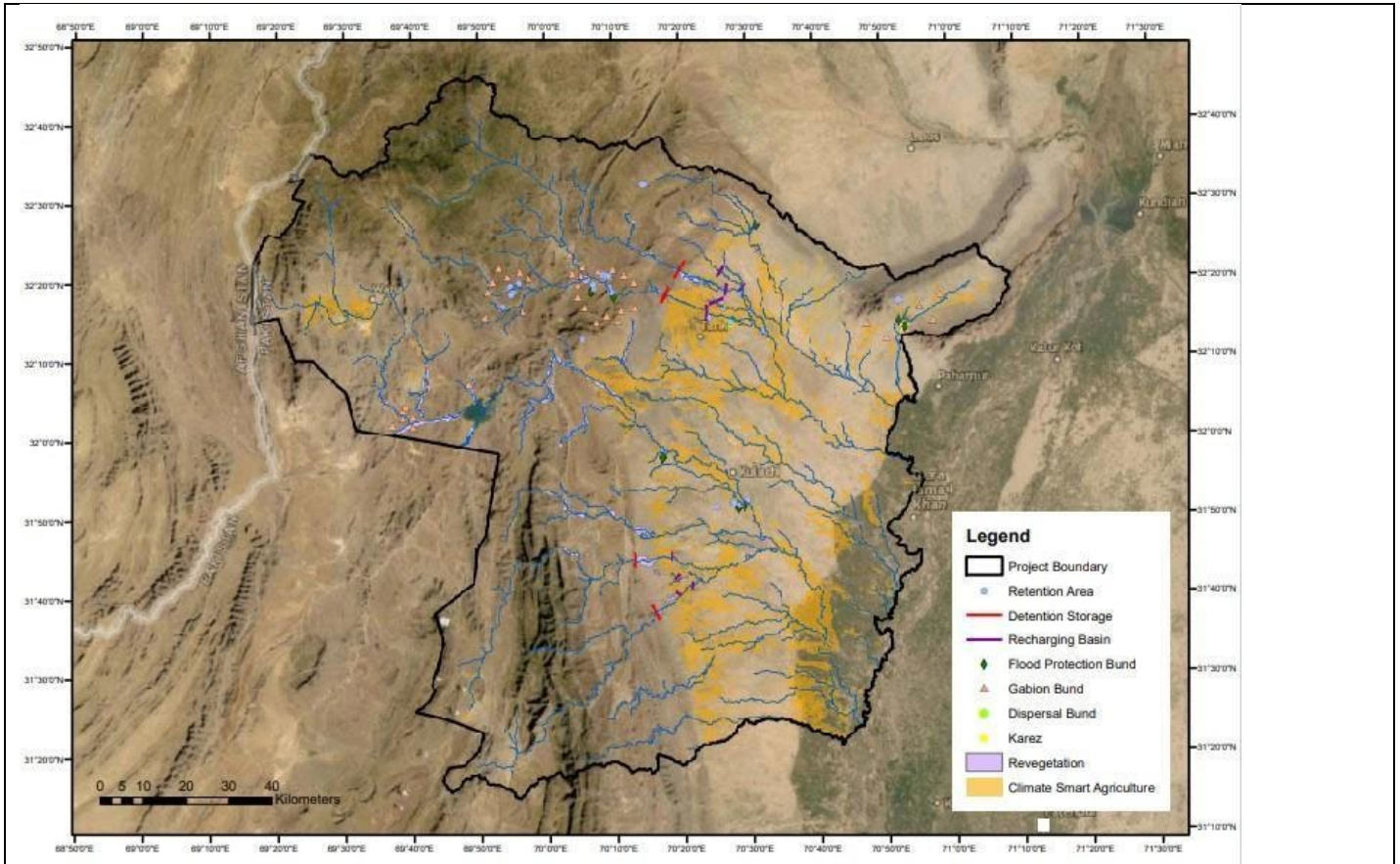
99. These project interventions align directly with the GCF’s paradigm shift objective of increased climate-resilient sustainable development and contribute to GCF Adaptation Result Area (ARA) 1.0 — Increased resilience and enhanced livelihoods of the most vulnerable people, communities, and regions; and ARA4.0 — Improved resilience of ecosystems and ecosystem services.
100. To support the uptake of the EbA and green infrastructure interventions among communities, ensure sufficient application of the updated procedures in the implementation, monitoring, operation, and maintenance of these interventions, and strengthen community resilience, the project will provide technical assistance and capacity-building to technical staff in national and provincial government and representatives from CBOs. This capacity-building will be led by WWF-Pakistan, in close collaboration with MoCC, MoWR (including FFC) and relevant provincial government departments.
101. An overview of the design of the project’s components is provided below. Specific details on the technical design of the interventions are presented in Annex 2: Feasibility Study.

**Component 1: Proofs of concept for EbA and green infrastructure interventions as efficient and effective solutions for flood and drought risk reduction in Pakistan.**

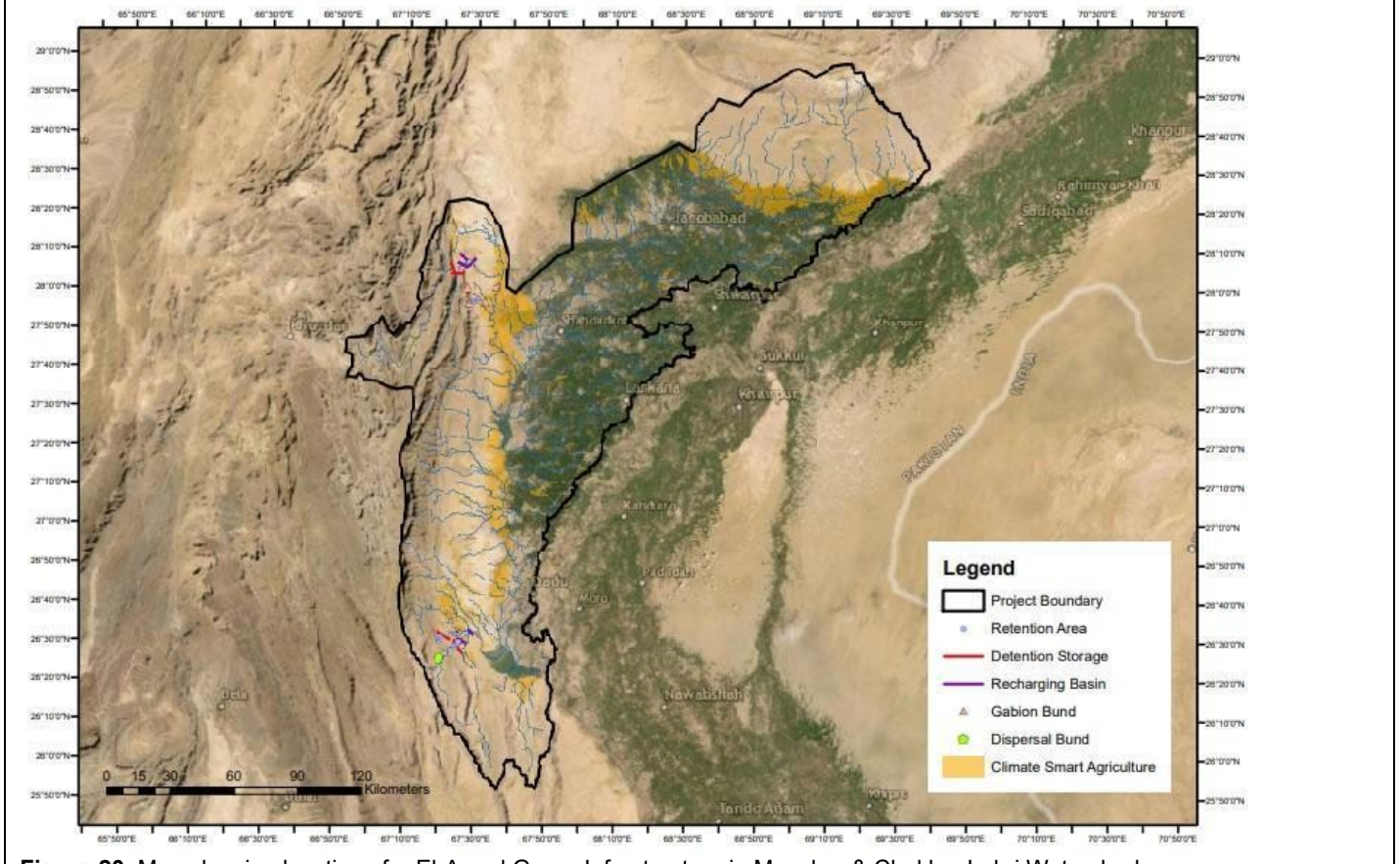
**Outcome 1. EbA and green infrastructure interventions with improved community-led management reduce flood risk and enhance the climate resilience of the most vulnerable people in Pakistan’s Indus Basin.**



**Figure 18.** Project intervention areas.



**Figure 19.** Map showing locations for EbA and Green Infrastructure interventions in DI Khan Watershed.



**Figure 20.** Map showing locations for EbA and Green Infrastructure in Manchar & Chakkar Lehri Watershed.

*Output 1.1: EbA interventions implemented to restore floodplain and watershed ecosystems.*

102. Under Output 1.1, a suite of EbA interventions will be implemented to restore degraded floodplain and watershed ecosystems in DI Khan, Ramak Watershed and Manchar Lake which have been damaged by past flood events and historically provided critical flood and drought protection to communities. These target ecosystems all fall within Pakistan's Indus Basin and include forests, riverine areas (including riverbanks), wetlands, water flow paths, and channels. The restoration of vegetation in these ecosystems will stabilize currently exposed slopes, slowing run-off and stabilizing soils. This will reduce the risk of flooding, landslides, and erosion, and concurrently enhance groundwater recharge, as well as the basal flows of rivers and springs. Revegetation of degraded ecosystems along riverbanks, springs, and lakes will also help to ensure sustainable water flows and reduce sedimentation. As a result of Output 1.1, 14,215 ha of degraded watersheds and floodplains will be brought under restoration. Furthermore, this output is expected to benefit a total of 427,300 people (310,200 direct beneficiaries and 117,100 indirect beneficiaries) through reduced adverse impacts of flooding, including damages to nearby community assets such as agricultural lands, livestock, and community infrastructure, as well as increased water availability for household use during droughts.

Activity 1.1.1: Restore 14,215 ha of degraded agro-ecological landscapes in watersheds.

103. Block and linear plantations will be established along identified hill torrents and catchment areas in D.I. Khan. This activity will be executed by WWF-Pakistan who will work with the Provincial Forest Department of Khyber Pakhtunkhwa through which planting stock will be sourced and plantation establishment will be executed. The Provincial Forest Departments will also provide the necessary excavation equipment and labour for this activity. For smaller sites and when available, saplings will be sourced from and planted by community owned and managed nurseries. Through this activity vegetation cover will be restored (natural regeneration and afforestation) across 14,215 ha of degraded riverine forests in the DI Khan regions. For natural regeneration activities of existing forested areas, replanting sites have been selected where at least 30% of tree cover is already available. Afforestation activities will include the planting of indigenous tree species which have close association with native biodiversity and adapted to local conditions. Revegetation of native species at this scale will help reduce flooding, erosion, flow velocities, and increase infiltration through enhancing soil porosity, ultimately increasing the climate resilience of surrounding communities. The GCF grant for the Provincial Forestry Departments will be managed by WWF-Pakistan's PIU in each province and the technical staff in the SIUs will coordinate with the Department staff in each province on the project planning, development and reporting.

Sub-activity 1.1.1.1: Restore 14,215 ha of degraded riverine ecosystems in D.I. Khan.

104. Under this sub-activity, 14,215 ha of degraded riverine ecosystems in D.I. Khan will be restored. The area of land that will be restored is located downstream, near existing agricultural areas. Restoring this area will reduce the impacts of flooding on communities and agriculture through improved attenuation of flood flows and provide water regulating functions to enhance agricultural productivity. Considering Pakistan's climate, restoration in DI Khan will involve the use of native trees well acclimated for the dry climate and capable to thrive on environments with limited water availability is essential. The project will largely plant Ghaf trees (*Porsopis cineraria*), Farash (*Tamarix aphylla*), Phulai (*Acacia modesta*), Ber (*Zizyphus Spp.*), Jand (*Porsopis cineraria*), Kikar (*Acacia nilotica*), and Shisham (*Dalbergia sissoo*) commonly used for revegetation in dry climates for areas such as the Indus Basin.

Activity 1.1.2: Rehabilitate degraded wetlands, flow paths, and channels.

105. Existing flow paths, channels, and wetlands in the Indus Basin are often filled with silt and debris preventing the channelling and holding of water, exacerbating peak flows (increasing flood risk), and preventing water retention (adversely impacting local water security and exacerbating the impacts of droughts). Under this activity, 34 km of flow paths/channels will be restored at the Ramak Watershed and Manchar Lake project sites. Activity 1.1.2 will be executed by WWF-Pakistan who will work with the Provincial Irrigation Departments of Khyber and Sindh who will be responsible for providing equipment and resources for restoration efforts in the area. The grant with the Provincial Irrigation Departments will be managed by WWF-Pakistan's PIU in each province and the technical staff in the SIUs will coordinate with the Department staff in each province on the project planning, development and reporting.

106. DI Khan watershed has an area of 2,763 km<sup>2</sup> and lies in the DI Khan district of Khyber Pakhtoon Khwa (KPK) province. The watershed of DI Khan generates flash floods from its main five hill torrents consisting of small perennial "nallahs"/"zams". The annual rainfall is low, sporadic and ranges between 350—400 mm. Several small streams are entering these Zams downstream of the proposed dam locations. Owing to the perennial nature of these Zams and favourable soil conditions, cultivation, and forestation in the upper reaches of the CRBC command area is a natural feature. The DI Khan and Ramak watersheds are located in Dera Ismail Khan, Pakistan's

southernmost district of KPK. The Ramak project area has been included in the same watershed delineation as the DI Khan project areas because they are influenced by some of the same streams and torrents.

107. The Manchar-Hamal watershed covers an area of 9,057 km<sup>2</sup> and lies in the Kohistan region. Farmers usually practice irrigation by harvesting stormwater by constructing small diversion dykes across the flowing streams. The Manchar Lake project area comprises two lakes, Manchar and Hamal, and is located in Qambar Shahdadt District in Sindh, Pakistan. The Manchar Lake is linked to the Hamal Lake via the Main Nara Valley Drain and receives additional water from the Kulachi River, small hill torrents from the Khirthar Mountain range and small canals from the Indus. As the main part of the watershed is connected to the watershed of the Chakkar Leri area, the delineation is the same for both project sites.

*Sub-Activity 1.1.2.1: Excavate 264 m of flow paths in Badri Village, Ramak, to restore the natural hydrology of connected wetlands.*

108. Restoring the flow paths of the Badri channel, which is currently filled with silt, debris, and other obstructions, will allow better freshwater flows via this natural channel into connected wetlands (including the Badri Pond), reducing the risk of water directly flooding community agricultural lands, assets and infrastructure. Excavation of the flow paths will include: determining proper depth to maximize water flows, reinforcing of channel embankments, and removal of debris materials from the flow paths using machinery and labour. Furthermore, the water-holding capacity of the Badri channel, which supplies the Badri Pond (Sub-activity 1.1.2.2), will be enhanced. These two features of Ramak's natural hydrology are the only sources of freshwater for agriculture and domestic use for Badri village, which consists of 300 households with an estimated population of 2,100 people. Their functioning is therefore critical, not only to flood attenuation, but also water supplies during drought periods.

*Sub-Activity 1.1.2.2: De-silt the 2 ha Badri Pond in the Ramak wetlands to enhance its water-holding capacity.*

109. The build-up of silt will lead to a reduction in water depth, an increased risk of flooding. This usually occurs when plants die, and trees lose their leaves it is also caused by run off from surrounding land as well as the decomposing of natural materials. In order to extend the life of a lake or body of water, it is necessary to periodically remove the build-up of silt from the lakebed using local labour. This sub-activity will enhance the water holding capacity of the Badri Pond by 20,000 m<sup>3</sup>. As mentioned above, the pond, together with the Badri channel, is the only freshwater source for Badri Village. The silt from the pond will be used to strengthen the embankments of the pond as described under Sub-activity 1.1.2.3.

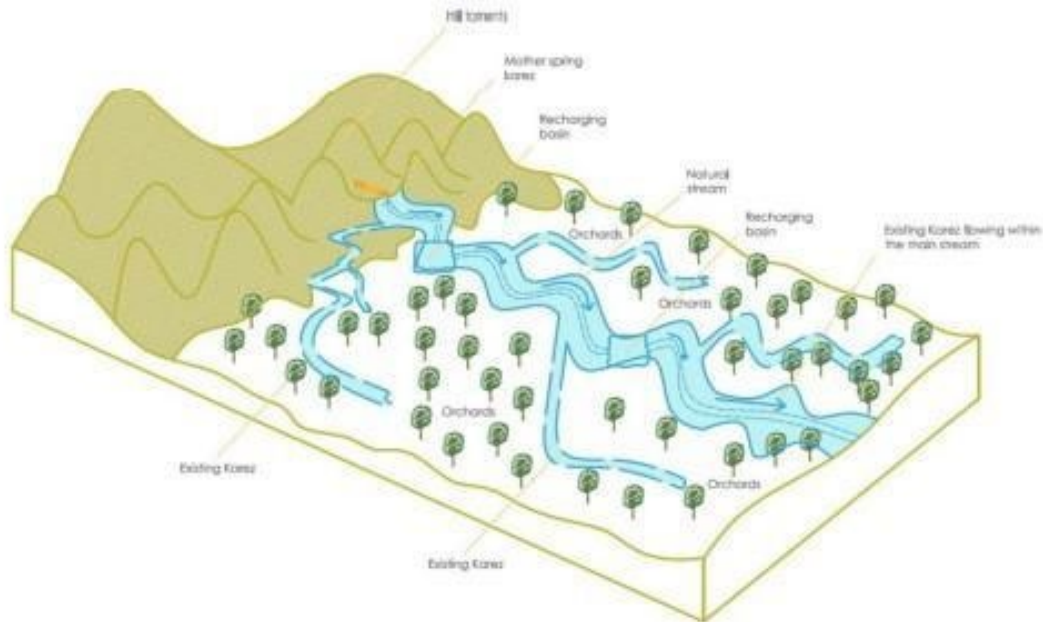
*Sub-Activity 1.1.2.3: Enhance and reinforce 410 m of embankments in Badri Village to reduce erosion.*

110. Flood embankments provide protection for peoples, livestock, and community assets such as crops against water surges. These embankments can be damaged by excessive rains and flooding. This sub-activity will improve bank stability by compacting clay soils and planting of native vegetation (such as *Tamarix Spp*, *Populus euphratica* and indigenous grasses) and stone pitching (placement of loose stone at the toe of embankments) to reduce the erosion of embankments during flooding.

*Sub-Activity 1.1.2.4: Excavate 4,000 m of flow paths in Paniala Village to restore natural hydrology of Karez Systems (surface and subsurface natural channels).*

111. Rehabilitation of Karez Systems<sup>97</sup> in the Ramak watershed will be an integral part of addressing the flood risks related to Khisor hill torrents, within which the Karez system is situated. Due to flow debris (such as silt) accumulated over years, the existing capacity of the channels is insufficient to accommodate current and future floodwaters. Consequently, they overflow, resulting in damage to nearby community infrastructure and agricultural land. The protection and rehabilitation of the Karez systems, will not only reduce the risk of flooding, but also enhance water supplies through a traditional conveyance system of waterbeds and banks, and multiple storage ponds, for agricultural and domestic use — increasing resilience to drought. Restoration, including desilting and repairs to natural flow paths of the Karez systems, will improve freshwater flows into three nearby natural ponds, which have a combined water-holding capacity of 10,000 m<sup>3</sup>. This will effectively capture water during flood events and reduce flood impacts, providing a natural flood buffer, while at the same time increasing dry season water supplies for the approximately 1,000 households (6,000–7,000 people) located in Paniala Village.

<sup>97</sup> Karez is an indigenous method of irrigation in which groundwater is tapped by a tunnel. After running for some distance, the tunnel comes out in the open and the water is supplied to the area that requires irrigation or for domestic use.



**Figure 21.** Conceptual Diagram of Karez Channels in Paniala Village, Ramak Watershed.

**Sub-Activity 1.1.2.5: Excavate 30,000 m of flow paths in the existing water channels of Manchar Lake to restore the natural hydrology of the 25,000 ha Manchar Wetland.**

112. The Indus River flows directly into the Manchar Wetland through three main river channels Aral Wah, Mor lak, and the Danistar Canal. Freshwater flows through these channels are currently obstructed due to blockage from debris and sediment, leaving local communities vulnerable to drought, and the risk of flooding of surrounding areas is increased. The freshwater flows will be restored through excavating the channels to reduce flooding of nearby communities, increase water availability, and restore natural ecosystem functioning essential to the livelihoods of local farmers and fishers. The excavation work will include desilting the channel using small machinery provided by the Provincial Irrigation Departments. Manchar Lake supports the livelihoods of approximately 10,000 households, including 2,000 Indigenous Mohana peoples.

**Output 1.2: Green infrastructure interventions established in Pakistan's Indus Basin.**

113. To complement Output 1.1's EbA interventions, green infrastructure interventions will be established to reduce the impacts of floods and droughts on people living in the Indus Basin. In this project, "green infrastructure" is considered as *'interventions which are not naturally occurring or existing in an ecosystem but are designed using natural elements and can contribute to the improved functioning and health of an ecosystem'*. Green infrastructure interventions will include the establishment of flood protection embankments, flood dispersal embankments, gabion bunds, small and large retention areas, and recharge basins.

114. These interventions are expected to benefit a total of 462,600 people (311,300 direct beneficiaries and 151,300 indirect beneficiaries) by reducing flood impacts on nearby communities and ecosystems through reducing soil erosion and river sedimentation, diverting and reducing the velocity of intense flows in the hill torrents away from nearby villages located in the floodplain, and increasing infiltration and groundwater recharge. People living near the green infrastructure interventions, particularly the retention and recharge areas, will benefit from the provision of temporary storage and infiltration of water from these interventions for use during droughts.

**Activity 1.2.1: Design and implement 127 green infrastructure interventions for flood risk reduction.**

115. The project will commission the design and implementation of green infrastructure measures by a specialized local engineering firm. WWF Pakistan will execute this activity and provide funding to the Provincial Irrigation Departments who will commission and manage the engineering services firms responsible for the design and implementation of green infrastructure measures under the oversight of WWF Pakistan. Green infrastructure interventions will include: i) 9 flood protection embankments spread across the D.I. Khan and Ramak Watersheds; ii) 7 dispersal embankments in the D.I. Khan, Ramak, and Chakar Lehri Watersheds; iii) 45 gabion bunds across the D.I. Khan, Ramak, Manchar, and Chakar Lehri Watersheds; and iv) 42 small and 9 large retention areas, and 15 recharge basins across the D.I. Khan, Manchar, and Chakar Lehri Watersheds. The type, location, quantity and



size of the green infrastructure Projects are included in Table 5 below. More details on the feasibility of the green infrastructure interventions are presented in Annex 2.

**Table 5.** Details of green infrastructure interventions to be implemented under the project for flood and drought risk management.

#	Location	Village	Quantity	Size
<b>Flood protection embankments</b>				
1	DI Khan Watershed	Jandola, Shahbaz Khel, Kulachi	6	Length: 150 m Width: 150 m Height: 10 m
2	Ramak Watershed	Paniala	3	Length: 150 m Width: 150 m Height: 10 m
<b>Total</b>			<b>9</b>	
<b>Dispersal embankments</b>				
1	DI Khan Watershed	Tank	1	Length: 150 m Width: 150 m Height: 10 m
2	Manchar Watershed	Gaji Shah	1	Length: 150 m Width: 150 m Height: 10 m
3	Chakar Lehri Watershed	New Mitho, Barija, Misar, New Shambani	5	Length: 150 m Width: 150 m Height: 10 m
<b>Total</b>			<b>7</b>	
<b>Gabion bunds</b>				
1	DI Khan Watershed	Jandola, Gomal Zam, Spalipon, Tangi Abbas Khel, Juma Gul Manrai	34	Length: 150 m Height: 6 m
2	Ramak Watershed	Tutti Khel and Abdul Khel	5	Length: 150 m Height: 6 m
3	Manchar Watershed	Wahi Pandi and Qasbo	2	Length: 150 m Height: 6 m
4	Chakar Lehri Watershed	New Mitho, Barija, Misar and New Shambani	4	Length: 150 m Height: 6 m
<b>Total</b>			<b>45</b>	
<b>Small retention areas</b>				
1	DI Khan Watershed	Tank, Kulachi, Jandola, Tangi Abbas Khel, Juma Gul Manrai	34	Length: 275 m Width: 275 m Height: 1 m
2	Manchar Watershed	Tando Rahim Khan	6	Length: 245 m Width: 245 m Height: 1 m
3	Chakar Lehri Watershed	New Mitho	2	Length: 180 m Width: 180 m Height: 1 m
<b>Total</b>			<b>42</b>	
<b>Large retention areas</b>				
1	DI Khan Watershed	Khargai, Kot Nasran, Daraban, Chaudhwan	2	Length: 874 m Width: 874 m Height: 1 m
2	Manchar Watershed	Tando Rahim Khan	2	Length: 1,000 m Width: 1,000 m Height: 1 m
3	Chakar Lehri Watershed	Barija	5	
<b>Total</b>			<b>9</b>	
<b>Recharge basins</b>				
1	DI Khan Watershed	Tank, Daraban	9	Length: 150 m Width: 14.5 m Height: 2 m
2	Manchar Watershed	Haleli Nadi, Haji Khan Shahani, Chhini	3	Length: 150 m Width: 14.5 m Height: 1 m

3	Chakar Lehri Watershed	Saifabad	3	
<b>Total</b>			<b>15</b>	

**Sub-Activity 1.2.1.1: Design the green infrastructure measures.**

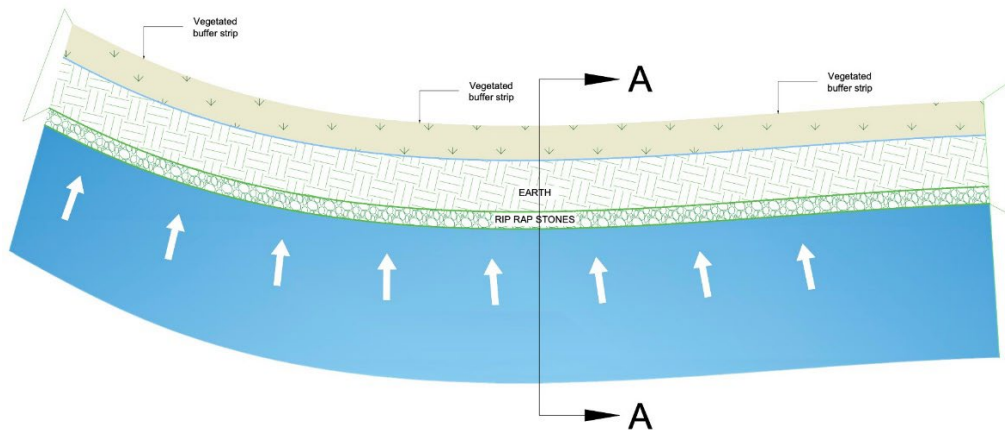
116. Under this sub-activity, the green infrastructure interventions under Sub-activities 1.2.1.2–1.2.1.7 will be designed. Preliminary assessments of the green infrastructure measures have already been completed as part of the Feasibility Study (Annex 2) to inform their design and implementation. Specifically, these assessments determined the type and cost-effectiveness of implementing green infrastructure interventions to reduce flood impacts in the Indus Basin, as well as the areas where such measures will have maximum flood and drought reduction benefits for communities. The proposed locations for these interventions are presented in Section 3 of Annex 2, along with concept drawings showing their preliminary design specifications.

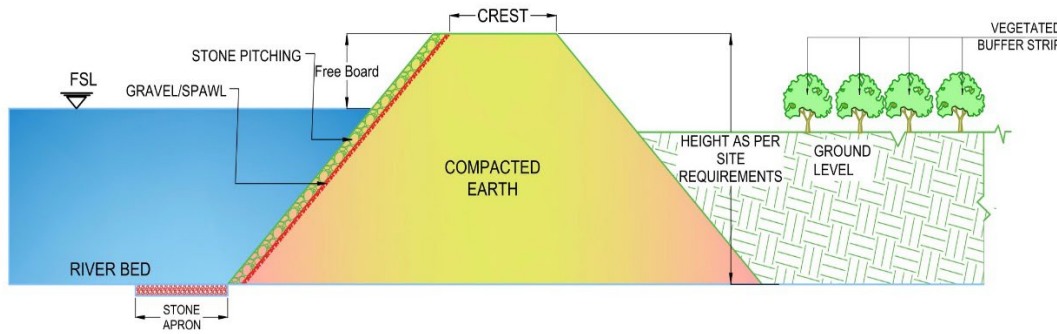
117. The design process will include: i) a site validation visit, and assessment of each proposed location; ii) the preparation of site-specific engineering designs for each proposed structure; and iii) an assessment of the site-specific costs for constructing each structure. The site-specific assessments will start in Year 1 of the project period and be completed by the end of Year 2. A certified local engineering firm will be procured to develop the detailed site-specific designs for all the green infrastructure measures under Activity 1.2.1.

**Sub-Activity 1.2.1.2: Build 9 flood protection embankments**

118. Sandbags traditionally used to retain and divert floodwaters fail to provide adequate protection for community assets and homes, particularly as flood events continue to intensify under conditions of climate change. Six (6) flood protection embankments will be built in D.I. Khan and three (3) in the Ramak Watershed using locally available materials, including clay-silt, earth, stones, and gravel (Figure 22). The embankments will retain floodwaters moving at fast velocities and control lateral erosion along riverbanks, protecting crops, property, and infrastructure from damage. Grass will be planted, and other supplementary structures established on the embankments to provide additional protection against erosion and overtopping where needed. To further reinforce the grass on the flood embankments, the riverbank slope will be armoured with stone pitching or riprap (loose stone).

**PLAN OF FLOOD PROTECTION EMBANKMENT**



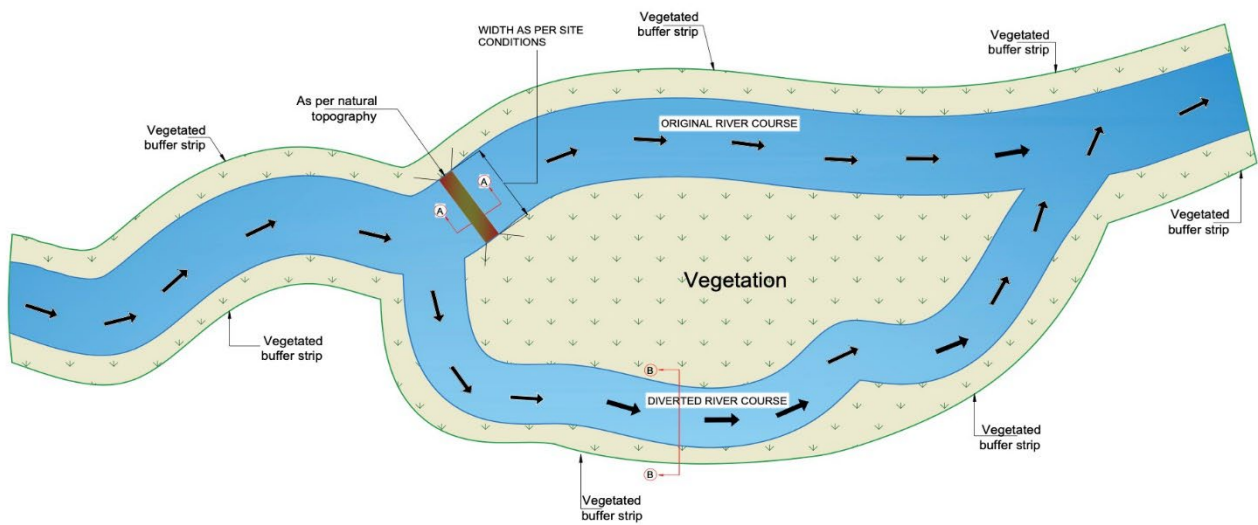


**Figure 22.** Conceptual drawing of flood protection embankments for D.I. Khan and the Ramak watershed. Top: flood protection embankment. Bottom: Cross-section view of flood protection embankment.

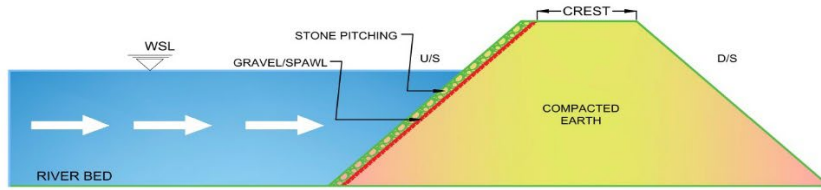
**Sub-Activity 1.2.1.3: Build 7 flood dispersal embankments**

119. Floodwater dispersal measures include earthen embankments, earth-clay bunds, levees, watercourses, water channels, and other structures that modify the natural flows of a waterway. Water dispersal or diversion consists of multiple measures that intercept clear surface water runoff upstream of an area at risk of flooding, transport it through the natural path, away from at-risk property, infrastructure or land, and discharge it safely downstream. Dispersal embankments will be built with local materials such as earth, clayey-silt, sandy loam stones, and gravel in the catchments of D.I. Khan and Manchar — 1 flood dispersal embankment will be built in each catchment (Figure 23). The embankments will be armoured with stone, placed in the form of riprap or stone pitching. The crest of the flood dispersal embankments will be further strengthened with murrum (gravel) on the overflow sections to protect them against extreme flood flows, which are more likely to occur under future climate scenarios. The diverted path will be crossed through existing channels and/or non-perennial streams so local farmers can use the now controlled floodwaters for irrigation purposes.

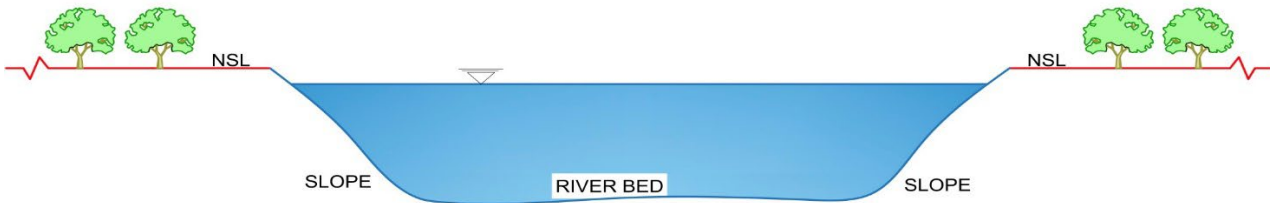
**PLAN INDICATING THE FLOOD FLOW AFTER DISPERSAL EMBANKMENT**



**SECTION A-A: SECTION OF FLOOD DISPERSAL EMBANKMENT**



**SECTION B-B: FLOOD DISPERSAL EMBANKMENT**

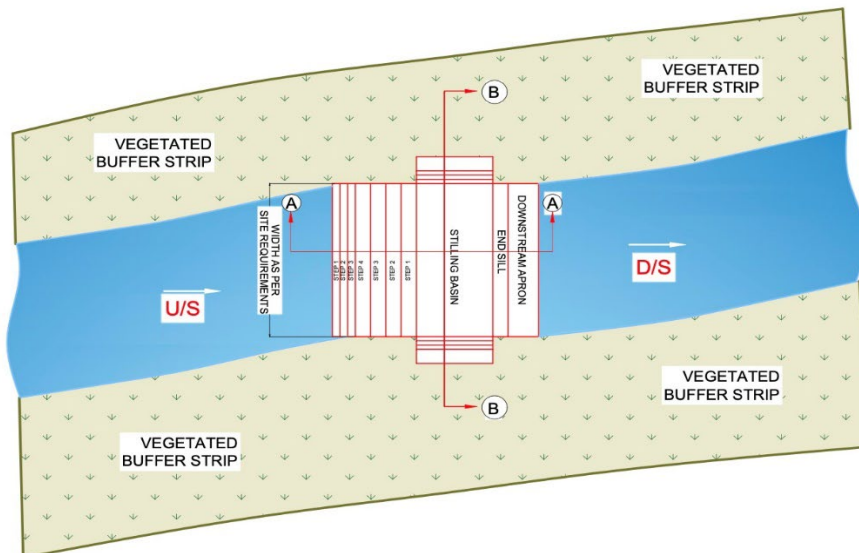


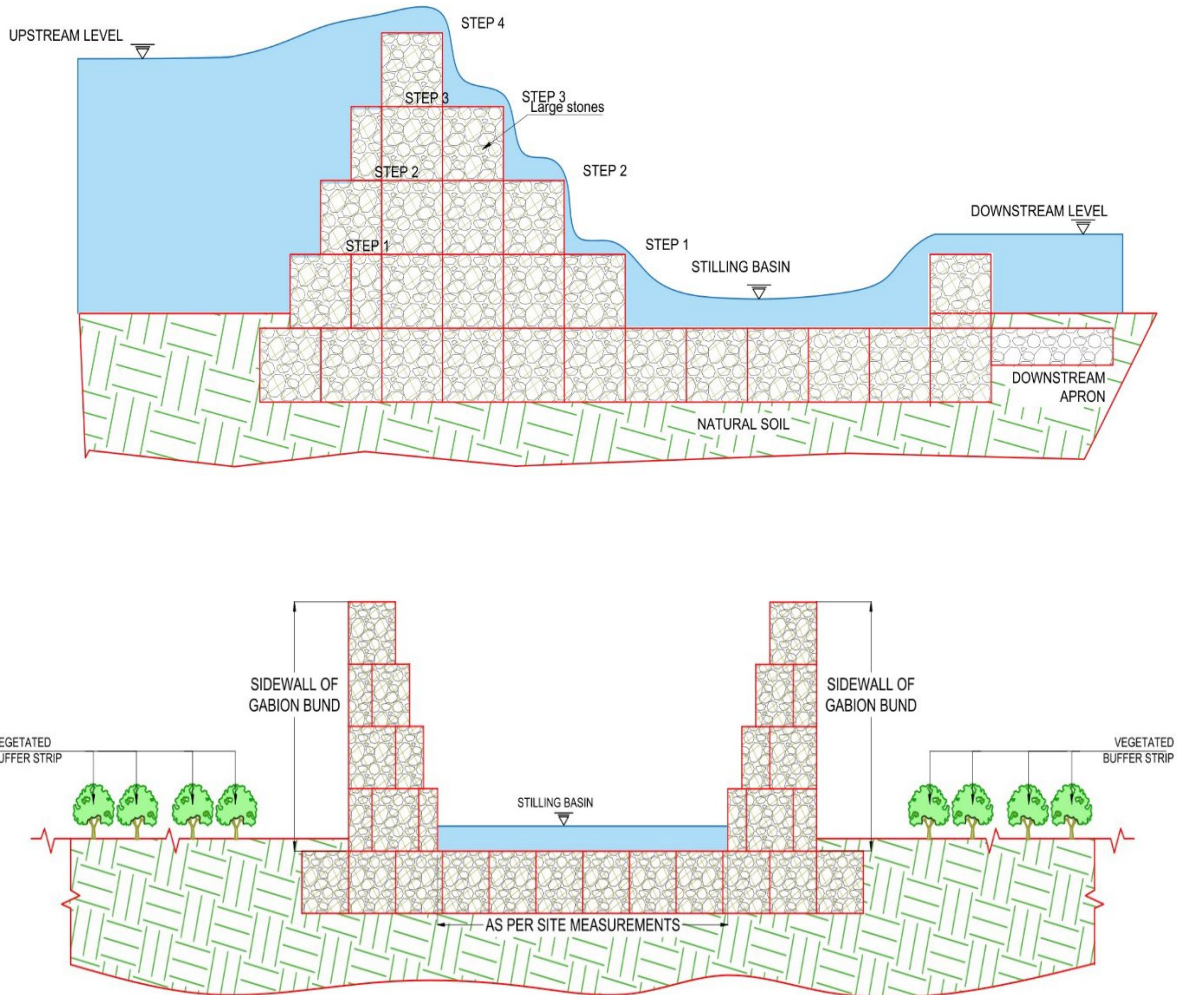
**Figure 23.** Conceptual drawing of flood dispersal embankment for D.I. Khan and Manchar watershed. Top: Plan of flood dispersal embankment. Bottom: Cross-section view of a flood dispersal embankment.

**Sub-Activity 1.2.1.4: Build 45 gabion bunds.**

120. A gabion bund is a wire cage filled with stones, boulders, rocks, or sand/soil. It is often used to stabilize and protect riverbeds, riverbanks, or slopes against erosion. Gabion stepped weirs are commonly used for river training and flood control; the stepped design enhances the rate of energy dissipation in the channel. The interlocking of the individual stones and rocks within the wire mesh ensure internal stability, and their mass coupled with vegetation will assist in resisting hydraulic forces. Gabion bunds will be established in the catchments of Manchar (2), DI Khan (34), Ramak (5) and Chakkar Lehri (4) to mitigate the risks of floods through delaying and diverting floodwaters (Figure 24). The gabion bunds will be designed to act as a spillway, safely diverting floodwaters.

**PLAN OF GABION BUND**





**Figure 24.** Conceptual drawing of gabion bunds for DI Khan, Ramak, Manchar and Chakar Lehri Watershed. Top: Plan of gabion bund. Middle and bottom: Cross-section view of gabion bund.

**Sub-Activity 1.2.1.5: Build 42 small retention areas.**

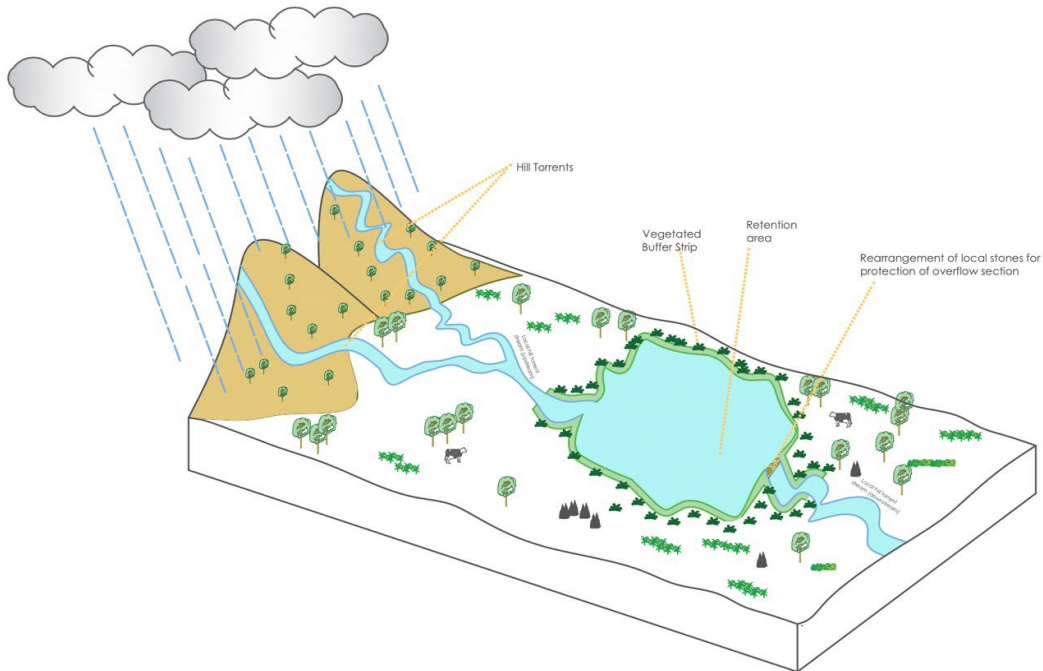
121. Retention areas are ponds where excess river discharge or floodwater is stored (Figure 25). Generally, they are connected to a river via channels so that in periods of high discharge or flooding, the retention areas are filled, which reduces the peak flow, increases infiltration, and stores water for domestic and/or agricultural purposes. During the field survey conducted as part of the project’s Feasibility Study (see Annex 2), potential intervention locations were identified and were prioritized if they overlapped with hot-spot areas for water level fluctuation and discharge, i.e., areas with high flood peaks. For maximum impact (water harvesting and flood attenuation), retention areas were mainly identified in upstream areas of the target watersheds. Sites for the establishment of retention ponds were also selected to take advantage of natural depressions and existing contours with some augmentation to ensure water remains trapped for a sufficient amount of time to reduce flood peaks, aid infiltration, and recharge groundwater. The retention areas will be established using local materials (such as stones and gravel), in natural depressions and watercourses as mentioned above. This will limit the transformation of the landscapes and ecosystems — reducing any risk of environmental impact. The detailed design of the retention areas (Sub-activity 1.2.1.1) will ensure that only flood peaks are captured, maintaining downstream water flows. The small retention areas to be established include 34 in D.I. Khan, 6 in Manchar Watershed, and 2 in Chakar Lehri Watershed.

**Sub-Activity 1.2.1.6: Build 9 large retention areas.**

122. Large retention areas have been proposed in areas of the Indus Basin where a river exits the mountains through a gorge, during the same field surveys described in Sub-activity 1.2.1.5. The flow focus results, and the discharge patterns are theoretically the same as for the small retention areas and served as the basis for the selection of the sites for the large retention areas. The design and functioning of the large retention areas is similar to those of the

smaller retention areas as described above (Sub-activity 1.2.1.5). The large retention areas to be established include 4 in the D.I. Khan watershed, , 2 in the Manchar Watershed, and 1 in the Chakar Lehri Watershed.

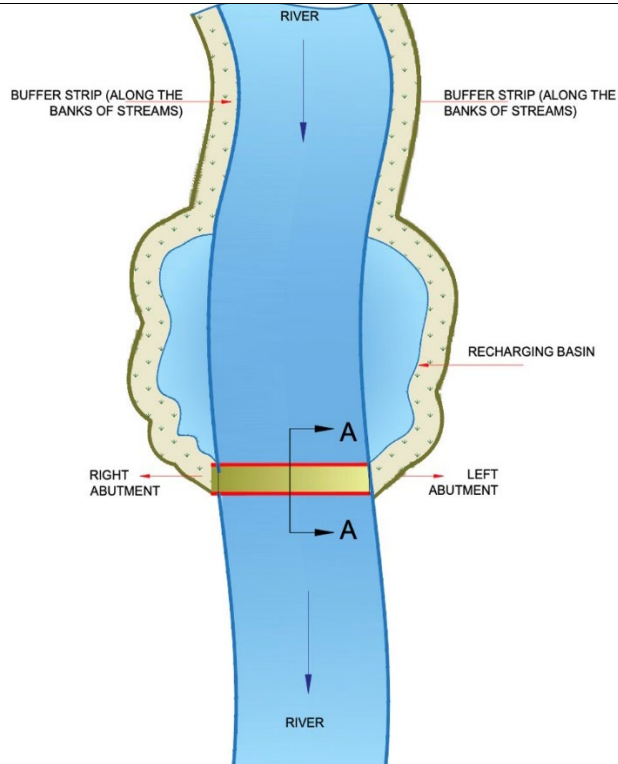
### RETENTION AREA (CONCEPTUAL DRAWING)



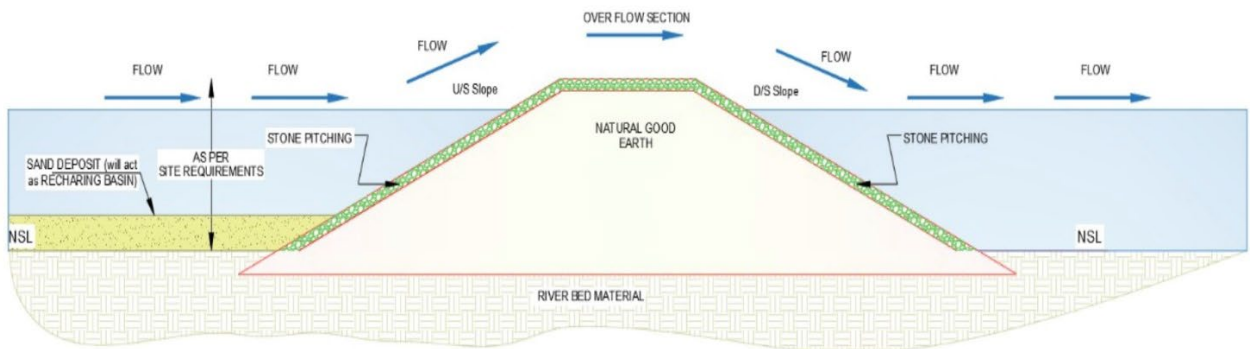
**Figure 25.** Conceptual drawing of retention areas of DI Khan, Manchar and Chakar Lehri watersheds.

#### Sub-Activity 1.2.1.7: Build 15 recharge basins.

123. Recharge basins can divert and slow down floodwaters and recharge shallow aquifers (Figure 26). They contribute to adaptation by diverting and slowing down floodwater flows and reducing flood peaks, and the risk of flooding downstream. However, their main goal is to capture water under the sediment layer, providing a constant water supply through recharging of the groundwater table, thereby reducing the impacts of droughts. Due to groundwater increases, biodiversity can benefit as well. This will also lead to an increase in local vegetation which in turn will contribute to a decrease in erosion and flow velocity during heavy rainfall events, further reducing flood risks — complementing the ecosystem restoration interventions to be implemented under Output 1.1. A recharge basin is different from the retention areas in that it has a sandy layer at the bottom to enhance recharge. The recharge basins to be established include 9 in the D.I. Khan Watershed, , and 3 in the Manchar Wetland, and 3 in Chakar Lehri Watershed.



**SECTION A-A: SECTION OF RECHARGING BASIN**



**Figure 26.** Conceptual drawing of a recharge basin to be established in the DI Khan, Manchar and Chakar Lehri watersheds. Top: Plan view of recharge basin. Bottom: Cross-section view of recharge basin.



**Figure 27.** Photograph of a recharge basin in Sindh Province captured during a field visit.

*Output 1.3: Strengthened community-based natural resource management to support water supply and flood attenuation services provided by EbA interventions implemented in floodplains and watersheds.*

124. Under this output, 18,215 ha of land in the Indus Basin (including the 14,215 ha that will be restored and rehabilitated, as well as an additional 4,000 ha under Component 1) will be placed under improved community-based climate-resilient management to support the adoption, implementation and maintenance of the EbA and green infrastructure interventions by the beneficiary communities, as well as strengthen the health of ecosystems. This will be achieved through directly engaging CBOs<sup>98</sup> — which are important contributors to water resources management in Pakistan, taking the lead for sustainably managing these resources at the household level — to: i) create community agreements with the CBOs to establish a common set of practices for communities and district-level governments on the use and management of ecosystems (including the EbA and green infrastructure interventions); ii) organize Water User Groups (WUGs) under CBOs and build their capacity for improved water resources management at the local level; iii) establish Community-based Watch and Ward Systems under CBOs to protect the project's EbA and green infrastructure interventions from degradation; and iv) strengthen communities' knowledge and awareness of climate change impacts and the benefits of the project's EbA and green infrastructure interventions. These interventions will be supported by capacity-building and stewardship to ensure the project's EbA and green infrastructure interventions continue contributing towards flood and drought risk reduction at the local level during and beyond the project period.

Activity 1.3.1: Strengthen the capacity of CBOs to adopt EbA and green infrastructure interventions and undertake climate-resilient community-based natural resource management.

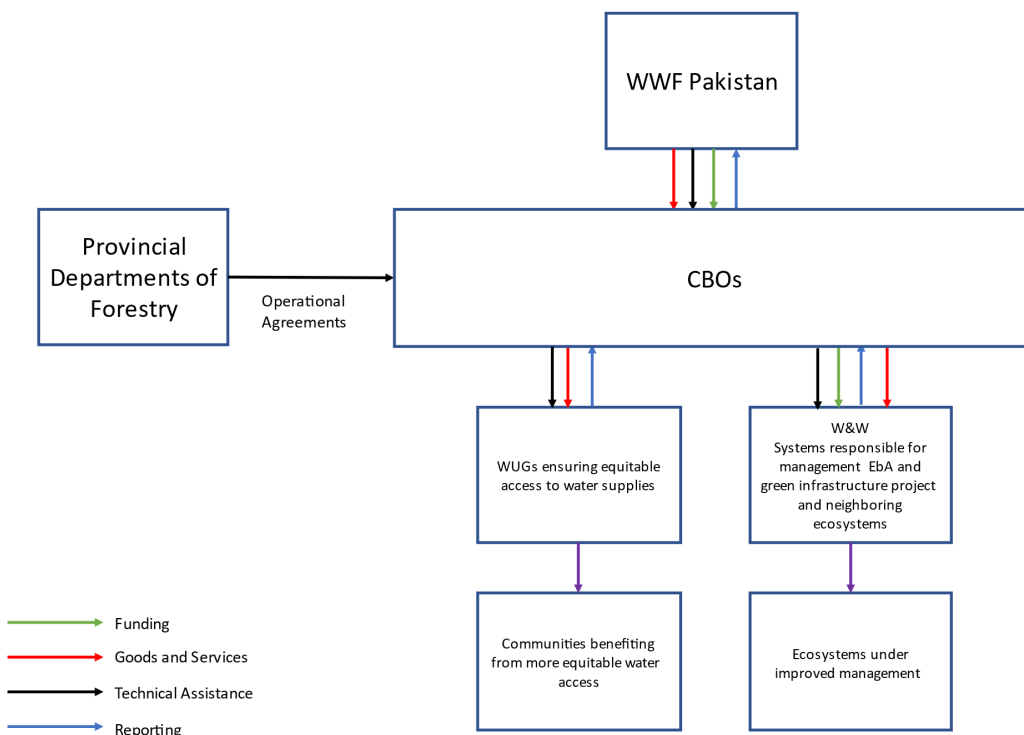
125. Under this activity, CBOs will be strengthened to support the adoption of EbA and green infrastructure interventions, as well as climate-resilient community-based natural resource management at the local level. WWF-Pakistan's project teams will work closely with at least 8 CBOs and the relevant provincial government departments in the Indus Basin to establish 8 WUGs and 4 Watch and Ward (W&W) Systems under these CBOs (Figure 28).

126. Four Watch and Ward Plans (one plan per project area) will be developed by Watch and Ward Systems under their respective CBOs and the Provincial Forest Departments. These plans will include provisions for ecosystem protection (such as protecting natural forests from illegal cutting and forest fires) and restoration, as well as operations and maintenance of the EbA and green infrastructure interventions. Operational agreements (terms of partnership & FPIC) will be created for the implementation of the Watch and Ward Plans assigning specific operation, maintenance, and stewardship roles among communities and Provincial Departments of Forestry of Sindh, Khyber Pakhtunkhwa and Balochistan. In addition, community agreements will be established with WUGs to define arrangements for accessing and using the additional water made available by the project's EbA and green infrastructure interventions, as well as determine water allocations for agriculture, domestic and disaster risk reduction measures to ensure effective distribution of water resources at the community level.



127. To support these community agreements, the 8 CBOs, 8 WUGs and 4 Watch and Ward Systems will be: i) engaged to implement and support the maintenance of EbA and green infrastructure interventions, incorporating indigenous knowledge and skills; and ii) trained and equipped for climate-resilient land and water resources management to secure the sustainability of the project's EbA and green infrastructure interventions, as well as the health of the ecosystems where they are located, e.g., maintenance of wetlands, floodplains, flood bypasses and washlands, watersheds and plantations (see Outputs 1.1 and 1.2). These capacity-building activities will be supported by field visits for CBO leaders (who sit on executive committees) to the EbA and green infrastructure interventions' sites. This will be done to demonstrate the progress and effectiveness of the project's EbA and green infrastructure interventions, support the uptake of these interventions at the community level, and enable knowledge on the experienced benefits and lessons learned to be shared with additional CBOs and communities across Pakistan's three provinces through the CBO executive committees. Activity 1.3.1 will be executed by WWF-Pakistan who will be providing technical assistance and grant funding to CBOs in the Indus Basin. If the need for new CBOs is determined during execution of the project, WWF Pakistan will take the following steps in keeping with WWF Pakistan's Social Mobilization Strategy:

1. Plan visits to the sites and identify focal points in each village/site and plan focus group discussions;
2. Request that the focal points organise community gatherings to present the project and its objectives in more detail with community members;
3. Request that the focal points organise community gatherings to present the project and its objectives in more detail with community members;
4. Identify and prioritise needs in the communities related to flooding and drought prevention and prepare community action plans. Engage the local people and apply participatory assessment tools for social mapping, wealth ranking, needs identification, prioritisation, SWOT analysis, risk assessment and mitigation planning, seasonal calendar, daily activity chart etc;
5. Organise local communities into CBOs developing participatory decision-making processes to ensure the needs of all constituencies are considered in CBO planning and decision making, ensuring e representation of marginalised and vulnerable households;
6. Once the CBOs are established and have received the necessary capacity development from the project, activities can be outsourced to the CBOs through grant agreements. WWF Pakistan will monitor the execution and progress of those activities.



<sup>98</sup> which represent Village and Women's Organisations as well as youth committees at the village level

**Figure 28.** Community-based natural resource management arrangements.

**Sub-Activity 1.3.1.1: Strengthen CBOs to adopt EbA and green infrastructure interventions and implement community-based natural resource management.**

128. The project will provide capacity development and training to CBOs to: i) strengthen and formalize their organization, governance, and management structures; ii) integrate EbA and green infrastructure interventions for flood and drought risk reduction within their mandates; iii) train and equip CBO members in W&W functions, including the implementation and maintenance of EbA and green infrastructure interventions, ecosystem management and monitoring of wetlands, floodplains, flood bypasses and washlands, watersheds and community plantations; and iv) establish and operate WUGs in communities (Table 6).

129. WWF-Pakistan will carry out detailed assessments for each of the CBOs in Year 1 and develop action plans to enhance participation, including the participation of underrepresented and vulnerable groups. It will design and carry out capacity building and participatory exercises to improve the ability of CBOs to define flooding and drought management priorities and sustainably manage nearby ecosystems to increase community resilience and reduce risks identified in section B.1. Trainings will be delivered to CBOs in each community twice a year in 2-day courses. The trainings will engage CBO managers and future W&W agents. 25 W&W agents will be trained per training (~240 in total). Each W&W agent will be responsible for 40 ha of land to be patrolled weekly. Daily wages for W&W agents during their patrols will be covered by the project grants to the CBOs. Training curriculums for each community will be adapted to meet specific community needs based on their capacities and needs identified in the table below and during further consultations and assessment of community capacity needs in Year 1 of the project.

**Table 6.** Overview of CBO baseline, gaps and Project approached for strengthening the capacity of CBOs in intervention areas to undertake community-based natural resource management.

<b>Community training and capacity development activities across all provinces</b>		
<ul style="list-style-type: none"> <li>• Training and capacity development for CBOs in organizational management, including financial management and record keeping, and proposal development to independently secure and execute small grants from local donors for community-based natural resource management Projects.</li> <li>• Working with CBOs to ensure better gender representation in their leadership and decision making.</li> <li>• Establish new W&amp;W systems and/or train existing W&amp;W agents in ecosystem management and monitoring of wetlands, floodplains, flood bypasses and washlands, watersheds and community plantations.</li> <li>• Establish new and/or train existing WUGs to establishing water use allocations for agriculture, domestic and disaster risk reduction uses.</li> <li>• Raise awareness in communities on the impacts of climate change and appropriate adaptation solutions.</li> </ul>		
<b>Existing community-based natural resource management arrangements</b>	<b>Gaps</b>	<b>Province specific activities</b>
<b>Khyber Pakhtunkhwa</b>		
The Forest and Wildlife Department of Khyber Pakhtunkhwa established CBOs under the Billion Tree Afforestation Project (BTAP) to engage communities in afforestation activities and community watch and ward systems.	<ul style="list-style-type: none"> <li>• WWF-Pakistan conducted the third-party monitoring of BTAP, under which it was observed the community W&amp;W agents needed training on the demarcation of enclosures, grazing and fire management, restoration and collecting basic vegetation data (such as survival rate, species composition, record and causes of damage, etc).</li> <li>• No formal WUGs exist to manage community water access disputes.</li> </ul>	<ul style="list-style-type: none"> <li>• Train W&amp;W agents in fire management, illicit grazing management, deforestation prevention, exclusion area establishment and restoration.</li> <li>• Establish WUGs governance mechanism to ensure effective implementation and distribution of water resources.</li> </ul>
<b>Balochistan</b>		
CBOs were established in the aftermath of the 2010 and 2012 floods by the UN and other relief agencies to ensure direct involvement of affected communities in relief and reconstruction.	Once the relief Projects were completed, all these CBOs were left without any follow-up or financial support or training in how to access public grants.	<ul style="list-style-type: none"> <li>• The Project will provide assistance to these CBOs in registering as official organizations with the Provincial Government of Balochistan.</li> <li>• Establish WUGs governance mechanism to ensure effective implementation and distribution of water resources.</li> </ul>
<b>Sindh</b>		

<p>The Indus Ecoregion Community Livelihoods Project (IECLP) formed eight CBOs and one CBO Network known as the Manchar Conservation Network in 2018 with the objective to support Project implementation and sustain the Project interventions once Projects are completed.</p>	<ul style="list-style-type: none"> <li>● Lack of representation from all ethnic groups.</li> <li>● Lack of proper training on organizational management and conflict resolution.</li> <li>● Lack of exposure to development agenda due to the high level of illiteracy and poverty.</li> </ul>	<ul style="list-style-type: none"> <li>● Working with CBOs to ensure better ethnic and gender representation in leadership and decision making.</li> <li>● Train these CBOs in organizational management and proposal development to secure and execute small grants from local donors.</li> </ul>
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**Sub-Activity 1.3.1.2: Organize WUGs under CBOs and build their capacity for improved water resources management.**

130. The GoP has been involved in the transfer of irrigation management to farmers' organizations at different levels of irrigation networks. This sub-activity will build on the GoP's initial work by establishing and strengthening of WUGs (associations of community members responsible for water planning), which will lead to improved water management mainly through reducing water theft and conflicts around water, as well as improving maintenance of waterways. WUGs empower communities to take ownership and get involved in managing and monitoring water-related ecosystems and infrastructure and help fill government capacity gaps in water resource management. The project will organize new and bolster existing WUGs through CBOs and provide technical capacity development to create and/or strengthen WUG governance and management structures, increase WUG membership through community trainings and awareness raising campaigns, and establish WUG operational plans and monitoring frameworks, including for the project's EbA and green infrastructure interventions. If new WUGs are needed, these will be established under the CBOs to ensure equitable access to water resources. CBOs will nominate members of WUGs through a community resolution signed by the executive bodies of the CBOs. The WUGs members will report to the executive body of the CBOs WWF-Pakistan will work with communities and the Provincial Irrigation departments to ensure alignment of the WUG workplans with provincial adaptation plans. WUGs will operate under the umbrella of local CBOs to improve water governance at the local level and formalize local water resource allocation processes. WUGs will also play a key role in propagating effective water utilization and reduce wasteful consumption at domestic and farm levels.

131. The water users of irrigation water will be the cultivators of lands, owners of private farms, lease-holding farms, owners of garden plots, etc. whereas, the water users of drinking water will primarily be households. The members of the committee will be selected from the CBOs of the respective project sites. The head of the committee will be a chairman who will be elected by the CBO members and a general body. Under the overall supervision of the CBOs and working in close collaboration with local community members, the WUGs will undertake the following specific duties:

- a. Contribute towards the analysis of general physical conditions of the local villages, including assessment of water availability once the drinking and domestic needs have been met;
- b. Ensure equitable distribution of drinking and irrigation water among water users;
- c. Ensure reliable supply of drinking as well as irrigation water to target water users;
- d. Resolve disputes that may arise on the usage or consumption of water among water users at a local level;
- e. Ensure the provision of technical resources for the operation and maintenance of irrigation channels and drinking water supply from the members of the water user groups;
- f. Prevent water theft and take action against those who are involved in water theft;
- g. Support the Provincial Irrigation Departments with regular Operation and Maintenance (O&M) and facilitate the implementation of water-related interventions in the project village;
- h. Coordinate with the project team in executing project activities under Output 3.2;
- i. During project execution, work with the CBOs to explore potential options for fee structures for irrigation and drinking water access to finance the O&M costs of community water infrastructure to be implemented after the GCF project period as part of the exit strategy;
- j. Assist the local government, CBOs and local communities with planning and scaling of existing systems; and
- k. Provide progress updates to the CBOs and their executive committees.

132. WUG participation within communities will be incentivized by linking incremental project support with WUG development milestones. To ensure sustainability, the WUGs will also be responsible for establishing a pay per use system in close consultation with local communities and project team to cover operation and maintenance cost once the project ends.

**Sub-Activity 1.3.1.3: Establish community-based watch and ward systems under CBOs to protect the project's EbA and green infrastructure interventions from degradation.**

133. Community-based W&Ws systems are community managed enforcement networks of individuals responsible for and taking ownership of, in this context, the improved management of ecosystems on which they depend. These W&W systems will be established under the CBOs to facilitate the implementation and protection of the project's EbA and green infrastructure interventions including their required operation and maintenance. This will be operationalized by the development of 4 W&W Plans by the CBOs and Provincial Forest Departments to protect and preserve freshwater ecosystems. These plans will include: i) ecosystem protection and restoration commitments; ii) provisions for the operation and maintenance of EbA and green infrastructure interventions developed under Component 1; iii) a process for operationalizing ecosystem and community impact monitoring; and iv) specific operation, maintenance, and stewardship roles agreed between CBOs and the Provincial Departments of Forestry.

Activity 1.3.2: Strengthen communities' knowledge and awareness of climate change impacts and the benefits of the project's EbA and green infrastructure interventions.

134. Under this activity, communities' knowledge and awareness of climate change impacts and the benefits of the project's EbA and green infrastructure interventions will be strengthened through a tailored communications strategy. The audience will include members of vulnerable communities, particularly women and children, students and academia, policymakers, and the general public. The objectives of the communication strategy include: i) educating communities, students, tourists and other project stakeholders on the impacts of climate change, particularly floods and droughts, on people and ecosystems, as well as on how to respond to these impacts through implementing EbA, green infrastructure and efficient community-based natural resources management; ii) informing relevant stakeholders about the project's EbA and green infrastructure interventions, their benefits and the progress made; and iii) communicating the successes and impacts of the project interventions to build a case for scaling up EbA and green infrastructure interventions. The following communication tools will be utilized: videos and project photography, short documentaries, press releases, news packages (electronic), blogs, signboards, brochures, manuals, briefs, flyers, posters, standees, etc. for stakeholder use, and posters, information sheets and pictorials for community members. This project activity will be executed by WWF-Pakistan.

Sub-Activity 1.3.2.1: Consult with tribal elders to support the sensitization of the project's adaptation interventions in beneficiary communities.

135. Consulting with tribal elders to support the sensitization of the project's adaptation interventions in beneficiary communities is important because many communities still follow tribal leadership. Under this sub-activity, consultations will be held with tribal elders to: i) promote dialogue among communities on the risks and impacts of floods and drought and how these are being intensified by climate change; ii) coordinate with tribal elders on the sensitization of the project's EbA and green infrastructure interventions among local communities; iii) garner support for the on-the-ground implementation, uptake and sustainable management of the project's EbA and green infrastructure interventions at the local level.

Sub-Activity 1.3.2.2: Develop and implement awareness-raising campaigns for target communities to increase their knowledge and awareness of climate change impacts and the benefits of the project's EbA and green infrastructure interventions.

136. Under this sub-activity awareness-raising campaigns will be developed and implemented for target communities to increase their knowledge and awareness of climate change impacts and the benefits of the project's EbA and green infrastructure interventions. To ensure that the information shared via the campaigns is contextually relevant to the different areas across the Indus Basin, it will be tailored to be site- and ecosystem-specific, through engagements with representatives of local communities and institutions who are members of local CBOs. The campaigns will focus on: i) the implementation and benefits of EbA and green infrastructure interventions and improved natural resource management for flood and drought risk reduction; ii) raising awareness about the impacts of climate change (particularly floods and droughts) on ecosystems, communities and economic sectors; iii) the progress of the project's EbA and green infrastructure interventions and how they have helped communities adapt to the impacts of climate change. Several different channels will be used to communicate this information to communities, including signboards, newspaper publications, local radio stations, short videos, photography and other digital media.

**Component 2: Enabling a paradigm shift towards EbA and green infrastructure in Pakistan**

**Outcome 2: Enabling environment for climate action that has new procedures for implementing EbA and green infrastructure interventions for flood and water resources management in Pakistan.**

*Output 2.1: Evidence base to support the adoption of EbA and green infrastructure interventions by the Government of Pakistan.*

137. To initiate public sector reform in Pakistan's approach to flood and water resources management and ensure EbA and green infrastructure interventions are implemented at scale, decision-makers must have strong evidence of the environmental and economic benefits of these interventions. Under Output 2.1, an evidence base will be established to demonstrate to policy makers and planners at the national and local levels (including the Ministry of Climate Change, Ministry of Water Resources, Federal Flood Commission, Ministry of Planning, Development and Special Initiatives, Pakistan Council for Research in Water Resources, Provincial Planning and Development Departments, Provincial Irrigation Departments, and Provincial Agriculture departments) the effectiveness of EbA and green infrastructure interventions for flood and drought risk reduction, as well as their economic, social and environmental benefits. This evidence will be generated through monitoring and evaluation of the activities under Component 1 of the project.

Activity 2.1.1: Develop an evidence-based case of the climate change adaptation benefits of EbA and green infrastructure in Pakistan.

138. The evidence will be generated under the project through an economic valuation of the project's EbA and green infrastructure interventions (described in detail in Component 1) which will include monitoring and analysis of these interventions' cost-effectiveness and efficiency in reducing the impacts of climate change-induced floods and droughts on vulnerable communities and ecosystems in Pakistan. Communities will be engaged throughout this process through their representative CBOs to ensure the analysis of the adaptation benefits of EbA and green infrastructure captures communities' experiences and appropriately addresses communities' needs.

139. The EbA interventions are expected to begin delivering adaptation benefits after 3 years, with the analysis work commencing in Year 4 of the project. The analysis will consider: i) avoided costs and losses — impacts or losses that would otherwise occur in the absence of ecosystem services generated by the project's EbA interventions, such as increased flood extent, damages and/or losses to agricultural land and the subsequent reduced productivity, and reduced water resource quantity and quality; and ii) alternative costs — the implication of implementing 'grey' artificial systems (as opposed to 'green' EbA solutions) that would be required to deliver the same adaptation benefits as ecosystems. The analysis will also consider a wide variety of sustainable development co-benefits, including but not limited to enhanced biodiversity, decreased pollution of water resources and improved access to clean water (see Section D.3 for additional details on the sustainable development potential of the project).

140. To ensure the evidence generated under this output is used to expand Pakistan's regulations and policies for flood and water resources management from only focusing on using grey infrastructure instead of prioritising EbA and green infrastructure interventions to address the impacts of floods and droughts, this evidence will be used for the development of updated procedures under Output 2.2 for Pakistan's key regulations and policies for flood and water resources management — namely the Implementation Framework for the National Water Policy, the National Adaptation Plan (NAP), and Provincial Adaptation Plans of Sindh, Khyber, and Balochistan, and Punjab provinces — on the proper execution of EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan.

Sub-Activity 2.1.1.1: Prepare baselines and indicators for the biophysical benefits of EbA on ecosystems and their flood attenuation and water resource-related services.

141. Because an economic valuation of the adaptation benefits of EbA and green infrastructure interventions has not yet been conducted for Pakistan, the baseline for the valuation to be undertaken under Activity 2.1.1 will be assessed and established under this sub-activity. The relevant indicators that will be used to monitor and analyse the performance of the EbA and green infrastructure interventions will also be set under this sub-activity, including metrics for the 'Ground Water Atlas' which is included within the monitoring framework of the National Water Policy. The project will help the Provincial Irrigation Departments align their monitoring efforts at the sub-basin for groundwater recharge potential, water quality and water table depth zones for recharging aquifers to the Atlas. Establishing the baseline and setting appropriate indicators is the first step in undertaking the economic valuation, so this will happen in Year 1 before the monitoring and analysis work can begin.

Sub-Activity 2.1.1.2: Monitor the biophysical benefits of EbA and green infrastructure on ecosystems and their flood attenuation and water resource-related services using the baselines and indicators prepared under Sub-activity 2.3.1.1.

142. Under this sub-activity, the biophysical benefits of EbA and green infrastructure on ecosystems and their flood attenuation and water resource-related services will be monitored annually using the baselines and indicators prepared under Sub-activity 2.1.1.1. This will include measuring these interventions' flood and drought risk reduction benefits, as well as their ecosystem service-related benefits, such as improved infiltration, and enhanced soil and water quality to build a case for integrating EbA and green infrastructure into policy and planning (Output

2.2). The project's M&E staff will undertake this monitoring (supported by community leaders/representatives wherever feasible) and compile the data in an appropriate format for the economic valuation study (Sub-activity 2.1.1.3 below).

*Sub-Activity 2.1.1.3: Conduct an economic valuation of the benefits of EbA and green infrastructure on ecosystems and their flood attenuation and water resource-related services.*

143. The economic valuation of ecosystems and their services and benefits will be conducted by WWF-Pakistan under this sub-activity using tools such as Integrated Valuation of Ecosystem Services and Trade-offs (InVEST) to value natural capital and evaluate the contribution of EbA and green infrastructure towards flood and water resources management under future climate change conditions.

*Sub-Activity 2.1.1.4: Identify additional opportunities and sites at the national level across Pakistan for scaling up and replicating the project's EbA and green infrastructure interventions for flood risk and water resource management.*

144. Once the economic value and benefits of the project's EbA and green infrastructure interventions have been assessed (under Sub-activity 2.1.1.3), site assessments will be conducted to identify opportunities for scaling up and replicating these solutions across other suitable areas in Pakistan that are vulnerable to floods and droughts. The identification of opportunities for scaling up and replicating EbA and green infrastructure interventions across Pakistan under this sub-activity will consider additional sites to the 11 sites identified during the project's Pre-Feasibility Study stage, with the project's EbA and green infrastructure interventions serving as blueprints for addressing increasingly severe floods and droughts caused by climate change across similar contexts nationally and regionally.

*Sub-Activity 2.1.1.5: Collate and store the data and information generated under 2.1.1.1–2.1.1.4*

145. The data and information generated by sub-activities 2.1.1.1–2.1.1.4 will be collated, managed and stored by WWF-Pakistan for Years 1–5 of the project implementation period. After Year 5, the information will be transferred to the MoCC and the FFC (under MoWR) and the Provincial Irrigation Departments to serve as evidence for future flood and water resources management and planning in Pakistan. While the collated data and information will initially be managed by WWF-Pakistan during Years 1–5 of the project, it will still be made readily available to project partners throughout the project period. The FFC will be responsible for sharing the collated evidence with relevant decision-makers as described in Activity 2.1.2 below.

*Activity 2.1.2: Develop and disseminate an evidence report to national and provincial government agencies for implementing EbA and green infrastructure interventions in response to flooding and droughts in Pakistan.*

146. Under Activity 2.1.2, the data and information generated under Activity 2.1.1 will be collated and synthesised into an evidence report, highlighting EbA and green infrastructure interventions' flood and drought risk reduction potential, economic value and environmental and social benefits. This report will serve two main purposes. First, it will be used to develop updated procedures under Output 2.2 for Pakistan's key regulations and policies for flood and water resources management on the proper execution of EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan. Second, this evidence report will stand alone as an important knowledge product and decision-making tool for policymakers and planners in Pakistan to use in other decision making around climate change planning and flood and water resources management. Moreover, because Pakistan has limited data on the cost-effectiveness of EbA and green infrastructure interventions, the economic valuation underpinning this evidence will demonstrate the cost-effectiveness and wide variety of adaptation benefits delivered by these interventions and serve as a key reference for policymakers in future flood and water resources management.

147. WWF-Pakistan will work with FFC to disseminate this evidence report to the MoCC, the Provincial Irrigation Departments, Provincial Agriculture Departments, Provincial Forestry Departments, academic and research institutions, as well as other relevant national and provincial stakeholders. The MoCC, as the NDA and chair of the PSC, will be responsible for the integration of lessons learned and best practices for EbA and green infrastructure from the project into other ongoing and future projects in Pakistan.

*Sub-activity 2.1.2.1: Prepare an evidence report on the use and benefits of EbA and green infrastructure interventions in response to flooding and droughts in Pakistan.*

148. Under this sub-activity, WWF-Pakistan will lead the preparation of an evidence report on the use and benefits of EbA and green infrastructure interventions in response to flooding and droughts in Pakistan. This report will be informed by the economic valuation undertaken under Activity 2.1.1 and contain step-wise instructions for how to implement EbA and green infrastructure interventions efficiently and cost-effectively in Pakistan. Importantly, this report will be used under Activity 2.2.1 for the development of updated procedures for Pakistan's key regulations

and policies for flood and water resources management, namely the Implementation Framework of the National Water Policy, National Adaptation Plan and four Provincial Adaptation Plans. The set of guidelines will be prepared by WWF-Pakistan.

**Sub-activity 2.1.2.2: Disseminate the evidence report developed under Sub-activity 2.1.2.1 to national and provincial planners and regulators involved in flood and water resources management, as well as academic and research institutions.**

149. The evidence report prepared under Sub-activity 2.1.2.1 will be disseminated by WWF-Pakistan and the FFC to five national-level stakeholders, seven provincial line departments, and at least five academic and/or research organisations through the National Working Group (which will be established under Activity 2.2.1), PSC and existing inter-departmental communication channels. These recipients are presented in the table below.

**Table 7.** Stakeholders to be involved in capacity-building interventions.

Stakeholder	Organisation type
Ministry of Climate Change (MoCC)	National government
Ministry of Water Resources (MoWR)	
Ministry of Planning, Development and Special Initiatives (MoPSI)	
National Disaster Management Authority (NDMA)	
Provincial Departments of Irrigation, Forestry, Wildlife, and Agriculture	Provincial government
Provincial Department of Environment Protection	
Provincial Disaster Management Authority (PDMA)	
Provincial Department of Planning and Development (PP&D)	
Pakistan Council for Research in Water Resources (PCRWR)	Academia and research
Pakistan Agriculture Research Council (PARC)	
Lahore University of Management Sciences (LUMS)	
National University of Science and Technology (NUST)	
University of Engineering and Technology (UET)	

***Output 2.2: Updated procedures for implementing EbA and green infrastructure in Pakistan.***

150. The Government of Pakistan approved its first National Water Policy in 2018 and MoWR is currently in the process of developing its Implementation Framework. The Implementation Framework is a document that accompanies the policy and contains instructions for how to apply the rules set out in the National Water Policy, including approaches and techniques for addressing flood impacts and droughts on Pakistan’s population and key ecosystems. The FFC, an Executive Department under MoWR, is mandated to address the problem of flooding in Pakistan, with the Provincial Irrigation Departments having the authority on-the-ground to enforce the National Water Policy through its Implementation Framework.

151. The Implementation Framework of the National Water Policy, National Adaptation Plan and four Provincial Adaptation Plans for the provinces of Khyber Pakhtunkhwa, Punjab, Balochistan and Sindh do not currently include EbA and green infrastructure interventions as effective solutions for addressing the impacts of climate change — particularly those related to floods and droughts — on Pakistan’s vulnerable population and key ecosystems. Instead, it prioritises hard infrastructure interventions, which have with limited flexibility to changing environmental conditions and high capital expenditure and operational costs.

152. In addition to EbA and green infrastructure interventions not being considered in the Implementation Framework of the National Water Policy, these interventions are not currently prioritised in Pakistan’s National Adaptation Plan and Provincial Adaptation Plans for the four provinces of Khyber Pakhtunkhwa, Punjab, Balochistan and Sindh. Because the National Adaptation Plan and four Provincial Adaptation Plans are currently under development and not yet finalised, there is a unique opportunity for the project to also integrate the use of EbA and green infrastructure interventions in these planning documents.

153. Output 2.2 will address these gaps through the creation and adoption of updated procedures for the Implementation Framework for the National Water Policy, the National Adaptation Plan (NAP), and Provincial Adaptation Plans of Sindh, Khyber, Balochistan, and Punjab provinces on the proper execution of EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan. The MoWR (through FFC) will require the application of the updated procedures for the Implementation Framework of the National Water Policy, while MoCC in collaboration with each province’s Environment Protection Authority (EPA) will require the application of the updated procedures for the National and four Provincial Adaptation Plans. This will lead to the creation of well documented procedures backed by a rigorous scientific base that enables the GoP to channel future

investments into EbA and green infrastructure interventions instead of grey infrastructure to respond to increasingly severe floods and droughts caused by climate change.

**Activity 2.2.1: Develop updated procedures for the Implementation Framework of the National Water Policy, National Adaptation Plan and four Provincial Adaptation Plans for implementing EbA and green infrastructure interventions in Pakistan.**

154. Activity 2.2.1 will contribute to transforming Pakistan’s approach to flood and water resources management by establishing a National Working Group chaired by the MoCC and comprised of regulators within the MoWR (including FFC) and the relevant Provincial Departments (such as the Provincial Departments of Irrigation, Forestry, Agriculture, Planning and Development) to: i) review the Implementation Framework of the National Water Policy, National Adaptation Plan and four Provincial Adaptation Plans to identify entry points for EbA and green infrastructure as cost-effective adaptation interventions for addressing floods and droughts; and ii) lead the development and adoption of updated procedures for Pakistan’s key regulations and policies for flood and water resources management — namely the Implementation Framework for the National Water Policy, the National Adaptation Plan (NAP), and Provincial Adaptation Plans of Sindh, Khyber, Balochistan, and Punjab provinces — on the proper execution of EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan.

155. The process for developing the updated procedures for adoption by the GoP is presented in Table 8 below, with further details provided in the sub-activity descriptions below. WWF-Pakistan will lead the implementation of this project activity, working with MoCC and MoWR (through FFC).

**Table 8.** Process for developing and adopting updated procedures for the Implementation Framework of the National Water Policy, National Adaptation Plan and four Provincial Adaptation Plans for the provinces of Khyber Pakhtunkhwa, Punjab, Balochistan and Sindh.

Strategic document being updated	Stage of integration of EbA and green infrastructure into the document	Timeline (i.e., what year of the Project period?)	Responsible entity
Implementation Framework of the National Water Policy	Draft updated procedures for the Implementation Framework of the National Water Policy on the proper execution of EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan are produced and presented to the National Working Group.	Q4 of Year 4	MoWR (through FFC)
	Representatives from the National Working Group, including MoCC, MoWR (including FFC) and the Provincial Departments of Irrigation, Forestry and Agriculture review the draft updated procedures for the Implementation Framework of the National Water Policy.	Q4 of Year 5	
	Representatives from the National Working Group, including MoCC, MoWR (including FFC) and the Provincial Departments of Irrigation, Forestry and Agriculture receive final updated procedures for the Implementation Framework of the National Water Policy on the proper execution of EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan for endorsement and adoption.	Q3 of Year 6	
National Adaptation Plan	Draft updated procedures for the National Adaptation Plan on the proper execution of EbA and green infrastructure interventions	Q4 of Year 4	MoCC



	to reduce the impacts of floods and droughts in Pakistan are produced and presented to the National Working Group.		
	Representatives from the National Working Group, including MoCC, MoWR (including FFC) and the Provincial Departments of Irrigation, Forestry and Agriculture review the draft updated procedures for the National Adaptation Plan	Q4 of Year 5	
	Representatives from the National Working Group, including MoCC, MoWR (including FFC) and the Provincial Departments of Irrigation, Forestry and Agriculture receive final updated procedures for the National Adaptation Plan on the proper execution of EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan for endorsement and adoption.	Q3 of Year 6	
Four Provincial Adaptation Plans for Khyber Pakhtunkhwa, Punjab, Balochistan and Sindh	Draft updated procedures for the four Provincial Adaptation Plans on the proper execution of EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan are produced and presented to the National Working Group.	Q4 of Year 4	The Provincial Adaptation Plans will be developed by each province's Environment Protection Authority (EPA), i.e., Khyber Pakhtunkhwa Environment Protection Authority, Punjab Environment Protection Authority, Balochistan Environment Protection Authority and Sindh Environment Protection Authority.
	Representatives from the National Working Group, including MoCC, MoWR (including FFC) and the Provincial Departments of Irrigation, Forestry and Agriculture review the draft updated procedures for the four Provincial Adaptation Plans.	Q4 of Year 5	
	Representatives from the National Working Group, including MoCC, MoWR (including FFC) and the Provincial Departments of Irrigation, Forestry and Agriculture receive final updated procedures for the four Provincial Adaptation Plans on the proper execution of EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan for endorsement and adoption.	Q3 of Year 6	

***Sub-Activity 2.2.1.1: Establish a National Working Group to develop and adopt updated procedures for using EbA and green infrastructure interventions in flood and water resources management in Pakistan.***

156. A National Working Group will be established to lead the development and adoption of updated procedures for Pakistan's key regulations and policies for flood and water resources management — namely the Implementation Framework for the National Water Policy, the National Adaptation Plan (NAP), and Provincial Adaptation Plans of Sindh, Khyber, Balochistan, and Punjab provinces — on the proper execution of EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan. This working group will also ensure these procedures align with current national and provincial climate change planning frameworks. The National Working

Group will include representation from the MoCC, MoWR (including FFC), the Provincial Departments of Irrigation, Forestry and Agriculture local NGOs, CSOs, and academic and research organisations<sup>99</sup>. The National Working Group members will be selected based on their subject matter expertise and decision-making capacity or influence within national and subnational government. The National Working Group will lead Sub-activities 2.2.1.2–2.2.1.4 below. At project completion, the National Working Group will be transitioned into specialized working groups within MoCC and MoWR responsible for continuing the uptake and use of EbA and green infrastructure in future flood and water resources management and adaptation initiatives in Pakistan beyond the project.

157. The project Steering Committee (PSC) and Provincial Oversight Committees (POCs) will be critical in facilitating engagements under this sub-activity, securing government and community buy-in, and driving approval/decisions at the national and provincial levels related to adopting the updated procedures. Targeted engagements will be held between the abovementioned national and provincial level water-related stakeholders and programme partners to enhance coordination between these stakeholders, improve knowledge sharing on integrated flood and water resources management strategies, strengthen water governance, and promote evidence-based decision-making for climate change adaptation with an emphasis on EbA and green infrastructure.

*Sub-Activity 2.2.1.2: Review the Implementation Framework of the National Water Policy, National Adaptation Plan and four Provincial Adaptation Plans for the four provinces of Khyber Pakhtunkhwa, Punjab, Balochistan and Sindh to identify entry points for EbA and green infrastructure as cost-effective adaptation interventions for addressing floods and droughts.*

158. The National Working Group, supported by WWF-Pakistan, will review the Implementation Framework of the National Water Policy, National Adaptation Plan and four Provincial Adaptation Plans for the four provinces of Khyber Pakhtunkhwa, Punjab, Balochistan and Sindh to identify entry points for EbA and green infrastructure as cost-effective adaptation interventions for addressing floods and droughts. This review will consider the evidence generated under Output 2.1.

*Sub-Activity 2.2.1.3: Draft updated procedures for the Implementation Framework of the National Water Policy, National Adaptation Plan, and four Provincial Adaptation Plans on the proper execution of EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan.*

159. Following the review under Sub-activity 2.2.1.2, and using the evidence generated under Output 2.1, the National Working Group, supported by WWF-Pakistan, will draft updated procedures for the Implementation Framework of the National Water Policy, National Adaptation Plan, and four Provincial Adaptation Plans on the proper execution of EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan. These draft updated procedures will be presented to the National Working Group for review and finalisation.

*Sub-Activity 2.2.1.4: Validate the updated procedures within the National Working Group for adoption into the Implementation Framework of the National Water Policy, National Adaptation Plan, and four Provincial Adaptation Plans.*

160. A series of consultative sessions will be held between the National Working Group and stakeholders mentioned in Table 7 under Sub-activity 2.1.2.2 to review the draft updated procedures produced under Sub-activity 2.2.1.3. Following the review, the required adjustments will be made and the final updated procedures for the Implementation Framework of the National Water Policy, National Adaptation Plan, and four Provincial Adaptation Plans will be submitted to the National Working Group for endorsement and adoption.

*Output 2.3: Strengthened capacity for implementing EbA and green infrastructure interventions in the Indus Basin for flood risk and water resources management.*

161. Capacity-building under this output will focus on: i) strengthening the capacity of national and sub-national staff, as well as community leaders/representatives, to apply the updated regulations under Activity 2.2.1, and implement, operate and maintain EbA and green infrastructure interventions for flood and water resources management; and ii) training national and sub-national technical staff, as well as community leaders/representatives, on how to implement, operate and maintain EbA and green infrastructure interventions for flood and water resources management. This capacity development will support the mainstreaming process under Output 2.2 and overall theory of change for the project by ensure that technical staff are aware of the updates to the implementation framework of the National Water Policy, National Adaptation Plan and four Provincial Adaptation Plans and are

<sup>99</sup> Such as the Pakistan Council for Research in Water Resources (PCRWR), Pakistan Agriculture Research Council (PARC), Lahore University of Management Sciences (LUMS), National University of Science and Technology (NUST), and University of Engineering and Technology (UET).

sufficiently equipped to implement EbA and green infrastructure interventions across Pakistan. It will also facilitate a community-driven and participatory approach to flood and water resources management by involving community leaders/representatives in the implementation, monitoring, operation and maintenance of EbA and green infrastructure interventions, and ensuring these interventions directly respond to communities' needs.

Activity 2.3.1: Strengthen the capacity of national and provincial staff, as well as community leaders/representatives, to apply the updated procedures under Activity 2.2.1 and implement, operate and maintain EbA and green infrastructure interventions for flood and water resources management.

162. This project activity will strengthen the capacity of national and sub-national staff, as well as community leaders/representatives, to apply the updated procedures under Activity 2.2.1. Additionally, because wide-scale implementation of EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan is not yet institutionalised in Pakistan, there is a need to train national and sub-national technical staff in the necessary skills to design, implement, operate and maintain these interventions to ensure they continue delivering adaptation benefits over the long term. Similar training is also required for community representatives to secure their buy-in to and ownership of these new approaches for Pakistan, fostering the sustainable adoption and use of these approaches to flood and water resources management at the community level.

163. To respond to these capacity needs, Interventions under Activity 2.3.1 will include: i) training and raising awareness of national and sub-national policymakers and planners on the contents and application of the updated procedures of the Implementation Framework of the National Water Policy, National Adaptation Plan, and four Provincial Adaptation Plans on the proper execution of EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan; ii) developing a national pool of experts for scaling up EbA and green infrastructure through investments in curriculum development, academic programmes, training of trainers approaches, and exposure visits; iii) training national and sub-national technical staff involved in flood risk and water resources management on the implementation, monitoring, operations and maintenance of EbA and green infrastructure interventions; and iv) training local communities on the impacts of climate change, benefits of EbA and green infrastructure interventions and how to operate and maintain these interventions; this will build on the awareness raising carried out under Activity 2.3.1 WWF-Pakistan will lead the implementation of this project activity, training 80 national and sub-national regulators, 120 national and sub-national Project planners, and 120 community leaders.

Sub-Activity 2.3.1.1: Train and raise awareness of national and sub-national policymakers and planners on the contents and application of the updated procedures developed under Activity 2.2.1.

164. Through a series of workshops, 80 participants from the following national and provincial governments will be trained on the updated procedures of the Implementation Framework of the National Water Policy, National Adaptation Plan, and four Provincial Adaptation Plans developed under Output 2.2:

- a. Ministry of Climate Change (MoCC)
- b. Ministry of Water Resources (MoWR)
- c. Ministry of Planning, Development and Special Initiatives (MoPSI)
- d. National Disaster Management Authority (NDMA)
- e. Provincial Departments of Irrigation, Forestry, Wildlife, and Agriculture
- f. Provincial Department of Environment Protection
- g. Provincial Disaster Management Authority (PDMA)
- h. Provincial Department of Planning and Development (PP&D)

165. Participants will be selected from the ministries listed above which have direct influence over flooding and drought regulation and planning. Those departments within these agencies will be sent requests to nominate trainees from their department. The training will focus on: i) the details of the updated procedures and their key considerations for on-the-ground implementation and adoption of EbA and green infrastructure; ii) the relevance of the updated procedures in future climate change adaptation initiatives in Pakistan, including in funding applications prepared by GoP staff to access external (e.g., donor) financing; and iii) how to apply the updated procedures in the design, construction, operation and maintenance of EbA and green infrastructure interventions in future country-driven climate change adaptation Projects. Additionally, WWF-Pakistan will work with the relevant national and sub-national government staff to connect them with international training institutions that provide certified online courses on the design, implementation and benefits of EbA and green infrastructure, such as IHE Delft Institute for Water Education. While IHE Delft Institute for Water Education is an already identified partner, the international training programmes will also include other similar institutes which meet the training needs. Such other institutes will need to be certified training institutes and will be selected based on specific training needs and capacity identified during Year 2 of project execution.

**Sub-Activity 2.3.1.2: Train national and sub-national technical staff on the implementation, monitoring, operations, and maintenance of EbA and green infrastructure interventions.**

166. Through a series of professional, technical trainings and exposure visits, 120 participants from the following national and provincial governments will be trained on how to implement, operate and maintain EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan:

- i. Ministry of Climate Change (MoCC)
- j. Ministry of Water Resources (MoWR)
- k. Ministry of Planning, Development and Special Initiatives (MoPSI)
- l. National Disaster Management Authority (NDMA)
- m. Provincial Departments of Irrigation, Forestry, Wildlife, and Agriculture
- n. Provincial Department of Environment Protection
- o. Provincial Disaster Management Authority (PDMA)
- p. Provincial Department of Planning and Development (PP&D)

167. Participants will be selected from the ministries listed above which have direct influence over flooding and drought regulation and planning. Those departments within these agencies will be sent requests to nominate trainees from their department. As part of this capacity-building, technical staff from these governments will visit the Component 1 project sites where local stakeholders are engaged in implementing EbA and green infrastructure interventions to enhance their learning and enable scaling up and replication across Pakistan. Furthermore, a pool of experts will be established within MoCC, MoWR (including FFC) and relevant provincial line departments mentioned above to ensure that EbA and green infrastructure interventions are integrated within future country-driven flood and water resources management and climate change planning.

**Sub-Activity 2.3.1.3: Train local community leaders/representatives on EbA and green infrastructure interventions and their benefits, as well as on the implementation, monitoring, operations, and maintenance of these interventions.**

168. Through a series of workshops, 120 local community leaders/representatives will be trained on the impacts of climate change on their livelihoods, how to implement EbA and green infrastructure interventions at an appropriate scale to reduce climate change impacts, and how to operate and maintain these interventions. The training and capacity building of communities under Sub-Activity 2.3.1.3 will be executed in consultation with the CBOs. The executive body of the CBOs which is responsible for making key decisions on behalf of the CBOs will nominate members from the CBOs and the community who will participate in these training sessions. The CBOs will ensure that the most relevant community members participate, and their capacity is built to ensure the CBO and the local community can effectively implement, monitor and maintain the EbA and Green Infrastructure interventions. Furthermore, to ensure the participation of local communities in decision-making, tools such as Participatory Rural Appraisal (PRA) and Rapid Rural Appraisal (RRA) will be used, and community elders and CBOs will be engaged to ensure the trainings respond directly to the needs of communities and local-level beneficiaries.

**Component 3: Enhanced community resilience and adoption of EbA and green infrastructure interventions in Pakistan's Indus Basin.**

**Outcome 3: Enhanced resilience of community livelihoods in the Indus Basin.**

***Output 3.1: Pipeline of feasible climate-resilient businesses.***

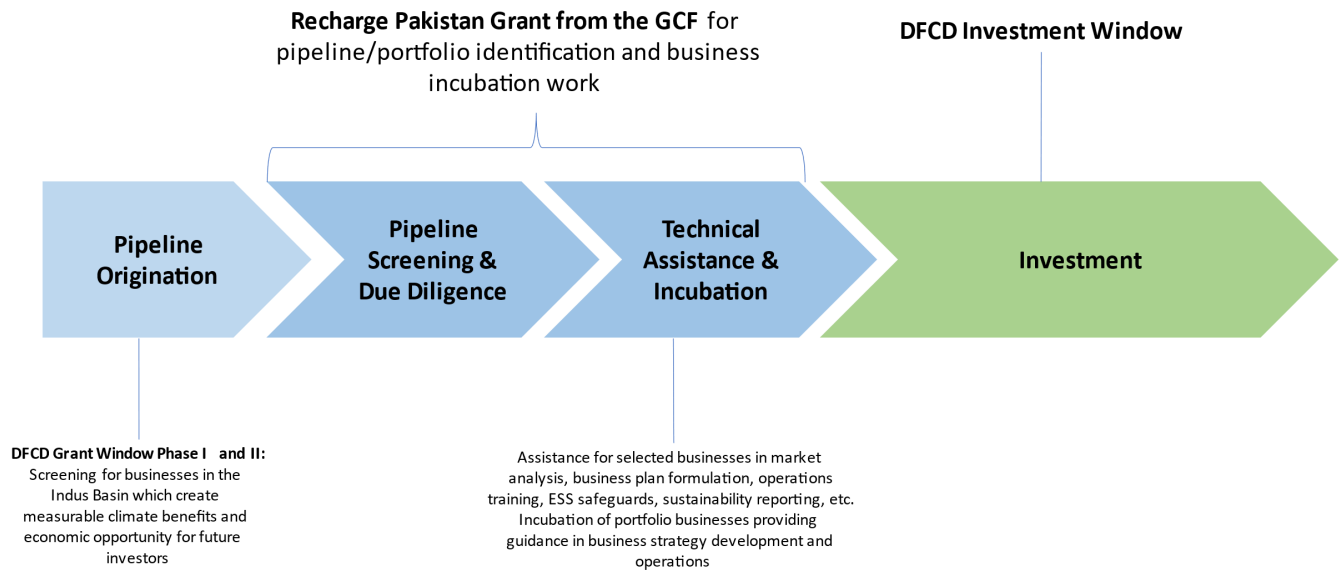
169. Although there is interest among financial institutions in Pakistan to invest in climate-resilient sustainable businesses, they are not willing to invest in the necessary origination and incubation work needed to identify such investments. Important foundational work in this space has been done by WWF-Pakistan in collaboration with the DFCD. In late 2019, WWF-Pakistan submitted a concept for the Indus Ecoregion as a potential target region for DFCD and was subsequently chosen out of 61 submissions to pilot and develop bankable projects. WWF-Pakistan will leverage its experience developing pipeline businesses for the DFCD and provide incubation services to these businesses which achieve adaptation benefits and provide real return opportunities for investors. The DFCD project is still on-going however Phases I and II which cover the period of feasibility assessment, pipeline screening, and grant assistance and TA for the businesses was ended for the DFCD portfolio in Pakistan despite remaining TA needs before being able to access non-grant concessional lending from the DFCD investment window. Through Recharge Pakistan the selected businesses included in Table 9 will receive the additional TA required and when ready will prepare investment pitches to the DFCD investment window. DFCD will not be the only investors to be approached. The Project will also prepare investment packages for other investors including JS Bank and the Acumen Fund in Pakistan.

170. WWF-Pakistan has identified 7 candidate businesses remaining from the DFCD project eligible for incubation assistance to ultimately access debt and equity finance. While these businesses have received some assistance

from DFCD, see table below, they still require additional support to access DFCD’s investment window where these can be considered for non-grant dept and/or equity investment. The project will however seek to link business supported under Activity 3.1.1 with other initiatives in Pakistan focused on sustainable investment such as the Acumen Climate Action Pakistan (ACAP) Fund being proposed to the GCF. The pipeline developed through grant financing under Recharge Pakistan will aim to secure investment from ACAP Fund. That primarily focuses on climate resilient agriculture and food systems at large.

**Activity 3.1.1: Develop a pipeline of 7 sustainable climate-resilient businesses.**

171. The project will conduct due diligence over the existing DFCD Project identified businesses, conduct detailed needs assessments, and prepare business development plans for each business, provide TA, incubation, and business support to each business based on their individual needs (see Table 9) below, and support businesses in closing financial agreements with investors, including with the DFCD investment window. This activity will be executed by WWF-Pakistan who will administer grants to each business. This activity will contribute to the project’s efforts to enhance community resilience by providing important case studies for business models which create positive environmental impacts while creating economic resilience for vulnerable communities and business owners.



**Figure 29.** Project support for businesses

**Sub-Activity 3.1.1.1: Build on the initial study completed by WWF-Pakistan identifying bankable project opportunities in the Indus Basin in the agriculture, forestry, and water sectors.**

172. The project will conduct due diligence over the DFCD pre-screened business to establish the final pipeline for the project. This due diligence will include: i) individual business surveys and visits; ii) identification of technical assistance needs among shortlisted businesses and projects; iii) determining financing needs; iv) business governance and management assessments; v) environmental and social safeguard screenings; and vi) risk identification. Businesses will be selected for support based on the results of these assessments.

**Table 9.** DFCD businesses needs assessment.

Business Name	Sector - Product	DFCF Phase/ What assistance have they already received if any, including amount of financing.	Estimated additional capital need	General areas of TA to be provided by the proposed GCF project
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Sustainable mushroom farming	Climate Smart Agriculture – Fresh and canned mushrooms	Secured a Euro 50,000 grant from DFCD to conduct pre-feasibility/ feasibility studies in the following areas; market analysis, technical studies, socio-economic and environmental baseline setting, stakeholder engagement & analysis, financial modelling, capital structure, legal & tax advisory, and organizational capacity building.	Pilot development: USD 300K-400K	<ol style="list-style-type: none"> <li>1. Grant finance to launch pilot Projects;</li> <li>2. Assistance in integrating sustainability and environmental and social safeguards within their business strategy and process.</li> <li>3. Improving market linkages and access accessing local and export markets;</li> <li>4. Technical assistance to access blended finance.</li> </ol>
Climate smart horticulture using hydroponics	Climate Smart Agriculture – High value commodities such as Ginger & bell pepper	Secured a Euro 50,000 grant from DFCD to conduct pre-feasibility/ feasibility studies in the following areas; market analysis, technical studies, socio-economic and environmental baseline setting, stakeholder engagement & analysis, financial modelling, capital structure, legal & tax advisory, and organizational capacity building.	Pilot development: USD 300K-400K	Same as above.
Sustainable banana and sugarcane growing using tissue cultures	Banana and Sugarcane	A detailed concept has been developed under the DFCD's scanning of bankable Project study, however the DFCD Project in Pakistan ended before the Project could access any grant finance.	<p>For pre-feasibility/ feasibility studies: USD 15K-20K</p> <p>Pilot development: USD 300K-400K</p>	<ol style="list-style-type: none"> <li>1. Development of feasibility studies;</li> <li>2. Grant finance to launch pilot Projects;</li> <li>3. Assistance in integrating sustainability and environmental and social safeguards within their business strategy and process.</li> <li>4. Improving market linkages and access accessing local and export markets;</li> <li>5. Technical assistance to access blended finance.</li> </ol>
Sustainable aquaculture of high value species and value chain enhancements	Aquaculture – Freshwater Fishes	A detailed concept has been developed under the DFCD's scanning of bankable Project study, however the DFCD Project in Pakistan ended before the Project could access any grant finance.	<p>For pre-feasibility/ feasibility studies: USD 15K-20K</p> <p>Pilot development: USD 300K-400K</p>	Same as above.
Development of natural sustainable fibre alternatives to cotton	Textile – Alternate fibre from <i>Sisal</i> and <i>Flax</i>	A detailed concept has been developed under the DFCD's scanning of bankable Project study, however the DFCD Project in Pakistan ended before the Project could access any grant finance.	<p>For pre-feasibility/ feasibility studies: USD 15K-20K</p> <p>Pilot development: USD 300K-400K</p>	Same as above.

Horticulture and livestock raising	Climate Smart Agriculture – Dates and other fruit commodities	A detailed concept has been developed under the DFCD's scanning of bankable Project study, however the DFCD Project in Pakistan ended before the Project could access any grant finance.	For pre-feasibility/ feasibility studies: USD 15K-20K  Pilot development: USD 300K-400K	Same as above.
Sustainable Medium Density Fiberboard (MDF) manufacturing through agro-forestry	Agroforestry – MDF boards and other raw & processed wood products	A detailed concept has been developed under the DFCD's scanning of bankable Project study, however the DFCD Project in Pakistan ended before the Project could access any grant finance.	For pre-feasibility/ feasibility studies: USD 15K-20K  Pilot development: USD 300K-400K	Same as above.

**Sub-Activity 3.1.1.2: Formulate technical assistance and business development plans for shortlisted climate-resilient DFCD businesses.**

173. The project will provide grant assistance to the selected businesses for: regional market studies; detailed environmental and social impact assessments; financial deal structuring; legal and tax advisory (deal structuring); piloting project activities; institutional capacity building (hiring, operations and financial systems buildout); stakeholder analysis, and community engagement. The aforementioned technical support is vital for bankable enterprises to help them secure the much needed financial and technical assistance to help them grow and reach the investment thresholds of debt and equity investors.

**Sub-Activity 3.1.1.3: Assist Bankable enterprises with financial close within the DFCD funding window (loaning application, investment pitch preparation, etc.).**

174. For those businesses capable of revenue generation and showing favourable financial forecasts, the project will assist these businesses in the preparation of applications to the DFCD loan and equity window and other investors such as JS Bank in Pakistan (GCF DAE).

**Output 3.2: Improved climate-resilient livelihoods among vulnerable target communities.**

175. Because the agricultural sector is one of the most vulnerable to the impacts of floods and droughts in Pakistan, interventions under Output 3.2 will strengthen the climate resilience of small-sale farmers and vulnerable people in the Indus Basin that depend on agriculture for their livelihoods. These people's vulnerability to climate change is exacerbated by limited technical support, high cost of inputs, lack of access to high-yielding and climate-resilient crop varieties, and the use of unsustainable agricultural practices. The Provincial Departments of Agriculture currently provide extension services to farmers, but these departments have yet to adapt these to be responsive to current and future anticipated climate scenarios.

176. WWF-Pakistan will assist the Provincial Departments of Agriculture to modernize their extension service programs by training extension agents in ecosystem friendly and climate-resilient alternatives to current agricultural practices employed by small-scale farmers. This will allow the Provincial Agriculture Departments in the future to deliver climate-responsive extension services on measures such as: i) improved water-efficient irrigation practices; ii) farming of drought-resistant crop varieties; iii) soil management practices responsive to changing climate conditions; and iv) installation and use of water storage tanks for vulnerable small-scale farming households. Output 3.2 will complement Outputs 1.1 and 1.2 by introducing a community-based climate-resilient approach to farming to enhance agricultural productivity, reduce agricultural expansion, and reduce the degradation of ecosystems that provide critical services that buffer the impacts of climate change. Interventions under this project output will benefit 50,750 small-scale farmers, their families and vulnerable people in the Indus Basin dependent on agriculture for their livelihoods.

**Activity 3.2.1: Improve the climate resilience of vulnerable agricultural livelihoods.**

177. Under this activity, WWF-Pakistan will partner with the Provincial Departments of Agriculture to enhance agricultural extension services and enable the adoption of climate-resilient agricultural practices in the Indus Basin. This will involve designing and delivering a new climate-responsive extension services curriculum, training the department's existing extension agents in delivering this curriculum, and improving the delivery of climate-responsive extension services to vulnerable farmers to adapt their practices in response to increasingly severe and frequent floods and droughts. The curriculum will include training modules focusing on: i) water-efficient irrigation methods; ii) the use of drought-resistant crop varieties; iii) climate-resilient soil management methods; and iv)

effective use of rainwater tanks, to be provided by the project, to supplement dry season water supplies, providing water for irrigation and livestock.

178. Activity 3.2.1 will use a Farmer Field School (FFS) approach in delivering this new curriculum, whereby training sessions are conducted over an entire crop season. Lessons learned from other initiatives in Pakistan indicate that such an approach leads to higher adoption rates and sustained behaviour change both within government agencies and communities. Through the FFS, the project will introduce new irrigation technologies and methods, facilitate the adoption of drought resistant seed varieties into current crop farming practices as well as improved farming and soil management techniques which are better suited to prolonged periods of drought. Water storage tanks, accompanied by training on their installation, operation and maintenance, will also be provided to capture rainfall and serve as immediate sources of water for irrigation and household use during droughts. The Farmer Field School cohorts will be assembled during execution of the project following calls for participation from local farmers by WWF Pakistan in the target villages and communities. Enrolment in the FFS will be contingent upon farmer willingness to adopt the climate-resilient agriculture practices covered by the curriculum.
179. The Provincial Agriculture Departments, via their extension services, will be responsible for delivering the training to communities in Punjab, Balochistan, Khyber Pakhtunkhwa and Sindh Provinces. The project will provide the necessary materials and equipment for the FFS trainings, including seeds, grow bags, saplings, low-cost material, irrigation systems, etc. The trainers will identify Lead Farmers during their trainings to demonstrate new approaches to others in the area. Lead Farmers within the FFS cohorts will be identified by the participating farmers in each of the communities. These Lead Farmers will be provided additional farming inputs to incentivize their knowledge sharing. Activity 3.2.1 will be executed by WWF-Pakistan who will provide training, capacity development, and grant finance to the provincial departments to provide training and equipment to farmers in the Indus Basin.

*Sub-Activity 3.2.1.1: Strengthen the capacity of small-scale farmers and people dependent on agriculture on climate-resilient agriculture and sustainable practices.*

180. WWF-Pakistan will develop a curriculum, training modules, and workplans for the FFSs, with Technical Assistance (TA) provided by international and local experts brought on as consultants by the project for the full seven-year implementation period. The curriculum, training modules and workplans for the FFSs will be shared with the Provincial Departments of Agriculture, local NGOs, academic and research institutions such as the Pakistan Agriculture Research Council (PARC), and community representatives to gather input before these are finalized and agreed upon with the Provincial Departments. WWF-Pakistan will organize the necessary logistics for these trainings including venues, training materials, supplies, equipment and materials, and excursions for training exercises on farm. The trainings will be hosted by the Provincial Departments of Agriculture in each province.
181. Eighty-five extension agents and Department of Agriculture staff (15% women) will be trained in each province. The training curriculum will be implemented over 90 days in Year 2 of the Project, with periodic scheduled refresher trainings. Upon completion of the training the trainees (staff and extension agents) will become Master Trainers and collectively responsible for delivering 170 FFS per year (6 trainings per Master Trainer and 25 farmers participating in each FFS) to total of 4,131 participants per year. A total of 24,786 small-scale farmers and people in the Indus Basin will benefit from this training on climate-resilient agricultural practices.
182. Trainers will be responsible for tracking adoption rates, water savings, and changes in yield over time. The PIUs will be responsible for coordinating the training delivery with the Provincial Agriculture Departments in each province and manage all TA consultancies for the development of the training materials. The agriculture activity leads in the SIUs (see Section B.4 for more details) will also be engaged to ensure that the training approaches are used in the project sites for Sub-activities 3.2.1.2, 3.2.1.3, 3.2.1.4, and 3.2.1.5.

*Sub-Activity 3.2.1.2: Improve the water efficiency of farming through improved farm management and irrigation systems.*

183. The project will organize and administer FFSs on water-efficient farming practices and irrigation technologies. Master Trainers from the Provincial Departments of Agriculture will deliver on farm trainings in best practices for the cultivation of crops and fruit trees more capable of withstanding drought conditions such as orchards, vegetables and horticulture varieties, and fodder cultivation plots. The trainers will distribute and demonstrate the use of water-efficient irrigation technologies including high efficiency irrigation systems (HEIS) and provide farmers the required components and inputs — e.g., drip irrigation, sub surface irrigation systems, and tunnel farming and green houses. Farmers will also be trained on the maintenance of these systems to ensure they can continue to operate



independently. A total of 6,752 small-scale farmers and people in the Indus Basin will benefit from improved irrigation techniques.

*Sub-Activity 3.2.1.3: Introduce drought-resistant crop varieties.*

184. Farming communities in the Indus Basin have traditionally relied on water-intensive crops such as rice and maize exposing them to an increasing risk of crop failure and lower yields due to climate change-related diminishing seasonal water access for irrigation. Under this sub-activity, 13,277 small-scale farmers will benefit from adopting drought-resistant crop varieties proven to be successful in these areas, including varieties of barley and wheat which require less water, olives, figs, vegetables, and herbs. Further adoption of these climate smart agricultural practices and enhanced seeds is predicated on the economic case to be demonstrated through the farmers plots that the use of these climate smart methods and seeds leads to greater economic efficiency for farmers from reduced irrigation costs and material costs, and increases in crop yields after which farmers would voluntarily purchase farming improved seeds using their own resources because of their economic benefits. This voluntary approach is already in practice in the Provincial Agriculture Departments existing extension programs and is essential to ensure sustainability in the uptake of new farming practices limiting dependence on public or donor funds.

*Sub-Activity 3.2.1.4: Improve the climate resilience of soil management practices.*

185. Under this sub-activity, climate-resilient management practices for improved soil conservation and productivity will be introduced to farmers in the Indus Basin. Sustainable soil management practices will include the use of bio-fertilizers provided by the project, conservation tillage, efficient use of synthetic fertilizers, improved crop residue management, mulching, and use of compost. These methods will reduce production costs as well as improve soil health and water holding capacity. A total of 4,424 farmers will benefit from the adoption of these improved practices. Agricultural businesses receiving assistance by the Project under Activity 3.1.1 will also receive extension services support to improve their farming practices.

*Sub-Activity 3.2.1.5: Provide water storage tanks to vulnerable agricultural communities.*

186. Under this sub-activity, rainwater storage tanks will be procured and installed, accompanied by training on their installation, operation and maintenance, to supplement dry season water supplies in agrarian communities in water scarce areas of the Indus Basin. The storage tanks will be used for agricultural purposes and livestock watering. 15 tanks will be installed on communal lands for public access. Specific tank locations will be identified by the communities to ensure these meet local needs and enhance equitable access. The anticipated storage capacity of each tank will be 1,350 m<sup>3</sup> (dimensions — 30 m × 30 m × 1.5 m), which will provide 20,250 m<sup>3</sup> of additional water to 1,512 smallholder farmers and their families. Communities which receive the water storage tanks will be identified during Year 1 of the project. WWF Pakistan will identify these communities based on the following criteria: presence of a central location allowing for equal access for community members and willingness and ability of communities to assume the O&M costs of the tanks after the GCF financing period. The water collected in the tanks will be provided free of charge for communities and the WUG established under Sub-Activity 1.3.1.2 will be responsible for establishing equitable distribution in each community.

Schematic Diagram of Water Storage Tank

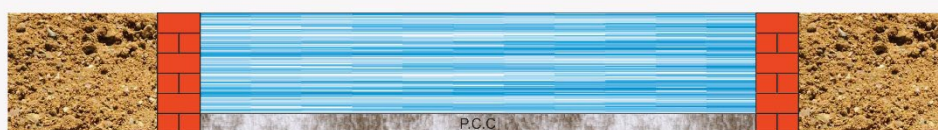
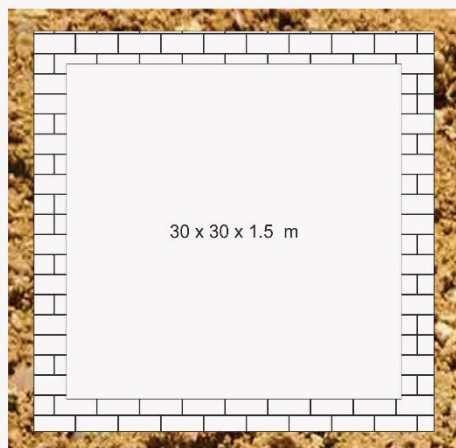


Figure 30. Schematic drawing of a water storage tank.

#### B.4. Implementation arrangements (max. 1500 words, approximately 3 pages plus diagrams)

##### Accredited Entity

187. **The World Wildlife Fund, Inc. (WWF-US)** will serve as the Accredited Entity (AE) for the project and will provide GCF Proceeds to the Executing Entity (EE), in accordance with the FAA to be entered with the GCF. The AE will be responsible for the overall oversight of this project, including technical, financial, and administrative monitoring and supervision (through reporting, audits, and annual site visits) and review and approval of the EE's annual workplans and budgets. WWF-US will also be responsible for channelling the GCF Proceeds and the relevant co-financing resources from USAID and TCCF to the EE, providing support, guidance and backstopping to the EE, monitoring of the achievement of project results and outputs, reporting to the GCF and the referred co-financiers, and project closure and evaluation. WWF-US will conduct these responsibilities, and disburse GCF Proceeds to the EE, in line with WWF-US' Accreditation Master Agreement (AMA) and anticipated Funded Activity Agreement (FAA) with the GCF. WWF-US also serves as the AE for *FP050 Bhutan for Life*, which was launched in 2018.

##### Executing Entity (EE)

188. The project will be executed by one Executing Entity (EE), WWF-Pakistan. The EE will be responsible for project execution, among others, including the management of grantees, recipients of goods or services, and procured parties and their activities, and reporting to the AE.

189. **WWF-Pakistan<sup>100</sup>**, a private independent organization under the international WWF Network and separate legal entity to WWF-US, will serve as an EE for the project. With its Head Office in Lahore, 6 regional offices, and 30 project site offices, WWF-Pakistan is the leading conservation organization in the country. WWF-Pakistan has significant experience working with the Government of Pakistan (GoP) in policy and regulatory design and reform, including the Environmental Protection Act, the National Water Policy, the National Wetlands Policy, and the Clean Drinking Water Policy. WWF-Pakistan also has a long track record implementing EbA projects in Pakistan's landscapes most vulnerable to climate change including: 1) restoring and protecting, through community

<sup>100</sup> WWF-Pakistan is not controlled by the AE, does not control the AE, and is not under common control with the AE, where "control" means ownership of a majority of the voting power of the either entity. Both organizations are independent legal entities with bilateral contractual and licensing relationships with World Wildlife Fund for Nature, a Swiss foundation that serves as the secretariat for the global network of WWF National Organizations.

management arrangements, mangroves ecosystems in the Indus Delta; 2) improving watershed management and enhancing agricultural livelihoods to better withstand climate change in sub-catchments of Khanpur Dan; 3) the development of pilot projects to serve as replicable models for future wetland conservation projects and their use as an evidence base to support the formulation of national and sub-national wetland regulations and plans under the Pakistan Wetlands Program; and 4), carrying out assessments in the Western Himalayas Ecoregion, Indus Floodplains, and Indus Delta Ecoregion to identify flood damages and formulate plans for ecological restoration as part of the 2010 Flood Early Recovery Program, which helped to restore flood-affected ecosystems through reforestation, natural regeneration through protection, construction of flood protection spurs, and restoration of landslide areas through green infrastructure.

190. WWF-Pakistan will be responsible for the execution of project Activities 1.1.1, 1.1.2, 1.2.1, 1.3.1, 1.3.2, 2.1.1, 2.1.2, 2.2.1, 2.3.1, 3.1.1, 3.2.1, managing all procured parties and their activities, reporting to the AE, and ensuring optimal alignment of the project with the GoP's policies and ministerial contributions to achieve the Project Outcomes and Fund-level impacts, as described in Section B.3. WWF-Pakistan will hold GCF Proceeds, in a new and separate dollar (USD) denominated account. As an EE, WWF-Pakistan will enter into a subsidiary agreement with WWF-US (as the AE) in respect of the GCF Proceeds, grant agreements with each grantee, consulting agreements with private sector service providers, and cooperative agreements with each recipient of goods or services, such as technical assistance for the project activities, retaining responsibility for any delegated authority over financial management and procurement. As part of the AE's due diligence, WWF-US assessed WWF-Pakistan's capacity to execute the project (see Annex 9 for details). This assessment determined WWF-Pakistan to be capable of applying WWF-US and GCF standards and policies in the execution of the project.
191. WWF-Pakistan (EE) will establish and host the **Project Management Unit (PMU)** within WWF-Pakistan's office in the Federal Capital, Islamabad (Figure 29). The PMU (through the project Manager) will report to the AE. The PMU will be led by the Project Director and operate under the guidance of the **Project Steering Committee (PSC)** described below. The Project Director will be a full-time staff member of WWF-Pakistan providing 50% of LOE to the project through high-level support and strategic guidance to the PMU and facilitate engagements with high-level government staff where appropriate and necessary during project execution. The PMU will be responsible for overall project management and planning, providing support to the execution of day-to-day activities, coordinating with the national government and project partners, coordination with the AE, direct supervision of contracted project activities, and coordinating project execution across four provinces. The PMU will also be responsible for reporting on the application of resources and results achieved, preparing management reports including annual reports and any proposals for the adaptive management of the project, promoting inter-institutional linkages and coordination with national initiatives, and disseminating project results.
192. The key staff in the PMU will include a: i) Project Director; ii) National Project Manager (PM); iii) Operations Manager, iv) Manager Administration & Security; v) Coordinator Contract Managements; v) M&E Manager; vi) Environment and Social Safeguards (ESS) Manager; vii) Gender Manager; viii) Senior HR Officer; ix) Officer, Contracts Management; x) 9 Office Attendants to support administration; and xi) Security Support. The PM will be a full-time staff member on the project, recruited competitively, who will be responsible for the daily implementation and management of the project. This will include ensuring that the project achieves the targets set out in the Logical Framework (Section E) to the required quality standards, and within the specified time and budget allocations. In line with this mandate, the PM will: i) report directly to the PSC on project management-related matters; ii) manage the project in accordance with the specified workplans and allocated budget; iii) ensure that all project interventions are implemented according to GCF and WWF rules, policies and standards; iv) work closely with national and local authorities to ensure that the project is managed effectively and that the needs of all beneficiary groups are considered; v) oversee the efficient and effective information- and knowledge-transfer to relevant project partners; vi) oversee the development of annual work plans and budgets; vii) communicate project progress updates to the PSC at biannual PSC meetings, including recommendations from the POCs on project implementation; and viii) develop ToRs for key project staff and implementing partners, including detailed scopes of work and service contracts, in line with the project Procurement Plan (Annex 10). The PM will be required to fulfil the role until project completion and the submission of the final evaluation report — as well as any other required documentation — to WWF US (AE). The Operations Manager will report directly to the PM and be responsible for: i) providing financial support to the PMU; ii) compiling reports on the disbursement procedures for the project and anticipated requirements for project funding during the implementation phase; and iii) ensuring that all project-related tasks are undertaken according to WWF and GCF rules, policies and standards. The Operations Manager will also manage the financial transactions for the project's activities, which will be implemented in accordance with the established project workplan and national priorities.

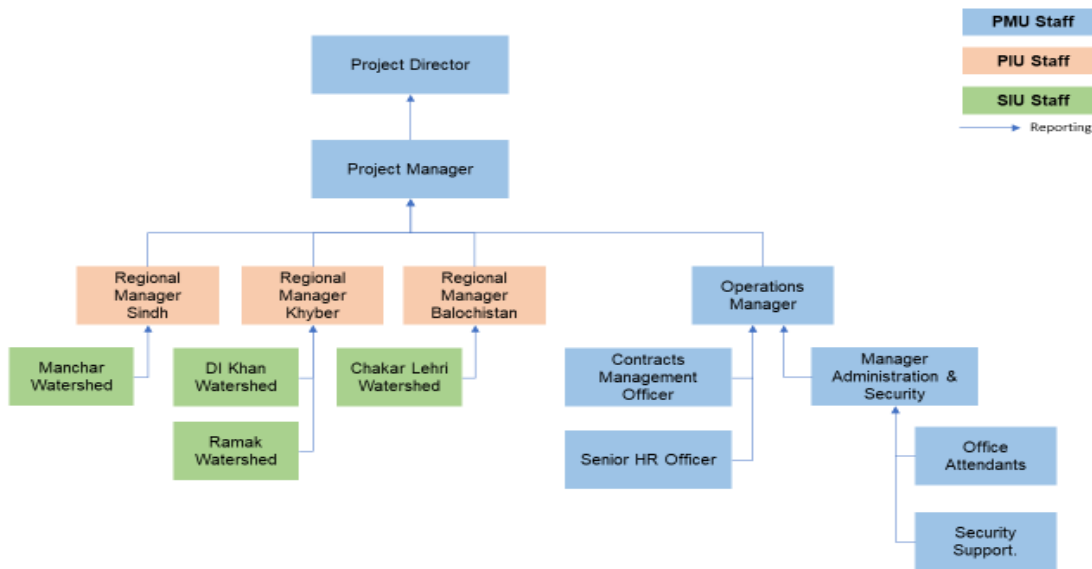


Figure 31. WWF-Pakistan Organigram.

193. There will be four **Provincial Implementation Units (PIUs)** hosted within WWF-Pakistan’s regional offices located in the Provincial Capitals (Khyber Pakhtunkhwa, Sindh and Balochistan). These units will coordinate the implementation of project activities under Components 1, 2 and 3 guided by the Provincial Oversight Committees (POCs) described below. The PIUs will be headed by Regional Managers (one for each of the three provinces), that are full time WWF-Pakistan staff working on the project, each reporting to the PM in Islamabad. The Regional Managers will be responsible for: i) managing the Site Implementation Units (SIUs) defined below, coordinating with provincial line agencies, and managing key service providers on the implementation of project activities; ii) providing technical support and oversight to field teams including ensuring compliance with WWF, GCF and national policies and standards, in collaboration with the Provincial Oversight Committees (POCs); iii) undertaking monitoring and evaluation (M&E) of project activities and developing knowledge products to share lessons learned via the PMU and project partners; and iv) development of ToRs for provincial and field level staff and implementing partners in addition to defining scope of service level agreements and procurement plans.

194. **Site Implementation Units (SIUs)** will be based at field offices in the following locations: i) DI Khan Watershed (this office will cover the DI Khan and Ramak Watershed project areas); ii) Chakar Lehri Watershed; and iii) Manchar Lake Watershed. SIUs are necessary for the successful implementation of project activities as the four target provinces under the project cover large areas with difficult terrain and road networks. Some of the proposed sites are as far as six hours away by car from the PIUs requiring smaller site-based offices to manage the daily execution of project activities. These offices will host full-time WWF-Pakistan staff who will report directly to the respective Regional Managers of the PIUs. The field office staff will be responsible for on-the-ground implementation of project activities and supervising the service providers responsible for executing specific project activities. The SIUs will also provide technical support to the CBOs located in the project areas. SIUs will also provide on-the-ground support to project M&E staff, collect data for project reporting and ensure the timely execution of project activities against the project workplan.

**Governance Bodies**

195. **The Project Steering Committee (PSC)** will be the project’s governance body and consist of 10 members that will ensure alignment with Pakistan’s national climate objectives and provide technical guidance to the Project Management Unit and Provincial and Site Implementation Units. Specifically, the PSC will: i) review and endorse annual work plans and budgets; ii) provide expert guidance on the project strategy and endorse any changes during implementation; iii) support the PMU with identifying and managing project-related risks; iv) support communication and dissemination of project outcomes to beneficiaries; v) provide strategic and policy guidance to ensure alignment of the project with national climate change regulations and plans; and vi) ensure that EbA and green infrastructure interventions are integrated in the main development agenda of the Government of Pakistan (GoP) at national and sub-national levels.



196. The PSC will support the PMU to implement the project's exit strategy across all levels of government, disseminate key lessons from the project, and maintain complementarity between the proposed project and key planned and ongoing initiatives in the Indus Basin such as the NDRMF-funded project and the two GCF-funded projects in the Indus Basin, FP108 *Transforming the Indus Basin with Climate Resilient Agriculture and Water Management (led by FAO)* and FP018 *Scaling-up of Glacial Lake Outburst Flood (GLOF) risk reduction in Northern Pakistan (led by UNDP)*, respectively. A quorum of at least 50% of the members shall be required with mandatory participation from the Chair and PM. During PSC meetings, all members will receive updates on the status of the project and on the significant project developments from the PM. Members of the PSC will join the AE during annual site supervision visits to monitor project activity progress and engagement with local communities and stakeholders.
197. The PSC for the project will include a representative from each of the following:
- Ministry of Climate Change (MoCC) (Chair & GCF NDA);
  - Ministry of Water Resources (MoWR);
  - National Disaster Risk Management Fund (NDRMF);
  - National Disaster Management Authority (NDMA);
  - Ministry of Planning Development and Special Initiatives (MoPDSI);
  - Provincial Planning and Development Departments (to include one from each province: Sindh, Balochistan and Khyber Pakhtunkhwa); and
  - Environmental Affairs Division (EAD).
  - Community Representatives
  - Academic Institutions
  - NGOs
198. Serving below the PSC and to ensure ownership at the provincial level and by key government line departments, **Provincial Oversight Committees (POCs)** will be established in each of the four provinces. The POCs will be chaired by the Provincial Planning and Development Department who will also represent their Province in the PSC and include representation from appointed Provincial Focal Points from the Provincial Departments of (1) Irrigation, (2) Forest, (3) Wildlife, (4) Fisheries, (5) Environment, and (6) Agriculture.
199. The POCs will: i) assist the PMU with the development of annual work plans and budgets for the project activities for endorsement by the PSC; ii) ensure coordination among all relevant federal and provincial government departments; iii) support the PMU with formalizing service based contracts with service providers who will implement project activities; iv) seek complementarities among on-going government projects to maximize project level impact; v) coordinate with project M&E staff to track project progress at provincial level against the approved work plans; and vii) provide guidance and support to the SIUs during implementation, as needed. The POC will appoint a Chair who will be responsible for consulting with key experts as and when required for knowledge sharing and peer assistance. The POCs shall meet bi-annually before the PSC meetings are convened. This will ensure that POCs recommendations are duly considered and incorporated at the national level.
200. Under the POCs, the Provincial Focal Points will serve as the points of contact at the provincial levels for the implementation of project activities and report to the PM for all project activities. One focal point will be identified from each department during project start-up. The POCs and the respective focal points will provide technical support and guidance to the field teams for the implementation of project activities, including promoting the adoption of the project's adaptation interventions and mainstreaming EbA and green infrastructure interventions into Pakistan's provincial governments' planning for flood and water resources management.
201. Entities under the EE level are characterized as "procured parties". Procured parties will receive grants or contracts from the EEs to provide goods or services to the EEs in support of specific activities. Procured parties include private sector firms, national government agencies, provincial governments, and local communities that are responsible for territorial planning and climate change mitigation and adaptation. Table 10 identifies each procured party and specifies the type of agreement and selection criteria deployed. Grants will be awarded under WWF's accreditation scope of "grant award and/or funding allocation". The table below also indicates which Activities involve grant award and/or funding allocation.

**Table 10.** Partner entity details: Procured Parties

Executing Entity	Entity Shown in Figure 33 below	Role of that Entity on the Project	If grant award and/or funding allocation,	Form of Agreement between the	Entity pre-selected or will criteria be	Will that entity sub-grant? i.e., will it be an
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			<b>which activities</b>	<b>Entity and the EE</b>	<b>applied during execution</b>	<b>intermediary for cash grants?</b>
WWF-Pakistan	Provincial Departments of Forestry	Procured party	Activity: 1.1.1. Sub-activity: 1.1.1.1, 1.1.1.2.	Grant agreement	Pre-selected	No
WWF-Pakistan	Community managed Nurseries	Procured party	Activity: 1.1.1. Sub-activity: 1.1.1.1, 1.1.1.2.	Grant agreement	Criteria will be applied during execution	No
WWF-Pakistan	Provincial Departments of Irrigation	Procured party	Activity: 1.1.2. Sub-activity: 1.1.2.1, 1.1.2.2, 1.1.2.3, 1.1.2.4, 1.1.2.5	Grant agreement	Pre-selected	No
WWF-Pakistan	Provincial Departments of Irrigation	Procured party	Activity: 1.2.1. Sub-activity: 1.2.1.1, 1.2.1.2, 1.2.1.3, 1.2.1.4, 1.2.1.5, 1.2.1.6, 1.2.1.7.	Grant agreement	Pre-selected	Yes – WWF Pakistan will provide funding to the Provincial Departments of Irrigation to hire the engineering firm(s) (see row directly below). Engineering firms will be selected by the Provincial Departments using Quality cum Cost-Based Selection (QCBS) selection criteria which evaluates cost committed by the bidder and the technical qualification of the bidder.
WWF-Pakistan	Engineering Firm(s)	Procured party	Activity: 1.2.1. Sub-activity: 1.2.1.1, 1.2.1.2, 1.2.1.3, 1.2.1.4, 1.2.1.5, 1.2.1.6, 1.2.1.7.	Consulting agreement	Criteria will be applied during execution	No
WWF-Pakistan	CBOs	Beneficiaries	Activity 1.3.1. Sub-activity: 1.3.1.1, 1.3.1.2, 1.3.1.3 Activity 1.3.2. Sub-activity: 1.3.2.1, 1.3.2.2	Grant agreement	Criteria will be applied during execution	No
WWF-Pakistan	MoCC	Procured party	Activity: 2.2.1. Sub-activity: 2.2.1.1,	Cooperative agreement	Pre-selected	No

			2.2.1.2, 2.2.1.3, 2.2.1.4			
WWF-Pakistan	Provincial Departments of Agriculture	Procured party	Activity: 3.2.1. Sub-activity: 3.2.1.1, 3.2.1.2, 3.2.1.3, 3.2.1.4, 3.2.1.5.	Grant agreement	Pre-selected	No

**Table 11.** Procurement selection criteria for entities that will not be pre-selected (as specified in the table directly above).

Entity shown in Figure 33 below	Selection criteria applied/to be applied during execution
Engineering Firm(s)	The selection criteria for procurement of this entity will be based on Quality cum Cost-Based Selection (QCBS) criteria and procurement will follow WWF-Pakistan's (EE) and the Procurement & Consultancy Guidelines. The QCBS selection criteria evaluates cost committed by the bidder and the technical qualification of the bidder.
CBOs	8 CBOs have been identified, however, if the need for new CBOs is determined during execution of the project, WWF Pakistan will follow its Social Mobilization Strategy (Appendix 6 of Annex 6: ESMF) to select CBOs, as described under Activity 1.3.1 of Section B.3 in the Funding Proposal.
Community managed Nurseries	Selection criteria will follow WWF Pakistan's (EE) Social Mobilization Strategy (Appendix 6 of Annex 6: ESMF) to select Community Managed Nurseries.

202. **The Ministry of Climate Change** is the **National Designated Authority (NDA)** for Pakistan. It holds the national mandate for climate change, environment, and Multilateral Environmental Agreements, including UNFCCC and NDC commitments. The environmental division of the ministry is led by the Director General (Env/CC), and its responsibilities include: i) Climate Change & Environment; Environmental Legislation and Trans-boundary (inter-provincial, regional and international) issues; and ii) matters relating to sustainable development, water and sanitation, sustainable urbanization, Multilateral Environmental Agreements (MEAs) — including UN Framework Convention on Climate Change (UNFCCC). The MoCC will be a procured party and a recipient of goods and services in the form of technical assistance and logistical support from WWF-Pakistan under Activity 2.2.1. MoCC will lead government efforts to develop and adopt updated procedures for Pakistan's Implementation Framework of the National Water Policy, National Adaptation Plan and four Provincial Adaptation Plans on the execution of EbA and green infrastructure.

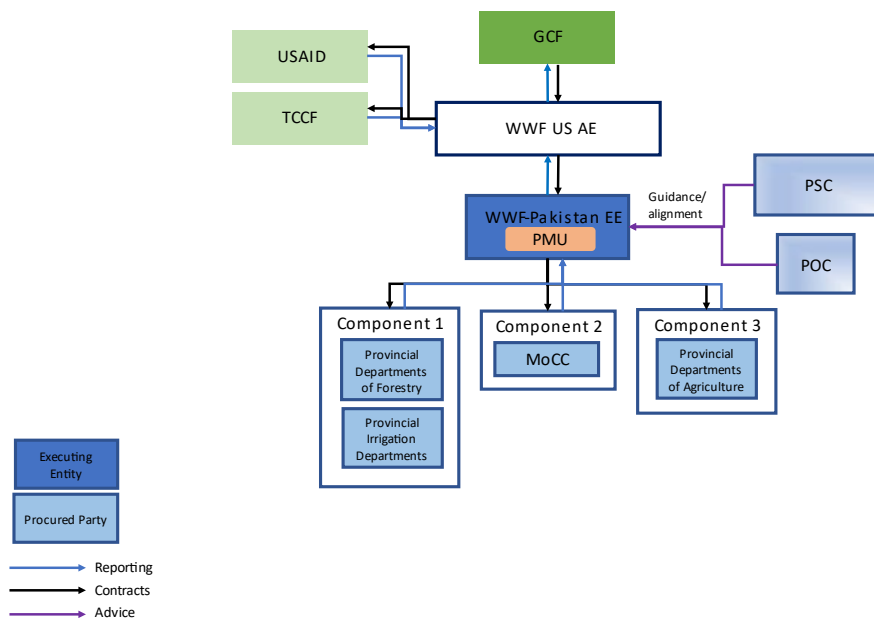
203. **The Ministry of Water Resources' (MoWR) Federal Flood Commission (FFC)**. The FFC is an Executive Department of the MoWR which was established in January 1977 to address the problem of flooding in Pakistan. FFC provides technical advisory services at national and sub-national levels — particularly to the MoWR and Provincial Departments of Irrigation — on engineering, water and hydropower sectors, including flood control, dams' safety, irrigation, drainage, and hydropower. FFC has over thirty-seven (37) technical officers who have experience in engineering and working in the water sector. The MoWR' FFC will provide technical assistance and coordination support to the Provincial Irrigation Departments on their activities, execution of project Activity 1.2.1.

204. **Provincial governments** are responsible for the administration of Pakistan's four Provinces. Governance over natural resources including forests and waterways is highly decentralized and provincial government Departments are largely responsible for the management of ecosystems and addressing climate change threats within their individual jurisdictions. They are also responsible for ensuring provincial level interventions align with national policies and regulations. Under the project, The Provincial Departments of Forestry will be procured parties for Activities 1.1.1 and 1.1.2, the Provincial Departments of Irrigation will be procured parties for Activity 1.2.1, and the Provincial Departments of Agriculture will be procured parties receiving grant funding and services in the form of technical assistance under Activity 3.2.1. The Provincial Departments are accustomed to managing sizeable projects and budgets considering their direct role in planning and implementation across key sectors. Just as recently as February 2023, the Province of Sindh, Planning and Development Department, Province of Sindh,

Irrigation Department received a 510-million-dollar loan from the World Bank to repair the provinces damaged grey infrastructure network<sup>101</sup>.

**Table 12. AE and EE roles & responsibilities.**

WWF US (AE)	WWF-Pakistan (EE)
<ul style="list-style-type: none"> <li>• Signs the FAA with the GCF detailing all the responsibilities of the AE for the execution of the project.</li> <li>• Signs a Subsidiary Agreement with the EEs to provide the GCF Proceeds and to hold them to the duties of an EE as described in the AMA and FAA.</li> <li>• Signs relevant Co-financing Agreements with USAID and TCCF in respect to the relevant co-financing resources, including the relevant terms and conditions from such donors; and signs separate grant agreements with the EE for the channelling of such co-financing resources and flow down of any donor-specific requirements.</li> <li>• Receives, reviews, and approves the project financial and technical information, and disburses GCF Proceeds and co-financing resources to the EE.</li> <li>• Reports to the GCF on the project technical and financial progress and requests disbursement of grant funding.</li> <li>• Monitors the performance of the EEs and supports their capacity building.</li> <li>• Communicates with the country NDA to facilitate the successful implementation of the project.</li> </ul>	<ul style="list-style-type: none"> <li>• Signs a Subsidiary Agreement with the AE.</li> <li>• Signs separate grant agreements with the AE in respect of the co-financing resources.</li> <li>• Submits requests for disbursement to the AE for GCF-funding in accordance with the timing and conditions of the Subsidiary Agreement.</li> <li>• Receives from WWF-US, the relevant annual instalments of the GCF grant and co-financing resources.</li> <li>• Leads the execution of Activities 1.1.1, 1.1.2, 1.2.1, 1.3.1, 1.3.2, 2.1.1, 2.1.2, 2.2.1, 2.3.1, 3.1.1, 3.2.1</li> <li>• Acts as financial manager for the project implementation.</li> <li>• Procures all goods and services funded by GCF proceeds in accordance with AE's fiduciary standards.</li> <li>• Prepares and compiles annual work plans and budgets.</li> <li>• Compiles and prepares technical and financial reports for submission to the AE.</li> </ul>



**Figure 32. Implementation arrangements for the project.**

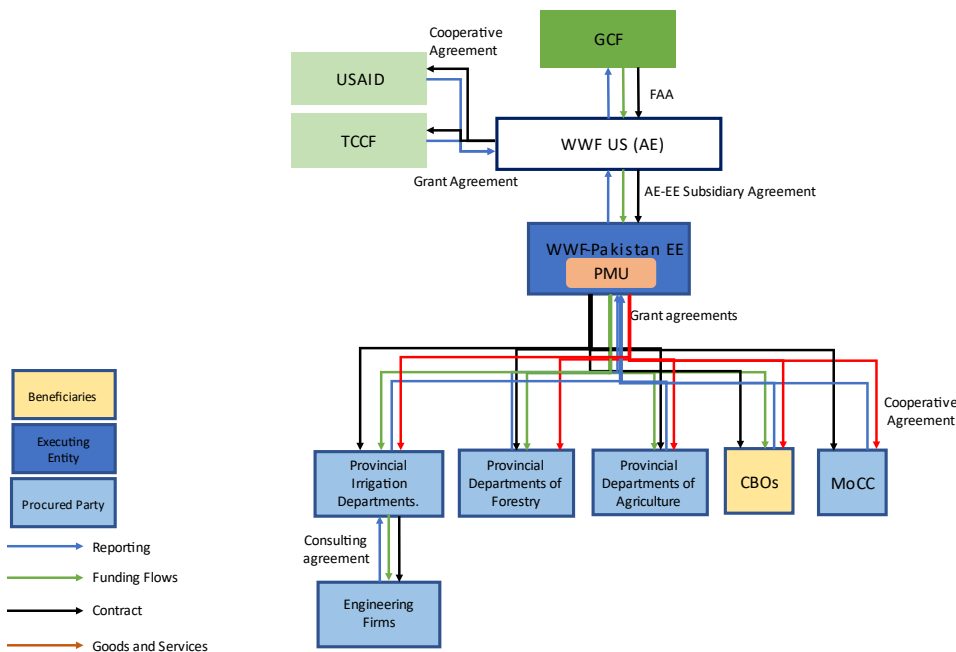
**Funds flow for the project**

205. A diagram showing the flow of funds is presented below. WWF-Pakistan will be an EE for the project and receive GCF Proceeds and the co-financing resources channelled through the AE. Under Component 1, WWF-Pakistan will provide cash grants to the Provincial Departments of Forestry and community-managed nurseries as procured parties for the execution of Activity 1.1.1, and to the Provincial Departments of Irrigation for Activity 1.1.2 and 1.2.1,

<sup>101</sup> <https://projects.worldbank.org/en/projects-operations/project-detail/P179981>



to competitively procure the services of one or more engineering firms to design and build the green infrastructure measures identified for the project sites. WWF-Pakistan will also provide grant financing to the CBOs to strengthen community-based natural resource management of EbA and green infrastructure interventions implemented in floodplains and watersheds (Activities 1.3.1 and 1.3.2). Under Component 2, WWF-Pakistan will provide goods and services to the MoCC, GCF NDA, to support its role in facilitating the establishment and operationalization of the National Working Group responsible for expanding Pakistan’s current flood and water resources management regulations to prioritise EbA and green infrastructure interventions (Activity 2.2.1). Under Component 3, WWF-Pakistan will provide grants to the Provincial Departments of Agriculture as procured parties for the execution of Activity 3.2.1.



**Figure 33.** Flow of funds for the project.

**Synergy and coordination between the proposed project and FP108**

206. There is no geographic overlap and therefore no duplication of investment between the existing FP108 and the proposed project.

207. Given that, broadly, both projects focus on the water and agricultural sectors, there are opportunities for the two projects to coordinate and contribute to each of their respective objectives. The table below specifies which activities will enable these contributions, and how alignment and coordination between the two projects will be ensured during implementation.

**Table 13.** Synergy and coordination between the proposed project and FAO-led GCF FP 108.

FAO Activity	The proposed GCF project’s activities	Coordination area	Coordination process
Activity 1.1.1: Develop and establish a water accounting system, including the equipment needed to operate this system in two canals.	Activity 2.1.1: Develop an evidence-based case of the climate change adaptation benefits of EbA and green infrastructure in Pakistan.	Data generated under the proposed project can feed into the FAO project’s ACWA Portal to inform future planning, decision-making and development. To ensure the investments into data generation on water under the FAO-led project are maximised, the proposed project will make use of this data through the ACWA Portal in its generation of evidence of EbA and green infrastructure interventions’ effectiveness in flood and	The FAO-led project’s Water Focal Point for FP108 is based in Islamabad, which is where the proposed project’s PMU will be located.  The proposed project’s PMU will therefore be well-placed to coordinate regularly with the FAO Focal Point on areas of alignment and reciprocal contribution during implementation.  Finally, the proposed project’s PMU and Site Implementation

		water resources management.	Units will engage with the FAO-led project's Project Facilitators, Coordinators on the ground in Sindh, as well as the Technical Working Group, to ensure coordination on this work. Synergy at the federal level between the proposed project's PSC and the FAO-led project's PSC will also be explored given the similarity between government partners between the two projects.
Activity 2.1.1: Develop and improve training materials to support adoption of CRA and OFWM practices.	Activity 3.2.1: Improve the climate resilience of vulnerable agricultural livelihoods.	<ul style="list-style-type: none"> <li>The proposed project will make use of knowledge and best practices generated by the FAO-led project's implementation of its CRA and OFWM activities.</li> </ul>	
Activity 2.1.3: Develop a CRA and OFWM practice repository – the Pakistan Climate Agriculture Information System (PCAIS).		<ul style="list-style-type: none"> <li>The knowledge and best practices generated by the FAO-led project will be used to inform the implementation of the proposed project's Activity 3.2.1. Specifically, this knowledge will be incorporated into the Farmer Field School approach (and associated curriculum) the proposed project will implement under Activity 3.2.1 through which the project will introduce new irrigation technologies and methods, facilitate the adoption of drought resistant seed varieties into current crop farming practices as well as improved farming and soil management techniques.</li> </ul>	
Sub-component 2.2: Training of Trainers on CRA and OFWM.		<ul style="list-style-type: none"> <li>This will ensure that investments in the FAO-led project into CRA and OFWM will result in knowledge transfer and replication of climate-resilient techniques under the proposed project, particularly given that both projects intend to work with similar crops (e.g., cotton).</li> </ul>	
Sub-component 2.3: Developing Farmers' Capacity to Transform Agriculture Practices with CRA and OFWM			
Sub-component 3.1: Improving Information and Awareness Raising Campaigns.			

<p>Activity 3.2.1: Increasing Collaboration between Institutions through Knowledge Sharing for Evidence based Policymaking.</p>	<p>Activity 2.1.1: Develop an evidence-based case of the climate change adaptation benefits of EbA and green infrastructure in Pakistan.</p> <p>Activity 2.2.1: Develop updated procedures for the Implementation Framework of the National Water Policy, National Adaptation Plan and four Provincial Adaptation Plans for implementing EbA and green infrastructure interventions in Pakistan.</p> <ul style="list-style-type: none"> <li>Sub-Activity 2.2.1.1: Establish a National Working Group to develop and adopt updated procedures for using EbA and green infrastructure interventions in flood and water resources management in Pakistan.</li> </ul>	<p>The proposed project's National Working Group, as well as the Project Steering Committee (PSC) and Provincial Oversight Committees (POCs), will contribute to the FAO-led project's Activity 3.2.1 by being the vehicle for enhancing coordination between stakeholders in the water sector, improving knowledge sharing on integrated flood and water resources management strategies, strengthening water governance, and promoting evidence-based decision-making for climate change adaptation with an emphasis on EbA and green infrastructure.</p>	
<p>Activity 3.2.2: Mainstreaming Climate Resilient Agriculture and Water Management across All Policy Areas</p>		<p>The proposed project's evidence base of the effectiveness of EbA and green infrastructure for flood and water resources management will build on the evidence generated by the FAO-led project on climate-resilient agriculture and on-farm water management. This evidence will be used to initiate public sector reform in flood and water resources management under the proposed project, as described in Section B.3 of this Funding Proposal.</p>	

**B.5. Justification for GCF funding request (max. 1000 words, approximately 2 pages)**

208. Pakistan already experiences significant economic and human capital losses from climate change and evidence suggests it will only have increasing impacts if no action is taken. According to the Global Climate Risk Index annual report for 2021, Pakistan has lost 0.53%/unit GDP, suffered economic losses worth USD 3.8 billion, and experienced 152 extreme weather events between 1999 and 2018<sup>102</sup>. Between 1995 and 2014, climate change cost Pakistan USD 3.9 billion (purchasing power parity) in average economic losses annually. Under future climate scenarios, water availability is expected to be less predictable, and floods and droughts more common. Pakistan is one of the most water-stressed countries of the world with average per capita water availability of less than 1,000 m<sup>3</sup> per annum<sup>103</sup>, making it extremely vulnerable to an increasing risk of drought. The 1998–2002 drought, recorded as one of the worst droughts of the last 50 years, affected 1.2 million people and caused the death of 2 million livestock animals and significant losses in crops<sup>104</sup>. Major floods that have affected Pakistan in the past decade have shown the vulnerability of homes, workplaces, and infrastructure. For example, the

<sup>102</sup> Source: [https://www.finance.gov.pk/survey/chapter\\_20/16\\_Climate\\_Change.pdf](https://www.finance.gov.pk/survey/chapter_20/16_Climate_Change.pdf)

<sup>103</sup> National Water Policy, 2018.

<sup>104</sup> Waseem, M., et al. 2022. Impact of meteorological drought on agriculture production at different scales in Punjab, Pakistan. *Water and Climate Change* (2022) 13 (1): 113-114. Available at: <https://iwaponline.com/jwcc/article/13/1/113/83806/Impact-of-meteorological-drought-on-agriculture>

catastrophic 2010 floods in the Indus Basin caused financial damages of an estimated USD 40 billion and 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. More recently, severe flooding in Pakistan in August/September 2022 destroyed 218,000 houses, damaged 452,000 houses, negatively impacted 2 million acres of crops, resulted in the loss of 794,000 livestock, injured 1,343 people and resulted in the death of 937 people<sup>105</sup>. See additional details on climate change and its impacts in Section B.1. of this Funding Proposal and Annex 2.

209. Combating the impacts of climate change 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<sup>106,107</sup>. According to the revised NDCs, climate change adaptation needs in Pakistan range from USD 7 to 14 billion per annum based on current exchange rates<sup>108</sup>.
210. Pakistan remains a resource-constrained economy, dependent on foreign financing in the shape of loans, foreign investment, and grant aid. The country relies predominantly on loans from multilateral banks for infrastructure projects and foreign aid to assist in post-disaster scenarios, including for drought and flood recovery. For instance, recent donor funding from, but not limited to, the FAO, WFP, and WHO were channelled through the Central Emergency Response Fund and Pakistan's Humanitarian Fund for targeted post-drought relief across multiple sectors totalling USD 15 million. Post-disaster foreign aid assistance (including for floods and droughts) provided to Pakistan over the last two decades from donors such as USAID, the European Commission, the World Bank and the Asian Development Bank (ADB) have totalled an approximate USD 1.5 billion.
211. As flooding has historically been a major observed and projected climatic hazard in Pakistan, a significant investment is required to meet the country's flood risk management needs. For example, the National Flood Projection Plan (NFPP) IV presents an estimated budget of USD 375 million for the country's flood risk management needs. However, due to insufficient GoP funds, foreign financing is needed to cover these costs, particularly for Ecosystem-based Adaptation interventions, which have historically received less attention and funding than hard infrastructure alternatives. According to the Federal Flood Commission's 2021 Annual Flood Report, Federal and Provincial Government funding needs for the Normal/Emergent Flood Programme, for 2019–20, totalled USD 56 million, but only USD 2.8 million was released for use leaving a funding gap of USD 53.2 million<sup>109</sup>. Despite these strong commitments towards climate action from the GoP, economic constraints continue to limit the amount of funding available. Approximately PKR 10 billion (approximately USD 50 million) has been allocated to the Ministry of Climate Change (MoCC) under the 2022-23 national budget, a decrease of PKR 4 billion from the year before likely brought by the economic downturn brought on largely by COVID and only widening the gap between available public climate finance and the growing economic needs brought on by Pakistan's continuous exposure to climate disasters<sup>110</sup>.
212. In addition, initiatives such as the NDRMF have been established to fund disaster risk reduction projects. With a total fund size of USD 393.56 million (mainly international donor funding), 56% of NDRMF's current grant portfolio targets flood protection, while 2% targets water conservation/drought mitigation. However, most of this finance is used to cover the costs of climate-related disaster relief and reconstruction, with adaptation in the form of disaster preparedness remaining limited. By increasing financial flows to adaptation approaches for climate-related disaster preparedness (such as EbA and green infrastructure), overall spending would be reduced, damages would be avoided and the negative impacts on Pakistan's economy lessened.

<sup>105</sup> UN Office for the Coordination of Humanitarian Affairs (OCHA). Pakistan: 2022 Monsoon Floods. Situation Report No. 03. 26 August 2022. Available at: Pakistan: 2022 Monsoon Floods - Situation Report No. 03: As of 26 August 2022 - Pakistan | ReliefWeb.

<sup>106</sup> UNDP (2015). Pakistan - Climate Public Expenditure and Institutional Review. Government of Pakistan. Source: <http://www.pk.undp.org/content/dam/pakistan/docs/Environment%20&%20Climate%20Change/UNDP%20Climate%20Report%20V10.pdf>

<sup>107</sup> Government of Pakistan (2017). Pakistan - Climate Change Financing Framework. United Nations Development Programme, Pakistan. Source: <https://www.climatefinance-developmenteffectiveness.org/sites/default/files/publication/attach/Pakistan-CCFF-Oct-2017.pdf>

<sup>108</sup> Source: [https://www.finance.gov.pk/survey/chapter\\_20/16\\_Climate\\_Change.pdf](https://www.finance.gov.pk/survey/chapter_20/16_Climate_Change.pdf)

<sup>109</sup> Government of Pakistan. 2021. Federal Flood Commission Annual Report.

<sup>110</sup> United States Institute of Peace. Pakistan's Climate Challenges Pose a National Security Emergency. A whole-of-government approach is needed now before climate change exacerbates conflict in the country. Thursday, July 7, 2022.

[https://www.usip.org/publications/2022/07/pakistans-climate-challenges-pose-national-security-emergency#:~:text=Almost%20PKR%2010%20billion%20\(approximately,the%202021%2D22%20national%20budget.](https://www.usip.org/publications/2022/07/pakistans-climate-challenges-pose-national-security-emergency#:~:text=Almost%20PKR%2010%20billion%20(approximately,the%202021%2D22%20national%20budget.)

213. While the GoP's financial commitment to flood and drought risk management is expected to continue increasing in the future, it will still fall far short of the abovementioned funding needs, particularly for initiatives such as the proposed EbA flood risk management project that inherently has high up-front costs. Pakistan debt level and trade imbalance imposes significant limitations on available finance from the GOP on climate adaptation. The country's public debt, including guaranteed debt, reached 70.7% of GDP at the end of December 2021, rising from 72% percent at the end of December 2020. In 2022: i) real GDP growth is expected to slow to 4.3% (and to 4% in 2023); ii) inflation is estimated to rise to 10.7%; iii) the current account deficit is expected to widen to 4.4% of GDP; iv) the fiscal deficit (including grants) is projected to widen slightly to 6.2% of GDP; and v) public debt as a share of GDP is projected to stay high<sup>111</sup>.

214. Along with the country's high level of indebtedness, rural communities in the project areas are too economically vulnerable to make significant financial contributions to climate projects. Local financing institutions also have limited funds and don't have the risk appetite for EbA and green infrastructure investments. In addition, private sector resources, either local or international, for climate change adaptation remain absent in rural areas of Pakistan, as is the case in most low-income developing countries. This is compounded by the lack of evidence on the economic benefits of EbA for flood risk and water resource management in Pakistan, which is a barrier to investment in EbA and green infrastructure approaches particularly in rural areas.

215. Given the funding gap between Pakistan's adaptation priorities and its public finance commitments, a shift is required in national policymaking and planning. Without GCF resources to catalyse this shift, Pakistan will continue to operate under the current paradigm relying on traditional and largely reactive models for flood risk and water resources management that is neither climate resilient nor financially sustainable. As a result, Pakistan's rural communities, such as those in the Indus Basin, will become increasingly vulnerable to the impacts of climate change.

#### **Financial instrument make-up of the proposed project**

216. Considering the needs and current adaptation funding constraints presented above, the GoP is requesting a GCF grant of USD 66 million to support the implementation of the proposed project's activities. As a result of WWF-Pakistan's engagements during Concept Note and Funding Proposal development with national (MoCC and MoWR), local (provincial irrigation departments) and international (e.g., World Bank, ADB, KfW, GIZ, etc.), the proposed project was designed to have a total of ~US\$67 million in government co-finance from the NDRMF (~US\$37 million) and MoWR (~US\$29 million) committed to the project to complement the GCF grant. While ~US\$67 million in government co-finance from the NDRMF and MoWR was committed to the project to complement the GCF grant, the recent 2022 floods have required that these funds be repurposed for immediate disaster relief making it very difficult for the Government of Pakistan to commit significant adaptation finance at this time. Despite these constraints, the GoP remains committed to the proposed project but is unable to commit any co-financing for the project due to the economic constraints on public spending due to the high costs for recovery from the 2022 floods.

The AE has engaged private and public sector partners to mobilize resources for this US\$77.8M project. As a result, a commitment letter from The Coca-Cola Foundation (TCCF) for US\$5M and a letter of interest from USAID/Pakistan for up to US\$10M has been secured. USAID requires a 1:1 match for its funding. With these commitments, US\$10M in co-finance will be provided for the project, secured by the AE from TCCF and USAID.

217. The conditions in Pakistan to support a rationale for maximum concessionality to be applied to investing in EbA for flood risk and water resources management are summarised below.

- *Market failures*: markets tend to be skewed toward hard infrastructure as they often do not account for any negative impacts of hard infrastructure and the wider benefits of ecosystem-based approaches and associated ecosystem services are undervalued.
- *Barriers to entry for alternative technologies*: investors may not have the technical knowledge to understand and be able to compare traditional hard infrastructure approaches to EbA alternatives.
- *Transaction costs*: economically viable EbA and green infrastructure interventions are often not considered as economically viable options due to their high transaction costs associated with community and stakeholder engagement and technical assistance needs among local governance.

218. The above market failures and barriers can be overcome by investing in an enabling environment that advances EbA and green infrastructure in Pakistan as a climate change adaptation response and demonstrates

<sup>111</sup> Source: <https://www.worldbank.org/en/country/pakistan/overview#1>

the potential to further reduce flood risk and improve water resource management but have high upfront costs and limited options for finance. Such activities have the potential to be scaled up once their potential or the ability of investment to generate returns is proven within the country, given expectations of intensified flood and drought risks (resulting from climate change) and consequent increases in the demand for solutions.

219. GCF grant funding will be used to fund and demonstrate the use of EbA and green infrastructure interventions as alternatives or complementary (to hard infrastructure) approaches to flood and drought risk management in Pakistan (Component 1). The implementation of these adaptation interventions will be used as evidence to create an enabling environment for climate action in Pakistan that removes barriers to novel climate solutions through promoting integrated strategies, planning and policymaking. Specifically, this evidence will be used to develop and adopt updated procedures for Pakistan's key regulations and policies for flood and water resources management — namely the Implementation Framework for the National Water Policy, the National Adaptation Plan (NAP), and Provincial Adaptation Plans of Sindh, Khyber, Balochistan, and Punjab provinces — on the proper execution of EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan (Component 2). Additionally, the project will support climate-resilient livelihoods among the most vulnerable communities in the Indus Basin by: i) providing incubation services to 7 small businesses already identified during the DFCD project to incentivize additional sustainable business development and help launch the creation of an investment market in sustainable enterprises; and ii) providing direct support to local communities to improve the sustainability of their land and water resources management practices and strengthen the climate-resilience of their agro-ecological livelihoods (Component 3).

#### **B.6. Exit strategy (max. 500 words, approximately 1 page)**

220. The proposed project has been designed in close collaboration with the relevant key government stakeholders and community representatives to ensure it provides sustainable adaptation benefits to the target vulnerable communities in Pakistan during and beyond the lifetime of the project. The project's Exit Strategy is presented in the paragraphs that follow, focusing on institutional, technical and financial sustainability, as well as local-level sustainability.

#### **Strengthened institutional capacity, awareness and ownership**

221. The project will be implemented in collaboration with relevant key government stakeholders — including MoCC, MoWR (and FFC), and the Provincial Departments of Irrigation, Forestry, and Agriculture — to ensure ownership for the sustainable adoption, scale up and replication of the project's interventions. This includes addressing institutional and technical needs regarding the ongoing O&M of the project's EbA and green infrastructure interventions identified in consultation with the GoP, as well as under the relevant policies and plans related to climate change planning, flood and water resources management (e.g., National Water Policy and its Implementation Framework, NAP, four Provincial Adaptation Plans, National Flood Protection Plan IV (NFPP IV), National Climate Change Policy, and National Forest Policy).

222. In addition, the project will foster ongoing national ownership by generating new evidence on the benefits and cost-effectiveness of implementing EbA and green infrastructure interventions for flood and water resource management, as well as lessons learned from implementing these interventions. This evidence will serve as a key reference for policymakers in future flood and water resources management. The evidence will also be presented to the Pakistan Climate Change Council (PCCC) — headed by the Prime Minister of Pakistan. In line with its mandate of leading climate change planning in Pakistan, the Council along with the National Working Group that will be established under the project will ensure that the ownership of project interventions is integrated into the relevant regulatory frameworks for ongoing implementation and financial support beyond the lifetime of the project.

#### **Policy and regulatory support**

223. The evidence generated under the project will also be used to develop updated procedures for Pakistan's key regulations and policies for flood and water resources management — namely the Implementation Framework for the National Water Policy, NAP, and four Provincial Adaptation Plans — to expand them from only focusing on using grey infrastructure to address the threats of floods and droughts to prioritising EbA and green infrastructure interventions. A National Working Group will be established to lead the development and adoption of these procedures into the MoWR's (including FFC's) and MoCC's mandates for flood and water resources management and climate change planning, respectively. Integrating the implementation of EbA and green infrastructure interventions into these government mandates will enable existing/planned public funds that would likely otherwise have been allocated to grey infrastructure interventions to instead be channelled towards the ongoing and future implementation and O&M of EbA and green infrastructure interventions during and beyond the project period.

**Operations and maintenance**

224. The GoP will undertake O&M of the project's interventions for the project lifespan (30 years) through its existing resources and infrastructure to ensure the interventions function optimally and achieve the desired adaptation impact. For the EbA interventions, MoCC and the Provincial Departments of Forestry will be primarily responsible for O&M and ensuring the optimal functioning of the interventions for the project lifespan. For the green infrastructure interventions, MoWR (including FFC) and the Provincial Departments of Irrigation will be primarily responsible for O&M and ensuring the optimal functioning of the interventions for the project lifespan. The required O&M arrangements for the project's EbA and green infrastructure interventions, including the type and frequency of O&M activities required as well as the relevant responsible entity(ies), are presented below.

**Table 14.** Required O&M arrangements for the project's EbA and green infrastructure interventions.

Intervention		O&M activity required	Frequency and importance of O&M activity	Responsibility
EbA interventions	Sub-activity 1.1.1.1: Restore 14,215 ha of degraded riverine ecosystems in D.I. Khan.	<ul style="list-style-type: none"> <li>Mowing</li> <li>Brush cutting</li> <li>Minor replanting/reseeding</li> <li>Weed control</li> <li>Inlet/outlet cleaning</li> <li>Animal nuisance control</li> </ul>	Routine (Recommended)	Provincial Forest Department of Khyber Pakhtunkhwa
		<ul style="list-style-type: none"> <li>Ditch stabilization</li> <li>Ditch reshaping/regrading</li> </ul>	Periodic (Recommended)	
		<ul style="list-style-type: none"> <li>Major replanting/reseeding</li> </ul>	Annual (Important)	
		<ul style="list-style-type: none"> <li>Watch and Ward Systems under CBOs to protect the intervention</li> </ul>	Annual (Important)	
	Sub-Activity 1.1.2.1: Excavate 264 m of flow paths in Badri Village, Ramak, to restore the natural hydrology of connected wetlands.	<ul style="list-style-type: none"> <li>Manual clearance of debris from the channel</li> </ul>	Routine (Recommended)	Provincial Irrigation Department of DI Khan
		<ul style="list-style-type: none"> <li>Clearance of debris from the culvert/pond inlet</li> </ul>	Periodic (Recommended)	
	Sub-Activity 1.1.2.2: De-silt the 2 ha Badri Pond in the Ramak wetlands to enhance its water-holding capacity.	<ul style="list-style-type: none"> <li>Silt removal</li> </ul>	Periodic (Recommended)	Provincial Irrigation Department of DI Khan
	Sub-Activity 1.1.2.3: Enhance and reinforce 410 m of embankments in Badri Village to reduce erosion.	<ul style="list-style-type: none"> <li>Compacting embankments</li> </ul>	Periodic (Recommended)	Provincial Irrigation Department of DI Khan
		<ul style="list-style-type: none"> <li>Mowing</li> <li>Brush cutting</li> <li>Minor replanting/reseeding</li> <li>Weed control</li> <li>Inlet/outlet cleaning</li> <li>Animal nuisance control</li> </ul>	Routine (Recommended)	
		<ul style="list-style-type: none"> <li>Major replanting/reseeding</li> </ul>	Periodic (Recommended)	
		<ul style="list-style-type: none"> <li>Watch and Ward Systems under CBOs to protect the intervention</li> </ul>	Annual (Important)	



	Sub-Activity 1.1.2.4: Excavate 4,000 m of flow paths in Paniala Village to restore natural hydrology of Karez Systems (surface and subsurface natural channels).	<ul style="list-style-type: none"> <li>• Clearance of debris from the channel</li> <li>• Clearance of debris from the culvert/pond inlets.</li> </ul>	Routine (Recommended)	Provincial Irrigation Department of DI Khan
			Periodic (Recommended)	
	Sub-Activity 1.1.2.5: Excavate 30,000 m of flow paths in the existing water channels of Manchar Lake to restore the natural hydrology of the 25,000 ha Manchar Wetland.	<ul style="list-style-type: none"> <li>• Clearance of debris from the channel</li> <li>• Clearance of debris from the culvert/pond inlets.</li> </ul>	Routine (Recommended)	Provincial Irrigation Department of Sindh
			Periodic (Recommended)	
Green infrastructure interventions	Sub-Activity 1.2.1.2: Build 9 flood protection embankments.	• Clearance of debris from the channel	Routine (Recommended)	Provincial Irrigation Departments of DI Khan and Khyber Pakhtunkhwa
		• Compacting embankments	Annual (Recommended)	
		• Readjustment of stone pitching on the riverside slope of the embankment	Annual (Recommended)	
	Sub-Activity 1.2.1.3: Build 7 flood dispersal embankments.	• Clearance of debris	Routine (Recommended)	Provincial Irrigation Departments of Sindh, Khyber Pakhtunkhwa and Balochistan
		• Compacting embankments	Annual (Recommended)	
		• Readjustment of stone pitching on the riverside slope of the embankment	Annual (Recommended)	
	Sub-Activity 1.2.1.4: Build 45 gabion bunds.	<ul style="list-style-type: none"> <li>• Inspecting the fence to identify bulging of the fence<sup>112</sup></li> <li>• Reinforcing/repairing any damage to the fence caused by localised bulging</li> </ul>	Routine (Recommended)	Provincial Irrigation Departments of Sindh, Khyber Pakhtunkhwa and Balochistan
		• Fixing damage to the fencing of gabion bunds	Routine (Recommended)	
	Sub-Activity 1.2.1.5: Build 42 small retention areas.	• Removal of blockages to the inlets and outlets of the retention areas	Annual (Recommended)	Provincial Irrigation Departments of Sindh, Khyber Pakhtunkhwa, and Balochistan
		• Clearance of debris/sedimentation	Routine (Recommended)	
		• Protect the shoreline from erosion, slow runoff into the pond, and capture sediment and other pollutants through establishing wide planted buffers using a variety of native perennial	Annual (Recommended)	

<sup>112</sup> Gabion baskets are made of steel or aluminium. Bulging of these baskets occasionally occurs when the rock filling in the gabion basket has caused it to change shape from its original design.



		shrubs with deep root systems		
	Sub-Activity 1.2.1.6: Build 9 large retention areas.	<ul style="list-style-type: none"> <li>Removal of blockages to the inlets and outlets of the retention areas</li> </ul>	Annual (Recommended)	Provincial Irrigation Departments of Sindh, Khyber Pakhtunkhwa and Balochistan
		<ul style="list-style-type: none"> <li>Clearance of debris/sedimentation</li> </ul>	Routine (Recommended)	
		<ul style="list-style-type: none"> <li>Protect the shoreline from erosion, slow runoff into the pond, and capture sediment and other pollutants through establishing wide planted buffers using a variety of native perennial shrubs with deep root systems</li> </ul>	Annual (Recommended)	
	Sub-Activity 1.2.1.7: Build 15 recharge basins.	<ul style="list-style-type: none"> <li>Removal of blockages to the inlets and outlets of the retention areas</li> </ul>	Annual (Recommended)	
		<ul style="list-style-type: none"> <li>Clearance of debris/sedimentation</li> </ul>	Routine (Recommended)	
		<ul style="list-style-type: none"> <li>Protect the shoreline from erosion, slow runoff into the pond, and capture sediment and other pollutants through establishing wide planted buffers using a variety of native perennial shrubs with deep root systems</li> </ul>	Annual (Recommended)	

225. During implementation, the project's Exit Strategy will be further developed by the PMU through: i) signing agreements with the relevant government stakeholders for O&M of the project's interventions; ii) strengthening the capacity of national and sub-national staff, as well as community leaders/representatives to implement, operate and maintain the project's EbA and green infrastructure interventions for flood and water resources management; iii) developing detailed long-term O&M plans for the project's EbA and green infrastructure interventions (in Year 3 of the project); iv) developing a scaling up and replication strategy for the project's interventions (in Year 6 of the project); and v) confirming with the GoP the financing arrangements for long-term O&M of the project's interventions and establishing an appropriate annual O&M budget in consultation with the relevant government stakeholders, including but not limited to MoCC, MoWR (and FFC) and the relevant Provincial Departments of Irrigation, Agriculture and Forestry.

**Project sustainability at the local level**

226. The GoP's O&M commitments will be supported at the community level by establishing community agreements between the relevant provincial line departments and CBOs. These agreements will outline arrangements for active community participation in O&M of the project's EbA and green infrastructure interventions, ecosystem protection and restoration, and impact monitoring. For example, under the CBOs, Watch and Ward Systems will be established to monitor and protect the project's EbA and green infrastructure from degradation, while Water User Groups will be created to manage community access to and use of the additional water that will be retained by the green infrastructure interventions (e.g., water stored in the small and large retention areas). These agreements will secure local-level ownership and future replication of the project's EbA and green infrastructure interventions at scale after project closure.

227. Additionally, WWF-Pakistan has learned from its more than 50 years of experience working in Pakistan that successful conservation objectives cannot be met unless local communities' livelihood needs are appropriately addressed. As a result, local communities that will benefit from the project's interventions have been extensively engaged throughout the project development process. These engagements include consultations with tribal leaders, who traditionally play an important role in leading their tribal communities. WWF-Pakistan understands the key dynamics of engaging these tribal leaders and took a proactive approach during project development to garner their support and incorporate their indigenous knowledge into the design of the project. These engagements will continue during the implementation phase to ensure sustainable delivery and adoption of the project's interventions by the target beneficiary communities in Pakistan<sup>113</sup>.

C. FINANCING INFORMATION						
C.1. Total financing						
<b>(a) Requested GCF funding (i + ii + iii + iv + v + vi + vii)</b>	<b>Total amount</b>			<b>Currency</b>		
	66,000,005			million USD (\$)		
<b>GCF financial instrument</b>	<b>Amount</b>	<b>Tenor</b>	<b>Grace period</b>	<b>Pricing</b>		
(i) Senior loans	<u>Enter amount</u>	<u>Enter years</u>	<u>Enter years</u>	<u>Enter %</u>		
(ii) Subordinated loans	<u>Enter amount</u>	<u>Enter years</u>	<u>Enter years</u>	<u>Enter %</u>		
(iii) Equity	<u>Enter amount</u>			<u>Enter % Equity return</u>		
(iv) Guarantees	<u>Enter amount</u>	<u>Enter years</u>				
(v) Reimbursable grants	<u>Enter amount</u>					
(vi) Grants	66,000,005					
(vii) Results-based payments	<u>Enter amount</u>					
<b>(b) Co-financing information</b>	<b>Total amount</b>			<b>Currency</b>		
	11,848,391			million USD (\$)		
<b>Name of institution</b>	<b>Financial instrument</b>	<b>Amount</b>	<b>Currency</b>	<b>Tenor &amp; grace</b>	<b>Pricing</b>	<b>Seniority</b>
WWF-Pakistan	<u>In-kind</u>	1,848,391	<u>million USD (\$)</u>	<u>Enter years</u>	<u>Enter%</u>	<u>Options</u>
United States Agency for International Development (USAID)	<u>Grant</u>	5,000,000	<u>million USD (\$)</u>	<u>Enter years</u>	<u>Enter%</u>	<u>Options</u>
The Coca-Cola Foundation (TCCF)	<u>Grant</u>	5,000,000	<u>million USD (\$)</u>	<u>Enter years</u>	<u>Enter%</u>	<u>Options</u>
<b>Total financing (c) = (a)+(b)</b>	<b>Amount</b>			<b>Currency</b>		
	77,848,397			million USD (\$)		
<b>(d) Other financing arrangements and contributions</b>	In addition to the grant resources identified above, USAID and The Coca-Cola Foundation will provide i) expert guidance on the project strategy and implementation and advice on several key project workstreams, including those focused on water resource management, climate-smart agriculture, and bankable project opportunities for climate-resilient businesses in the agriculture, forestry, water and sanitation sectors; ii) provide strategic and policy guidance inclusive of global					

<sup>113</sup> Further details on stakeholder engagement are provided in Annex 7.



**(max. 250 words, approximately 0.5 page)**

learnings and best practices; iii) support the PMU with identifying and managing project-related risks; iv) support communication and dissemination of project outcomes to key stakeholders; v) Seek to identify complementary and aligned efforts to bring Recharge Pakistan together in coordination with others in powerful ways, inclusive of connecting to existing efforts and bringing new partners to support the work. USAID and The Coca-Cola Foundation will receive regular updates on the status of the project and on the significant project developments from the PMU and participate in site visits to monitor project activity progress and engage with local communities and stakeholders.

**C.2. Financing by component**

Please provide an estimate of the total cost per component and output as outlined in section B.3. above and disaggregate by source of financing. More than one co-financing institution can fund a single component or output. Provide the summarised cost estimates in the table below and the detailed budget plan as annex 4.

Component	Output	Indicative cost million USD (\$)	GCF financing		Co-financing		
			Amount million USD (\$)	Financial Instrument	Amount million USD (\$)	Financial Instrument	Name of Institutions
<b>Component 1: Proofs of concept for EbA and green infrastructure interventions as efficient and effective solutions for flood and drought risk reduction in Pakistan.</b>	Output 1.1: EbA interventions implemented to restore floodplain and watershed ecosystems.	12,448,479	7,960,595	Grant	4,487,884	Grant	TCCF
	Output 1.2: Green infrastructure interventions established in Pakistan's Indus Basin.	51,697,224	51,633,958	Grant	63,266	Grant	TCCF
	Output 1.3: Strengthened community-based natural resource management to support water supply and flood attenuation services provided by EbA interventions implemented in floodplains and watersheds.	2,004,253	1,877,721	Grant	126,532	Grant	TCCF
<b>Component 2: Enabling a paradigm shift towards EbA and green infrastructure in Pakistan.</b>	Output 2.1: Evidence base to support the adoption of EbA and green infrastructure interventions by the Government of Pakistan.	1,154,849	380,537	Grant	774,312	Grant	USAID



	Output 2.2: Updated procedures for implementing EbA and green infrastructure in Pakistan.	563,425	152,268	Grant	411,156	Grant	USAID
	Output 2.3: Strengthened capacity for implementing EbA and green infrastructure interventions in the Indus Basin for flood risk and water resources management.	977,425	340,268	Grant	637,156	Grant	USAID
<b>Component 3: Enhanced community resilience and adoption of EbA and green infrastructure interventions in Pakistan's Indus Basin.</b>	Output 3.1: Pipeline of feasible climate-resilient businesses.	1,687,550	487,794	Grant	1,038,597	Grant	USAID
					161,159	Grant	TCCF
	Output 3.2: Improved climate-resilient livelihoods among vulnerable target communities.	1,528,910	302,466	Grant	1,065,285	Grant	USAID
					161,159	Grant	TCCF
<b>Monitoring and Evaluation</b>		2,154,279	1,080,786	Grant	1,073,493	Grant	USAID
<b>Project Management Costs</b>		3,632,003	1,783,612	Grant	1,848,391	Grant	WWF-Pakistan
<b>Indicative total cost (USD)</b>		<b>77,848,397</b>			<b>66,000,005</b>		<b>11,848,391</b>

*This table should match the one presented in the term sheet and be consistent with information presented in other annexes including the detailed budget plan and implementation timetable.*

*In case of a multi-country/region programme, specify indicative requested GCF funding amount for each country in annex 17, if available.*

**C.3 Capacity building and technology development/transfer (max. 250 words, approximately 0.5 page)**

C.3.1 Does GCF funding finance capacity building activities? Yes  No

C.3.2. Does GCF funding finance technology development/transfer? Yes  No

**Technology transfer**

228. Under Outputs 1.1, 1.2, 3.1, and 3.2, technology transfer will be facilitated through: i) implementing EbA interventions (including floodplain and watershed restoration and rehabilitation) in the four project sites in the Indus Basin (Activities 1.1.1 and 1.1.2); ii) establishing green infrastructure interventions at specific locations within the project target areas to reduce flood impacts and provide temporary storage and infiltration of water outside of flooding events (Activity 1.2.1); iii) developing a pipeline of sustainable climate-resilient businesses (Activity 3.1.1); and iv) introducing drought-resilient crop varieties, improved irrigation infrastructure, and sustainable agricultural and land use practices to farmers, as well as providing them with water storage tanks (Activity 3.2.1). The total project investment supporting technology transfer is US\$67,362,163.

**Capacity-building interventions**

229. Technical and institutional capacity of government and non-government actors involved in flood and water resources management, as well as communities in all four project sites — namely DI Khan Watershed, Ramak Watershed, Chakar Lehri Watershed, and Manchar Lake and Watershed — will be strengthened.

230. Under Output 1.3, training will include: i) strengthening CBOs to implement community-based natural resource management, including on sustainable forest management practices to ensure sustainability of interventions and ecosystems such as wetlands, floodplains, flood bypasses and washlands, watersheds and plantations; ii) developing formal WUGs to resolve and prioritize water allocation for agriculture, domestic and disaster risk reduction measures; iii) establishing community-based watch and ward systems under the CBOs to facilitate the implementation and protection of the project's EbA and green infrastructure interventions, including the required operation and maintenance, as well as protect and preserve natural forests from illegal cutting/forest fires. The establishment of these systems will be accompanied by Watch and Ward Plans, which will be developed with respective CBOs and the Provincial Forest Departments. The total project investment supporting capacity-building under Output 1.3 is US\$2,004,253.

231. Under Outputs 2.1, 2.2 and 2.3, national technical and institutional capacity, as well as the regulatory framework for flood and water resources management will be strengthened. This will be achieved through: i) undertaking an economic valuation of the project's EbA and green infrastructure interventions to analyse their cost-effectiveness and efficiency in reducing the impacts of climate change-induced floods and droughts on vulnerable communities and ecosystems in Pakistan; ii) establishing a National Working Group to lead the development and adoption of updated procedures for Pakistan's key regulations and policies for flood and water resources management on the proper execution of EbA and green infrastructure for flood and water resources management; and iii) strengthening institutional and technical capacity at the national and sub-national levels for implementing EbA and green infrastructure interventions. Local communities will also be engaged and equipped to implement, operate and maintain EbA and green infrastructure interventions. The total project investment supporting capacity-building under Outputs 2.1, 2.2 and 2.3 is US\$2,695,698.

## D. EXPECTED PERFORMANCE AGAINST INVESTMENT CRITERIA

*This section refers to the performance of the project/programme against the investment criteria as set out in the GCF's [Initial Investment Framework](#).*

### D.1. Impact potential (max. 500 words, approximately 1 page)

232. The proposed project will contribute to the following GCF Adaptation Result Areas (ARAs): ARA1.0 — Increased resilience and enhanced livelihoods of the most vulnerable people, communities, and regions; and ARA4.0 — Improved resilience of ecosystems and ecosystem services, as described below<sup>114</sup>.

#### Outcome<sup>115</sup> level: Increased resilience

*ARA1.0 — Increased resilience and enhanced livelihoods of the most vulnerable people, communities and regions.*

233. The project will strengthen the resilience of the most vulnerable people living in Pakistan's Indus Basin — most of whom depend on agriculture for their livelihoods — to increasingly severe floods and droughts caused by climate change through implementing a combination of EbA, green infrastructure and community-based adaptation interventions in the four project sites. EbA and green infrastructure interventions implemented under the project will protect a total of 889,900 people (621,500 direct beneficiaries and 268,400 indirect beneficiaries) from climate change induced flooding. Over the 30-year modelled period for which benefits were evaluated (see Annex 3), EbA and green infrastructure interventions will avoid US\$20.2 million in losses and damages to crops, livestock, housing, and infrastructure, as well as indirect damages resulting from disruption of economic activities (e.g., because of transport severance) on or adjacent to the floodplain.

- **EbA interventions** will reduce flood impacts on populations close to the intervention sites and for people living downstream. Populations close to the EbA interventions will benefit from local ecosystem services including but not limited to slowing of flood waters delays in flood peak onset, and increased access to water during drought periods, while downstream communities will benefit from the slowing of upstream velocity and delayed peak flood. The downstream benefits will slowly decrease with increasing distance from the EbA intervention sites as their impacts and benefits are reduced.

<sup>114</sup> Detailed information on the assumptions and estimates of the impact potential of the proposed project are provided in the project's results framework and economic analysis (Section E of this document and Annex 3, respectively).

<sup>115</sup> A detailed description of the project activities that will be implemented under each output to achieve the GCF Outcomes is presented in Section E.6 of the Funding Proposal.

- **Green infrastructure interventions** will reduce flood impacts on nearby communities and ecosystems by reducing soil erosion and river sedimentation, diverting and reducing the velocity of intense flows in the hill torrents away from nearby villages located in the floodplain, and increasing infiltration and groundwater recharge. Populations near the green infrastructure interventions, particularly the retention and recharge areas, will benefit from localised slowing of flood waters and the subsequent temporary storage and infiltration of water outside of flooding events. The gabion bunds and flood protection embankments will primarily protect people close to these interventions as the purpose of these structures is to reduce immediate damages from floodwaters rather than reduce large-scale flood magnitude.
- **Community-based adaptation interventions** will increase the climate resilience of 50,750 of the most vulnerable smallholder farmers in the project sites. As a result of the project, these farmers will: i) adopt climate-resilient agricultural inputs (e.g., drought-resilient crop varieties); ii) have capacity (and regular access to improved extension services) to implement resilient and sustainable irrigation and soil management techniques; and iii) have access to 20,250 m<sup>3</sup> of additional water made available through new water storage tanks. This will optimise on-farm water efficiency and support agricultural production under increasingly severe drought conditions.

*ARA4.0 — Improved resilience of ecosystems and ecosystem services.*

234. EbA interventions implemented under the project will enhance ecosystem functioning and the delivery of goods and services to vulnerable communities living in the Indus Basin and secure their livelihoods by restoring a total of 14,215 ha of degraded watersheds in DI Khan, restoring 34.2 km of flow paths, as well as desilting and restoring channels in Ramak Watershed and Manchar Lake. This will result in among other benefits: i) improved attenuation of flood flows through increased land cover; ii) increased infiltration and groundwater recharge through reduced runoff; and iii) reduced soil erosion from flooding through improved flow regulation in rivers, streams and channels at these sites. Moreover, the EbA and green infrastructure interventions implemented at the project sites will reduce flood extent by 50,800 ha, capture an additional 20 million m<sup>3</sup> of water, and increase soil infiltration by 1.6 million litres.

**GCF Outcome<sup>116</sup> level: Enabling environment**

*Core indicator 5 — Degree to which GCF investments contribute to strengthening institutional and regulatory frameworks for low emission climate-resilient development pathways in a country-driven manner.*

235. Using the evidence of the cost-effectiveness and efficiency of the project's EbA and green infrastructure interventions (described under Core indicator 8 below), a National Working Group will be established chaired by the MoCC and comprised of regulators within the MoWR (including FFC) and the relevant Provincial Departments. This working group will lead the development and adoption of updated procedures for Pakistan's key regulations and policies for flood and water resources management — namely the Implementation Framework for the National Water Policy, the NAP, and Provincial Adaptation Plans of Sindh, Khyber, Balochistan, and Punjab provinces — on the proper execution of EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan.

236. Improved policymaking and planning for integrated flood and water resources management at the national level will be supported at the local level by: i) formalising CBOs' organization and governance structure and integrating flood and drought prevention into their mandate; ii) working closely with CBOs to develop formal WUGs to resolve and prioritize water allocation for agriculture, domestic and disaster risk reduction measures; iii) establishing community-based watch and ward systems under the CBOs to secure the adoption and sustainability of EbA and green infrastructure interventions at the local level, including the required operation and maintenance; and iv) developing Watch and Ward Plans with CBOs and the Provincial Forestry Departments to protect and preserve natural forests from climate change impacts, illegal cutting/forest fires.

*Core indicator 7 — Degree to which GCF Investments contribute to market development/transformation at the sectoral, local, or national level.*

237. The project will build on WWF-Pakistan's experience and foundational work developing pipeline businesses for the DFCD to: i) identify additional businesses with that can provide positive climate change benefits to communities and ecosystems; and ii) provide these businesses — which are currently not eligible for blended financing — with technical assistance and grant funding of ~US\$700,000 required to enhance their operations. As a result of the project's sequencing of DFCD and GCF investments in pipeline development, these businesses will have the opportunity to access debt or equity finance from DFCD or other investors. The portfolio of businesses established under the project will serve as a successful case study that demonstrates the financial and economic benefits new sustainable industries and markets can provide to both investors and businesses which, in turn, can incentivize future investment in the sector.

<sup>116</sup> A detailed description of the project activities that will be implemented under each output to achieve the GCF Outcomes is presented in Section E.6 of the Funding Proposal.

*Core indicator 8 — Degree to which GCF investments contribute to effective knowledge generation and learning processes, and use of good practices, methodologies and standards.*

238. Part of the GCF investment for the project will be used to generate an evidence base to make the case for policymakers and planners to adopt EbA and green infrastructure interventions for flood and water resources management in Pakistan. The evidence base will be generated through an economic valuation of the project's EbA and green infrastructure interventions which will include analysing the biophysical benefits of EbA and green infrastructure on ecosystems as well as their flood attenuation and water resource-related services. Results from the analysis capturing the benefits of EbA and green infrastructure, as well as lessons learned and effective adaptive management strategies used under the project, will be collated into an evidence report and delivered to national- and provincial-level policymakers and planners involved in flood and water resources management through the National Working Group and PSC. This report will be used for the development of updated procedures for the Implementation Framework for the National Water Policy, the NAP, and four Provincial Adaptation Plans on the proper execution of EbA and green infrastructure interventions.

### Adaptation impact

239. Project interventions will directly benefit a total of 687,336 people, including 357,414 men (52% of the total population) and 329,922 women (48% of the total population), as well as indirectly benefit a total of 7,024,361 people, including 3,652,668 men (52% of total population) and 3,371,693 women (48% of total population) in Pakistan's Indus Basin. The project lifespan is 30 years because this is the period over which the adaptation benefits below, particularly the EbA interventions, are expected to mature and continue delivering adaptation benefits to the project beneficiaries. **The table below defines and captures the project's direct and indirect beneficiaries per output. Annex 23 presents further details on the methodology used to calculate these project beneficiaries.**

**Table 15.** Number of direct and indirect beneficiaries.

Outputs	Definition of direct and indirect beneficiaries per output	Direct beneficiaries (sex-disaggregated)	Indirect beneficiaries (sex-disaggregated)
Output 1.1: EbA interventions implemented to restore floodplain and watershed ecosystems.	<p><b>Direct beneficiaries:</b> These are calculated as the number of people living within 3 km of the EbA interventions. This includes those people near the interventions and downstream who will experience a direct change in flood/drought character because of improved floodwater management and watershed ecosystems.</p> <p><b>Indirect beneficiaries:</b> These are people living between 3 and 10 km downstream from to the EbA intervention locations who will benefit from reduced knock-on effects of floods and droughts on the direct beneficiaries described above (e.g., this would be the people who would buy food at local markets from farmers who are a subset of the direct beneficiaries described above).</p>	310,200 people  (161,304 men and 148,896 women)	117,100 people  (60,892 men and 56,208 women)
Output 1.2: Green infrastructure interventions established in Pakistan's Indus Basin.	<p><b>Direct beneficiaries:</b> These are calculated as the number of people living within 3 km of the green infrastructure intervention locations who will directly experience a change in flood character from the interventions.</p> <p><b>Indirect beneficiaries:</b> These are people living between 3 and 10 km from the green infrastructure interventions that will benefit from reduced disruption to the direct beneficiaries described above, as well as the co-benefit of increased water retention and infiltration.</p>	311,300 people  (161,876 men and 149,424 women)	151,300 people  (78,676 men and 72,624 women)
Output 1.3: Strengthened community-based natural resource management to support water supply and flood attenuation services provided by EbA interventions	<p><b>Direct beneficiaries:</b> This is calculated as the number of community leaders and CBO representatives trained on community-based natural resource management, as well as the people living near natural forests brought under</p>	14,520 people  (7,550 men and 6,970 women)	3,300 people  (1,716 men and 1,584 women)

<p>implemented in floodplains and watersheds.</p>	<p>restoration and improved management through community-based watch and ward systems.</p> <p><b>Indirect beneficiaries:</b> This is the number of people living in the project sites who will benefit from improved knowledge related to climate-resilient livelihoods/community-based natural resources management transferred by the now trained CBO leaders.</p>		
<p>Output 2.1: Evidence base to support the adoption of EbA and green infrastructure interventions by the Government of Pakistan.</p>	<p><b>Direct beneficiaries:</b> The evidence base will be disseminated to national-level stakeholders, provincial line departments, and academic and/or research organizations. These recipients who will directly use the information were calculated as direct beneficiaries.</p> <p><b>Indirect beneficiaries:</b> Beneficiary calculations for Output 2.2 considers the benefits of Output 2.1, which will generate the economic case for EbA and green infrastructure to inform current and future planning and capacity development. As a result, indirect beneficiary numbers have not been included for Output 2.1 to avoid double counting.</p>	<p>120 people (62 men and 58 women)</p>	<p>-</p>
<p>Output 2.2: Updated procedures for implementing EbA and green infrastructure in Pakistan.</p>	<p><b>Indirect beneficiaries:</b> The total population of the four project target sites will indirectly benefit from this project output, which involves enhancing the regulatory environment for integrated flood and water resources management, and climate change adaptation in Pakistan. The indirect beneficiaries for Output 2.2 include the indirect beneficiaries identified for the other project outputs. The total number of indirect beneficiaries for this output will therefore also be the total number of indirect beneficiaries.</p> <p>Site-specific indirect beneficiary numbers are provided below.</p> <ul style="list-style-type: none"> <li>● 2,729,391 people in DI Khan Watershed</li> <li>● 461,828 people in Chakar Lehri Watershed</li> <li>● 3,833,142 people in Manchar Lake and Manchar Watershed</li> </ul>	<p>-</p>	<p>7,024,361 people (3,652,668 men and 3,371,693 women)</p>
<p>Output 2.3: Strengthened capacity for implementing EbA and green infrastructure interventions in the Indus Basin for flood risk and water resources management.</p>	<p><b>Direct beneficiaries:</b> These are the total number of national and sub-national decision-makers and planners trained on EbA and responsible for integrating EbA into provincial- and district-level flood risk, water resource management and adaptation plans. The national/subnational technical staff and community members working on/executing flood risk and drought prevention work using EbA and/or green infrastructure measures will also be trained and counted as direct beneficiaries.</p> <p><b>Indirect beneficiaries:</b> The indirect beneficiaries under this output will overlap with the indirect beneficiaries of Output 2.2 above. Therefore, to avoid double-counting, indirect beneficiaries for Output 2.3 have not been included.</p>	<p>320 people (166 men and 154 women)</p>	<p>-</p>
<p>Output 3.1: Pipeline of feasible climate-resilient businesses.</p>	<p><b>Direct beneficiaries.</b> These are the business owners/people involved in the management of the 7 bankable projects, as well as the downstream partners directly involved in implementation of these projects.</p>	<p>126 people (66 men and 60 women)</p>	<p>1,008 people (524 men and 484 women)</p>



	<b>Indirect beneficiaries:</b> These are the consumers of bankable projects and the household members <sup>117</sup> of the direct beneficiaries mentioned above.		
Output 3.2: Improved climate-resilient livelihoods among vulnerable target communities.	<p><b>Direct beneficiaries:</b> These are the local people and their families<sup>118</sup> who would be direct recipients of climate-resilient agricultural interventions and alternative livelihood support. A breakdown of these benefits is provided below.</p> <ul style="list-style-type: none"> <li>• 24,786 people will benefit from training on climate-resilient agricultural practices (Sub-activity 3.2.1.1)</li> <li>• 6,752 people will benefit from improved irrigation (Sub-activity 3.2.1.2)</li> <li>• 13,277 people will benefit from climate-resilient crop varieties (Sub-activity 3.2.1.3)</li> <li>• 4,424 people will benefit from improved soil management (Sub-activity 3.2.1.4)</li> <li>• 1,512 people will benefit from increased water security from water storage tanks (Sub-activity 3.2.1.5)</li> </ul> <p><b>Indirect beneficiaries:</b> These are the people who will benefit from increased knowledge and capacity for implementing climate-resilient, sustainable agricultural practices transferred by the direct beneficiaries named above.</p>	50,750 people (26,390 men and 24,360 women)	16,000 people (8,320 men and 7,680 women)
<b>Total</b>		<b>687,336 people</b> <b>(357,415 men and 329,921 women)</b>	<b>7,024,361 people</b> <b>(3,652,668 men and 3,371,693 women)</b>

### Mitigation co-benefits

240. While the proposed project is an adaptation-only project, the EbA interventions will provide mitigation co-benefits. These co-benefits have been calculated as follows: A total of 14,215 hectares (ha) of degraded forests, deforested areas, and rangelands in DI Khan watershed will be placed under afforestation, reforestation and Assisted Natural Regeneration (ANR). Annual CO<sub>2</sub> removals from these activities are estimated at 26,450 tons of CO<sub>2</sub> per year while the total lifetime removals are estimated at 1,037,928 tons of CO<sub>2</sub>. The total CO<sub>2</sub> removals will be achieved in 10-85 years, depending on the forest type and stand age.

241. Methods: To estimate the annual CO<sub>2</sub> removal from afforestation, reforestation and assisted natural regeneration, the activity area was multiplied by a removal factor. To estimate the total lifetime CO<sub>2</sub> removals, the annual removals were multiplied by the number of years the activity is expected to continue to sequester carbon. See Table 14 for calculations. The mean stand age of each forest type where the project's activities will be undertaken was used to estimate the removal factors and number of years for carbon sequestration.

242. The Removal Factors for different forest types/ ecological zones were taken from the Sub-National Forest Monitoring Systems and Greenhouse Gas Inventory Reports for KP and Punjab Provinces developed by WWF-Pakistan for the Ministry of Climate Change (MoCC) under the National REDD+ Project, 2022. The development of removal factors followed the IPCC recommended approach and methodologies. A brief summary of the removal factor methodology is outlined in bullets below.

- Carbon stock densities were determined for each of the different forest types using the forest inventory data at sample plot level.
- The carbon stock density values included aboveground biomass of trees and shrubs, belowground biomass, dead wood, and litter.
- Both national and IPCC default allometric equations were used for estimating aboveground tree biomass.
- The default IPCC fraction (0.47) was applied to convert biomass to carbon.

<sup>117</sup> Pakistan's average household size of seven was used to calculate the number of beneficiaries.

<sup>118</sup> Ibid.

- The carbon stock density value (C ton/ha) of each forest type was converted to CO<sub>2</sub> using the conversion factor of 3.67.
- The EE/RF were originally developed for the mean age of the forest. Annual EF/RF values were determined by dividing these factors by the mean age of each forest type.
- EE/RF for forest degradation were developed by determining the carbon density values (C t/ha) of different forest strata and the difference between these values when one forest stratum is degraded into a lower stratum (open forest-canopy cover 11-30%, sparse forest-canopy cover 31-50%, medium-canopy cover 51-70% and dense-canopy cover >70%).

243. The relevant calculations are provided in the table below.

**Table 16.** Total annual and total lifetime CO<sub>2</sub> removal estimates for the proposed project.

Expected ecological zone/ area in the proposed project sites	Type of activity	Area (ha)	Removal Factor (Tons CO <sub>2</sub> /ha/year) <sup>119</sup>	Total annual removals (Tons CO <sub>2</sub> /year) [area*removal factor]	Expected number of years for carbon sequestration	Total lifetime removals (Tons CO <sub>2</sub> ) [Total annual removal* years]
Dry Temperate (DI Khan)	Assisted Natural Regeneration in degraded forest	2,100	2.09	4,389	85	373,023
	Block plantation in rangelands/ grasslands	1,500	2.12	3,182	85	270,450
	Farmland plantations/ Woodlots (irrigated)	40	7.59	304	10	3,036
Subtropical Broadleaved Scrub (DI Khan)	Assisted Natural Regeneration in degraded forest	2,200	3.57	7,851	17	133,471
	Block plantation in rangelands/ grasslands	3,000	1.29	3,865	17	65,700
	Farmland plantations/ Woodlots (irrigated)	105	7.59	797	10	7,970
Tropical Thorn Forest (DI Khan)	Assisted Natural Regeneration in degraded forest	2,250	1.82	4,103	34	139,500
	Block plantation in rangelands/ grasslands	2,900	0.36	1,049	34	35,670
	Farmland plantations/ Woodlots (irrigated)	120	7.59	911	10	9,108
<b>Total</b>		<b>14,215</b>		<b>26,450</b>		<b>1,037,928</b>

## D.2. Paradigm shift potential (max. 500 words, approximately 1 page)

244. Current flood and drought events in Pakistan are surpassing the country's existing water infrastructure's capacity to prevent large scale economic damages and loss of human life. As recently as August 2022, as this Funding Proposal is being finalized, the project areas have been hit by disastrous floods causing the displacement of an estimated 33 million people and loss of more than 1,000 human lives<sup>120</sup>. Flood management efforts in Pakistan

<sup>119</sup> Sub-National Forest Monitoring Systems and Greenhouse Gas Inventory Reports for KP and Punjab Provinces developed by WWF-Pakistan for the Ministry of Climate Change (MoCC) under the National REDD+ Project, 2022

<sup>120</sup> <https://www.bbc.com/news/world-asia-62704004>

to date have been largely reactive following extreme events, relying on grey infrastructure solutions that require continuous repairs to flood embankments and irrigation infrastructure. These business-as-usual approaches fail to consider the critical role of healthy freshwater ecosystems in sustaining community livelihoods and providing natural buffers for these communities during flood and drought events.

245. Communities in Pakistan have suffered a series of external shocks that affected their living standards, including the damages inflicted by catastrophic floods in 2010 and now in 2022. Pakistan's high dependence on the agricultural sector, including smallholder farming and cattle raising to guarantee incomes for households, has left these communities highly vulnerable to these impacts. For example, in Sindh province alone, one of the four target provinces of the project, agriculture accounts for approximately 22% of the GDP and employs 44% of the labour force; almost 80% of the population relies on agriculture for their incomes through secondary and service markets<sup>121</sup>. Exacerbated by the COVID pandemic, almost 44% of the population has been identified as economically vulnerable with 24% living under the poverty line, leaving communities in the Indus Basin with very little income security or financial reserves to withstand the economic disruptions of flooding and drought brought on by climate change<sup>122</sup>.

### Accelerating Climate Innovation

246. The project creates a paradigm shift in Pakistan's flood and water resources management efforts by establishing proofs of concept for EbA and green infrastructure interventions in the Indus Basin that validate the cost efficiency, benefits, and sustainability of these adaptation and resilience measures. As the largest investment in EbA and green infrastructure in the freshwater sector in Pakistan and one of the largest for the GCF, the project will invest US\$64 million on the ground to reduce the impacts of increasingly severe floods and droughts on vulnerable communities and ecosystems. The project's proposed EbA and Green Infrastructure interventions will reduce flood extent by 50,833 ha, capture an additional 20 million cubic meters of water, and increase soil infiltration by 1.6 million litres. This will be achieved by: i) restoring 14,215 ha of degraded forests in watersheds in DI Khan to reduce flooding intensity and restore water regulating functions such as the absorption of rainfall and maintaining soil health (Activity 1.1.1); and ii) designing and building 127 green infrastructure interventions such as flood embankments and retention ponds to reduce flood damages to community assets including households, crops, and infrastructure, as well as increase water security through additional water retention and access for households, farmers, and herders across 12 communities (Activity 1.2.1). Together these interventions will increase the resilience of the most vulnerable people and communities in Pakistan (GCF ARA1) and restore and enhance ecosystems and ecosystem services in the Indus Basin on which communities depend (GCF ARA 4).

247. Given the devastation caused by the August 2022 floods, GoP co-financing has been reallocated to relief efforts. While precise timing for restitution of GoP co-financing, or a substitute co-financier, will be reassessed in six months, the Government of Pakistan has maintained and reconfirmed its commitment to shift a significant portion of their public water management budget into green infrastructure and EbA solutions through its multi-agency GCF board.

### Enabling Environment for Climate Action

248. The integration of EbA and green infrastructure interventions to address flooding and drought in the Indus Basin and across Pakistan represents a significant innovation in the country's climate change response strategy. The paradigm shift for an enabling environment for climate action is comprised of four elements that address key barriers identified in Section B.2 (a):

- a. **Evidence for Decision Making:** The project will generate new evidence for the climate change adaptation benefits of these interventions, including setting baselines and indicators to measure the benefits of EbA in attenuating floods, conducting economic valuations of EbA and green infrastructure interventions to determine their cost effectiveness against historical loss and damages from past floods, and assessing the viability of additional EbA and green infrastructure interventions beyond the GCF project in the Haleji and Hadero Watershed, Nara-Deh Akro Watershed, and the Indus Dolphin Reserve in Sindh Province, the Isa Khel Watershed, in Khyber Pakhtunkhwa, and Lala Creek, in Punjab Province (Activity 2.1.1).
- b. **National and Provincial Policy and Planning Reform:** Using the evidence generated under Activity 2.1.1, the project will develop updated procedures for the integration and execution of EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan. The project will create a National Working Group chaired by the MoCC and comprised of regulators within the MoWR, and the relevant Provincial

<sup>121</sup> Agriculture Policy Khyber Pakhtunkhwa. A Ten-Year Perspective (2015-2025). Available from <http://extwprlegs1.fao.org/docs/pdf/pak173417.pdf>

<sup>122</sup> Impact of COVID-19 on Socioeconomic Situation of Pakistan. Available from [https://finance.gov.pk/survey/chapters\\_21/Annex%20IV%20Covid.pdf](https://finance.gov.pk/survey/chapters_21/Annex%20IV%20Covid.pdf)

Departments to lead the development and adoption of updated procedures. These updated procedures will be co-created with the MoCC, MoWR, the Ministry of Planning, Development and Special Initiatives (MoPSI), and the Provincial Departments of Irrigation, Forestry, and Agriculture, as well as academic and research institutions including the Pakistan Council for Research in Water Resources (PCRWR) and the Pakistan Agriculture Research Council (PARC) (Activity 2.1.2). Together, these government agencies will be responsible for drafting, validating, and ultimately approving the updated procedures for integration into three of Pakistan’s major climate and water management policies – the Implementation Framework for the National Water Policy, the National Adaptation Plan (NAP), and Provincial Adaptation Plans of Sindh, Khyber, Balochistan, and Punjab provinces (Activity 2.2.1) – and used in future flood and water resources planning and management.

- c. **National and Provincial Capacity:** Following the passage of updated procedures for the Implementation Framework of the National Water Policy, the NAP, and the Provincial Adaptation Plans, project planners and technical staff within the MoCC, MoWR, and Provincial Departments of Irrigation, Agriculture, and Forestry will be trained by project team members on the requirements of the new regulatory procedures and how to apply these procedures in the design and construction of EbA and green infrastructure interventions in future country-driven projects (Activity 2.3.1).
- d. **Community Capacity:** As community ownership is essential for long-term sustainability of the project’s green infrastructure and EbA investments, operational agreements will be established between 8 CBOs and the Provincial Departments of Forestry for the provinces of Sindh, Khyber Pakhtunkhwa and Balochistan. These agreements will codify at the local level the updated procedures for the Implementation Framework of the National Water Policy, the NAP, and the four Provincial Adaptation Plans, as well as assign specific operation, maintenance, and stewardship roles among communities and Provincial Departments of Forestry.

#### Potential for Scaling Up and Replication

249. The project approach is strongly aligned with the GCF’s goal of funding initiatives that catalyse climate impact beyond a one-off investment. It will serve as the key proof point in Pakistan that EbA and green infrastructure interventions are cost-effective and impactful adaptation options. The GoP has already committed to expanding EbA and green infrastructure beyond the GCF project’s 4 sites to 5 additional sites in Haleji, Hadero and Nara-Deh Akro Watersheds in Sindh Province, Indus Dolphin Reserve in Sindh Province, Isa Khel Watershed in Khyber Pakhtunkhwa, and Lala Creek in Punjab Province.

#### Potential for Knowledge Sharing and Lessons Learned

250. The project will generate an economic valuation on the benefits of EbA and green infrastructure, providing new evidence and lessons learned on the value of these interventions in response to floods and droughts (Activity 2.1.1). Using this evidence, the project will create updated procedures for ecosystem management and flood management for regulators and planners (Activity 2.2.1). The evidence and knowledge products will be used in Pakistan to improve flood and water resources management and also be shared through the WWF International Network to climate change and freshwater practitioners to be replicated in other flood and drought prone areas. A WWF Freshwater Adaptation Specialist will be financed under the project to facilitate this evidence and knowledge sharing through their existing networks within the scientific community. The project will also enable knowledge sharing within the target provinces by providing training to provincial governments and farmers on climate-smart agriculture practices (Activity 3.2.1) as well as to CBOs (Activities 1.3.1 and 1.3.2).

### D.3. Sustainable development (max. 500 words, approximately 1 page)

251. The project’s interventions will contribute to the achievement of a number of the Sustainable Development Goals (SDGs). Improving the resilience of ecosystems and communities currently vulnerable to increased instances of drought and flooding brought on by climate change (SDG 13 Climate Action), directly helping to enhance the resilience of 687,336 people, will also achieve co-benefits in the areas of GHG reduction, biodiversity conservation, poverty reduction, food insecurity attenuation, enhanced health and well-being, and gender equality promotion. Co-benefits are presented below and linked to relevant SDGs contributed to by the project. More detail on co-benefits related to EbA interventions is presented in Table 16 below and in Annex 2: Feasibility Study.

- **SDG 1 - No poverty.** The project will help alleviate poverty for 50,750 farmers vulnerable to income loss from flooding and drought by training in improved irrigation practices, the use of alternate crop and seed varieties better suited to withstand water insecurity, and improved soil and farm management practices. These new skills along with the provision of equipment and materials will allow farmers to better adapt their farming and livelihood practices to future climate conditions. The project will improve farming practices across 128 ha of farmland on which communities are directly dependent for income generation. This will help avoid income losses from flooding damaging to crops and agricultural equipment and improve water efficiency on farms reducing crop

failure and subsequent income loss for households (economic co-benefit). The impacts of climate change on poverty levels in Pakistan are evident when looking at the economic outcomes of major flooding events in 2010 and now in 2022 on Pakistan's household and overall economy. Early estimates of the ongoing damages from the floods in Pakistan are expected to surpass US\$10 billion<sup>123</sup>. The project will help reduce the impacts of largescale floods and drought in Pakistan such as those in 2010 and 2022 helping to reduce economic losses.

- SDG 2 - Zero hunger. The poverty reduction benefits of the project outlined above are also expected to help reduce food insecurity in the Indus Basin. Close to 90% of agricultural production is dependent on irrigation due to Pakistan's arid climate and variable rainfall leaving food production and household access in the Indus highly vulnerable to flooding events which can disrupt irrigation networks. The activities outlined above will help reduce water dependency and enhance the resilience of agricultural systems facing increased instances of flooding and drought. The restoration of ecosystems' provisioning of services such as habitat for fisheries, freshwater availability for food cultivation and livestock raising, along with the improvement of agricultural resilience will together help enhance food security for communities in the Indus and Pakistan more broadly (social co-benefit).
- SDG 5 - Gender equality. The challenges of climate change impacts, building resilience and gender inequalities are inextricably linked. By exacerbating inequality, climate change slows progress toward gender equality and thus impedes efforts to achieve wider goals like poverty reduction and sustainable development. Conversely, gender inequality can worsen the impacts of climate change and further propel the 'feminization' of violence, poverty, marginalization and exclusion. Therefore, taking steps to narrow the gender gap and empower women can help counter the impacts of climate change. 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. 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. The Project will implement a Gender Action Plan (Annex 8) tied to the activities of the project designed to help bridge development and decision-making gaps for women by providing training to women in improved farm management and climate smart agricultural methods, providing financing and technical assistance to women owned and/or operated enterprises, and empowering women in community decision making within CBOs. The project will expand women's social and economic freedoms by focusing on their role as change agents, decision-makers and experts as well as increasing their access to resources required to meet their practical needs. It is expected that their participation in the project will serve to empower them, change societal perceptions and lead to their greater participation in other spheres of public and professional life (gender co-benefits).
- SDG 14 - Life below water and SDG 15 - Life on land. The project will restore approximately 14,215 ha of forests and place this 14,215 ha and an additional 4,000 hectares of freshwater and riverine ecosystems under improved community management. These interventions will provide additional suitable habitat and increasing landscape and freshwater ecosystem connectivity (through the creation of corridors) for vulnerable species such as the Indus River dolphin. Only about 1,100 of this unique species exist today in the lower parts of the Indus River in Pakistan. Improved water availability will also support healthy riverine forests and wetlands, and associated ecosystem services such as fish stocks, clean water, and fodder sources (environmental and social co-benefits). The restoration and increased water retention capacity of targeted wetland sites, expanding and rehabilitating riverine forest areas, and improving watershed management will also capture an estimated 26,450 M-Tons of GHG emissions annually over the project lifespan. These benefits are categorized as mitigation co-benefits under the project.

**Table 17.** Co-benefits associated with selected project adaptation intervention types.

Adaptation intervention type	Co-benefits		
	Environmental	Social	Economic
Restoration of riverine catchment vegetation	<ul style="list-style-type: none"> <li>● Revegetation provides long-term stabilization of riverbanks, prevents erosion, and enhances protection of the bank toe from continual scour while reducing fine sediment input.</li> </ul>	<ul style="list-style-type: none"> <li>● Improved drinking water quality and supply.</li> </ul>	<ul style="list-style-type: none"> <li>● Increased lifespan and capacity of dams.</li> </ul>

<sup>123</sup> <https://www.reuters.com/world/asia-pacific/initial-economic-losses-pakistan-floods-least-10-blm-planning-minister-2022-08-29/>

	<ul style="list-style-type: none"> <li>● Improved forest cover.</li> <li>● Improved carbon sequestration.</li> <li>● Enhanced habitats for local wildlife species.</li> </ul>		
Restoration of flow paths	<ul style="list-style-type: none"> <li>● Improved deposition processes on the floodplain and the reduced movement of gravel.</li> <li>● Improved nutrient and pollution retention in upstream areas.</li> </ul>	<ul style="list-style-type: none"> <li>● Continuation of cultural, recreational and aesthetic value associated with biodiversity of ecosystems.</li> </ul>	<ul style="list-style-type: none"> <li>● Increase in irrigated land and hence food production.</li> </ul>
De-siltation of wetlands	<ul style="list-style-type: none"> <li>● Improved health of native wetland vegetation.</li> </ul>	<ul style="list-style-type: none"> <li>● Improved drinking water quality and quantity.</li> </ul>	<ul style="list-style-type: none"> <li>● NA</li> </ul>
Enhancing and reinforcing embankments	<ul style="list-style-type: none"> <li>● Enhanced habitats for local wildlife species.</li> </ul>	<ul style="list-style-type: none"> <li>● Continuation of cultural, recreational and aesthetic value associated with biodiversity of ecosystems.</li> <li>● Improved drinking water quality and quantity.</li> </ul>	<ul style="list-style-type: none"> <li>● Lower infrastructure maintenance costs and strengthened local economies through diversification of livelihoods based on natural resources.</li> </ul>
Flood protection embankments	<ul style="list-style-type: none"> <li>● Improved hydrological connectivity across flood plains.</li> <li>● Improved carbon sequestration.</li> <li>● Erosion control and nonpoint source pollution prevention.</li> <li>● Increase of vegetation and biomass with extended growing seasons and enhanced soil moisture.</li> <li>● Sediment retention.</li> </ul>	<ul style="list-style-type: none"> <li>● Improved drinking water quality and quantity.</li> </ul>	<ul style="list-style-type: none"> <li>● NA</li> </ul>
Improved efficiency of irrigation systems	<ul style="list-style-type: none"> <li>● Improved soil health and water content.</li> </ul>	<ul style="list-style-type: none"> <li>● Reduced conflict over water resources.</li> </ul>	<ul style="list-style-type: none"> <li>● Cost savings as a result of reduced water and labour inputs.</li> <li>● Intensification of agriculture.</li> <li>● Income diversification and market access for smallholder farmers.</li> </ul>
Drought-resistant crop varieties	<ul style="list-style-type: none"> <li>● Reduced degradation of natural areas through expansion of croplands.</li> </ul>	<ul style="list-style-type: none"> <li>● NA</li> </ul>	<ul style="list-style-type: none"> <li>● Improved food security.</li> </ul>
Water harvesting	<ul style="list-style-type: none"> <li>● NA</li> </ul>	<ul style="list-style-type: none"> <li>● NA</li> </ul>	<ul style="list-style-type: none"> <li>● Agricultural expansion and diversification of crops.</li> <li>● Additional income</li> </ul>

#### D.4. Needs of recipient (max. 500 words, approximately 1 page)

##### Pakistan's Vulnerability

252. Pakistan is a middle-income developing country however; it is also among the most vulnerable countries to extreme weather events due to the high recurrence and magnitude of disasters associated with changing climate conditions and is ranked 18 out of 191 countries by the 2019 [Inform Risk Index](#). Pakistan is highly exposed to flooding and drought and is ranked 8th most affected country in the world on GermanWatch's Long-Term Climate Risk Index (2000–2019).

253. As this proposal is being developed, Pakistan is experiencing unprecedented floods killing over 1,300 peoples and displacing over 33 million. The latest reports show that over 1,600 have been injured, 325,000 homes have been destroyed, 735,000 heads of livestock have been lost, and 2 million acres of crops damaged. As the floods are still on-going, these figures are expected to increase. Pakistan's Planning Ministry estimates to total cost of the

damages to exceed \$10 billion equivalent to 4% of the country's GDP<sup>124</sup>. The floods have destroyed huge swaths of inundated farmland which will be unusable for some time. Pakistan's economy is heavily dependent on its agricultural sector both for national food production and as part of its export revenue, these most recent floods will cause significant crop revenue losses and risk for severe food shortages.

254. The floods in 2022 are Pakistan's most recent experience with climate disaster but has experienced significant events in the past decade only exacerbating its compounding vulnerability. 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 also damaged, with financial damages estimated at \$40 billion. Since then, Pakistan has experienced large floods for six consecutive years<sup>125</sup>.

#### **Economic and financial constraints for climate change adaptation in Pakistan**

255. Given Pakistan's significant vulnerability to climate change, there is urgent need of adaptation finance to implement projects which can help reduce Pakistan's vulnerability to extreme events. The country's climate adaptation needs range between US\$7 billion and US\$14 billion a year, according to an ADB report of 2017<sup>126</sup> which will require contributions from international public financing sources, such as the GCF. Furthermore, there is a key gap in financing for Ecosystem-based solutions (EbS) to climate change.

256. As described above, Pakistan already suffers immense losses from climate change impacts and evidence suggests that such losses will continue to have a significant and increasing effect on the GDP if no adaptation action is taken. Between 1995 and 2014, climate change cost Pakistan US\$ 3.9 billion (PPP) in average economic losses annually. Addressing these effects requires a swift increase in investment in climate change adaptation. 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.

257. Pakistan remains a resource-constrained economy, dependent on foreign financing in the shape of loans, foreign investment, and grant aid for, amongst others, infrastructure projects and assistance during post disaster situations. There is significant investment required to meet the requested budgets for National Flood Protection Plans (NFPPs) ~US\$ 431 million dependent on exchange rate fluctuations and due to insufficient government funds, foreign financing is relied on significantly for tackling the impacts of floods and droughts, and/or investing in flood and drought management initiatives.

258. National adaptation budgets are also constrained by the urgent need for investments in other development initiatives. A recent example of such a need is related to rising food and energy which is diminishing the real purchasing power of households, disproportionately affecting poor and vulnerable households that spend a larger share of their budget in these areas. In response, the Government introduced a targeted food subsidy program (Ehsaas Rashan Riyat) in February 2022<sup>127</sup>. Despite the country's financial constraints, estimated federal climate-related expenditure was between 5.8 and 7.6% of the total expenditures in the federal budget<sup>128</sup>. 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 of that required to finance Pakistan's adaptation needs. GCF support in the form of grant financing is consequently being requested to support climate-resilient sustainable development in Pakistan.

259. While ~US\$67 million in government co-finance from the NDRMF and MoWR was committed to the project, the recent floods have required that these funds be repurposed for immediate disaster relief. Pakistan is one of the first countries in South Asia to create a Ministry of Climate Change and has had a National Climate Change Policy since 2012, demonstrating the country's commitment to counter the adversities of climate change. Despite these commitments, Pakistan's economic development challenges, large external public debt and subsequent exchange rate vulnerability, and compounding national emergencies brought on by climate change such as the floods of 2010 and now in 2022 make it very difficult for the government of Pakistan to commit significant adaptation finance at this time<sup>129</sup>.

<sup>124</sup> <https://www.bbc.com/news/world-asia-62704004>

<sup>125</sup> Government of Pakistan, 2017.

<sup>126</sup> <https://pide.org.pk/research/pakistans-options-for-climate-finance/>

<sup>127</sup> Source: <https://www.worldbank.org/en/country/pakistan/overview#1>

<sup>128</sup> UNDP, 2015.

<sup>129</sup> <file:///C:/Users/jaudel/Downloads/Advocacy%20Brief%20Financing%20Climate%20Action%20in%20Pakistan.pdf>

260. Pakistan's large geographical area makes it the 34th largest country in the world. Its population is over 207 million with an average population density of 267 km<sup>2</sup>, making it the fifth most populous country<sup>130</sup>. Its GDP is ~US\$304 billion and GDP per capita is ~US\$1,629. Long-standing structural weaknesses of the economy and low productivity growth continue to pose risks to a sustained recovery. Strong aggregate demand pressures, in part due to previously fiscal and monetary policies, paired with the continued less conducive external environment for exports have contributed to a record-high trade deficit, putting pressure on the Rupee and the country's limited external buffers. The current account deficit (CAD) in early 2022 widened to US\$9 billion, from a surplus of US\$1.2 billion 2021, as imports values surged by 54%, doubling the 27% growth in export values.

261. Pakistan's Human Development Index (HDI) score is 0.550, resulting in its placement of 147 out of 188 countries in terms of level of human development. With the economic recovery and improved labour market conditions, poverty measured at the lower middle-income class poverty line (US\$3.20 Purchasing Power Parity (PPP) per day in 2011)<sup>131</sup> is estimated to have declined from 37% in 2020 to 34% in 2021. According to the country's new poverty index, 38% of population lives with multi-dimensional poverty, with the highest rates in KP and Balochistan. Most of these people living in poverty reside in rural areas (54.6% rural poverty) and are disproportionately impacted by climate change<sup>132</sup>. Furthermore, Pakistan scores 0.546 on the Gender Inequality Index (GII), with inequality between female and male achievements in the following areas: reproductive health, empowerment, and economic activity. Pakistan's value of 0.742 for its Gender Development Index (GDI) is the highest global score in gender inequality.

262. The proposed project's contribution to supporting equitable wealth distribution includes targeting rural agriculturalists as direct and indirect beneficiaries including indigenous communities, women, and other marginalized groups. Rural agricultural livelihoods are reliant on ecosystem services, such as water provision, resulting in large portions of society being indirectly affected by the impacts of climate change on ecosystems, in addition to direct climate impacts. Agricultural and subsistence-based livelihoods in poor and marginalized communities with often limited access to modern farming technology and basic infrastructure and services are highly dependent on ecosystem services. The multi-dimensional poverty and poverty status in the project's targeted Provinces are presented in Table 18.

**Table 18.** Multi-dimensional poverty and poverty status of the project's target sites.

Province	Site	District	Population (2017)	Multi-dimensional poverty	Poverty status
Khyber Pakhtunkhwa	Dera Ismail Khan	Tank	391,885	0.385	Very poor
	Dera Ismail Khan & Darya Khan – Ramak	D.I. Khan	1,627,132	0.362	Very poor
Sindh	Manchar Lake Catchment	Dadu	1,550,266	0.247	Very poor
Balochistan	Chakar Lehri Sub Basin	Jhal Magsi	149,225	0.528	Extremely poor

263. Pakistan is one of the most water-stressed countries of the world, with an average per capita water availability of less than 1,000 m<sup>3</sup> per year<sup>133</sup>. Water is crucial for the country's predominantly agriculture-based economy, which accounts for 19% of GDP, 42% of jobs<sup>134</sup>, and 91% of the annual freshwater usage<sup>135</sup>, making it extremely vulnerable to an increasing risk of drought. Many areas of Pakistan experienced temperatures 5–8°C higher than averages, posing a risk to water supplies and agriculture, as well as human and animal health. During the country's 2015 heatwave, over 65,000 people were hospitalized with heatstroke.

#### Local-level (community and livelihood) vulnerability

264. Agriculture employs ~42% of the population and contributes 21% of GDP. Farmers engage in a combination of activities encompassing crop production, livestock management and non-timber forestry products, all of which are climate sensitive. As 90% of agriculture depends on irrigation from the Indus River and its tributaries, the agriculture sector is highly vulnerable to changes in the availability (too little and too much) and timing of water resources. For

<sup>130</sup> PBS (2019) Labour Force Statistics 2017-18 [online] accessed at <https://www.pbs.gov.pk/content/labour-force-statistics>

<sup>131</sup> More information on Global Poverty Lines is available here: <https://www.worldbank.org/en/news/factsheet/2022/05/02/fact-sheet-an-adjustment-to-global-poverty-lines>

<sup>132</sup> UNDP, 2016.

<sup>133</sup> National Water Policy, 2018.

<sup>134</sup> Government of Pakistan, 2017.

<sup>135</sup> UNDP, 2016.



example, in 2010–2014, five flood events destroyed 10.6 million acres of crops, negatively affecting farmers' incomes and land fertility. Although Pakistan has the most extensive continuous irrigation network in the world and a high level of flows (outside the drought regions), the country is still considered water stressed. This is mainly due to high demand for irrigation because of increasing evaporation rates and poor water storage capacity. Furthermore, over one-quarter of cultivable land is already degraded because of water logging, salinization, flooding and erosion. Changes in rainfall patterns and seasonal shifts in weather have resulted in climate irregularities that are making agricultural livelihoods challenging and unpredictable, thus adversely impacting farmers. All these factors compound the climate change vulnerability of agricultural communities<sup>136</sup>.

265. Women, children, people with disabilities and smallholder farmers are among those that are the most at risk to the impacts of climate change in Pakistan. Climatic shocks particularly affect women's livelihoods. Whilst women take care of farming work when men migrate for better employment opportunities, they very seldom own or have decision-making rights over the productive assets. Only 44% of women reported being able to make decisions about major household purchases, thereby limiting their ability to respond to crisis situations. Women rarely own property (either houses or land), which limits their ability to rely on their asset base in times of emergencies or receive Government compensation if there are damages. Additionally, women also have limited access to information compared to men<sup>137</sup>.

266. The impacts of climate change on food productivity pose a very serious challenge in a country where 60% of the population is food insecure (especially in Khyber Pakhtunkhwa) and almost half of the women and children are malnourished. Rising average temperatures are projected to reduce cereal production by up to 20% in the warmer southern parts of Pakistan, though there will be minor improvements in yield in the colder northern areas. Punjab and Sindh provinces — which together account for over 90% of agricultural produce — are the most vulnerable to climate change impacts. The production of income-generating cash crops like cotton, maize, rice, sugarcane and wheat is expected to decline due to climate change. Livestock production is also projected to decline by ~30%<sup>138</sup>.

267. Livestock rearing constitutes 53% of Pakistan's agricultural GDP. It is dependent on climate-sensitive grasslands and rangelands, which are increasingly under pressure from longer and more frequent droughts, flash floods and a rise in temperature. Livestock rearing is an important agriculture-allied activity for 30–35 million rural farmers who earn about 40% of their income through livestock. There are regional differences with the highest proportion (87%) of people rearing livestock being in the arid province of Balochistan. The direct effects of climate change on livestock include heat stress resulting in lower milk and meat production and reduced reproduction. Rising temperatures and water-related disasters increase the risk of zoonotic epidemics as well as the loss of livestock. Indirect climate-related pressures such as lower fodder production, soil erosion and land degradation will also adversely affect the livestock sector<sup>139</sup>.

268. Vulnerable communities in the Indus Basin depend on the water supply and recharge, food and products, flood protection, sediment control, carbon sequestration, climate regulation, and other benefits provided by 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/ha<sup>140</sup>. Degradation of wetlands, forests, and pastures due to climate change is causing habitat and land productivity loss and decreasing grazing areas and fodder<sup>141</sup>. These impacts are compounded by the existing constraints on the Indus Basin such as irrigation infrastructure and other stresses (e.g., pollution of ecosystems). The combined impacts considerably increase the vulnerability of communities and their livelihoods.

### **Need for strengthening institutions and implementation capacity**

269. Historically, development initiatives in Pakistan's water sector have lacked the integration of adaptation, leaving the sector vulnerable to the increasingly severe impacts of climate change. Examples of this approach include the construction of two major dams (Tarbela and Mangla) and linking canals for storage and irrigation via the Indus Waters Treaty (1960) using financing from the World Bank. At the time, the adaptation-related needs were not well understood and hence not considered in such initiatives, leaving them vulnerable to climate change impacts such

<sup>136</sup> ADB, 2017.

<sup>137</sup> IFRC, 2021. Climate Change Impacts on Health and Livelihoods: Pakistan Assessment. Available at: [https://www.climatecentre.org/wp-content/uploads/RCRC\\_IFRC-Country-assessments-PAKISTAN-3.pdf](https://www.climatecentre.org/wp-content/uploads/RCRC_IFRC-Country-assessments-PAKISTAN-3.pdf)

<sup>138</sup> IFRC, 2021. Climate Change Impacts on Health and Livelihoods: Pakistan Assessment. Available at: [https://www.climatecentre.org/wp-content/uploads/RCRC\\_IFRC-Country-assessments-PAKISTAN-3.pdf](https://www.climatecentre.org/wp-content/uploads/RCRC_IFRC-Country-assessments-PAKISTAN-3.pdf)

<sup>139</sup> IFRC, 2021. Climate Change Impacts on Health and Livelihoods: Pakistan Assessment. Available at: [https://www.climatecentre.org/wp-content/uploads/RCRC\\_IFRC-Country-assessments-PAKISTAN-3.pdf](https://www.climatecentre.org/wp-content/uploads/RCRC_IFRC-Country-assessments-PAKISTAN-3.pdf)

<sup>140</sup> Dehlavi & Nawaz, 2012.

<sup>141</sup> ADB, 2017.

as increasing evaporation and siltation. While access to information and knowledge on climate change and adaptation responses (such as EbA) have since improved in Pakistan, the water sector's regulatory and planning framework does not yet reflect these important learning experiences. As a result, the sector remains vulnerable to climate change impacts. There is also a disconnect between plans, regulations and mandates for water management at the federal, provincial and district levels. The roles and responsibilities of relevant institutions such as the Departments of Water, Irrigation and Agriculture are not clearly defined, coupled with a non-existent knowledge transfer mechanism that contributes to limited coherence between sectoral plans and policies.

270. The situation is further exacerbated by severely limited public sector budgets for adaptation; only 5–7% of the GoP's budget is designated for climate change adaptation, the majority of which is used for costly and high-maintenance hard infrastructure<sup>142</sup>. This is further compounded by limited technical expertise in Pakistan for planning and implementing adaptation, especially in the areas of EbA and green infrastructure interventions. Consequently, alternatives to hard infrastructure for adaptation (that also considers future climate risks) remain poorly understood and underutilized, with an ad-hoc, reactive and uncoordinated approach to floodwater and flood risk management, leaving communities and vulnerable ecosystems at risk. The proposed project will address the institutional and implementation needs described above through mainstreaming EbA and green infrastructure as key approaches to integrated flood and water resources management in Pakistan. This will include: i) establishing an evidence base of EbA and green infrastructure interventions' effectiveness and efficiency at reducing the impacts of climate change-induced floods and droughts on vulnerable communities and ecosystems in Pakistan to expand Pakistan's regulations and policies for flood and water resources management from only focusing on using grey infrastructure to address the threats of floods and droughts to prioritising EbA and green infrastructure interventions; and ii) strengthening technical and institutional capacity for scaling up and replicating EbA and green infrastructure interventions at the national and sub-national levels.

#### D.5. Country ownership (max. 500 words, approximately 1 page)

271. Improving resilience to climate change hazards, particularly floods and droughts, is among the top priorities of GoP. Following a Ramsar recommended exposure visit (Ramsar Advisory Mission (RAM)) 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"<sup>143</sup>. RAM's recommendations and the subsequent exchanges with flood management experts in the Yangtze Basin successfully convinced the GoP of the advantages of EbA for flood management in the Indus Basin. Specifically, a 'Diversified Portfolio Approach' is needed, combining: i) EbA interventions (e.g., restoration, reconnection and/or rehabilitation of watersheds, floodplains and wetlands<sup>144</sup>); ii) green infrastructure interventions (e.g., retention areas and recharge basins); and iii) climate-resilient land and water resources management strategies (e.g., expanding flood and water resources regulations and policies to prioritise EbA and green infrastructure interventions).

272. The proposed project has been developed at the request of the GoP specifically to act on these recommendations. A participatory approach has been taken for the design of the proposed project, including close consultations with Pakistan's main water resources, flood management, and climate change adaptation stakeholders, particularly the MoWR, MoCC, and FFC, respectively. In particular, the AE and project partners have worked closely with the NDA (MoCC), who has contributed considerably to driving the project development process at a national level, as well as providing timely inputs into the development of the proposal. Twenty letters of support from federal ministries and provincial departments<sup>145</sup> — including the Letter of No Objection (Annex 1) from the GCF NDA, MoCC — have been received in support of the project, which emphasises the country's ownership and commitment. While not presented in Pakistan's GCF Country Programme (2017), the proposed project is aligned with the key climate needs and agenda presented therein, further reinforcing the ownership of the proposal by the country as presented in this section. Moreover, the GoP has highlighted the proposed project's important role of

<sup>142</sup> Pakistan - Climate Public Expenditure and Institutional Review, UNDP, 2015.

<sup>143</sup> Ali, 2013.

<sup>144</sup> Opperman, et al., 2017.

<sup>145</sup> Government of Pakistan: Ministry of Water Resources, Pakistan Council of Research in Water Resources, Federal Flood Commission; Government of Balochistan: Environment Department, Provincial Disaster Management Authority (PDMA) Irrigation Department, Planning and Development Department; Forest and Wildlife Department; Government of Khyber Pakhtunkhwa: Forest Environment and Wildlife Department, Irrigation Department, Provincial Disaster Management Authority; Government of Sindh: Forest and Wildlife Department, Irrigation Department, Provincial Disaster Management Authority, Environmental Protection Agency; Government of Punjab: South Punjab Forest Company, Environment Protection Agency, Forestry, Wildlife and Fisheries Department, Irrigation Department, Provincial Disaster Management Authority.

contributing to national adaptation objectives by including it as a priority initiative under the country’s updated NDCs (2021).

273. The 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 manage the increasingly severe threat of floods in the Indus Basin, and harvest surplus floodwater to support water security. The Ministry of Climate Change further presented this project to the former Prime Minister of Pakistan in September 2018 — during this meeting this project was approved and prioritized for immediate funding under the “Recharge Pakistan” initiative (of which the proposed project is a major part). The Office of the Advisor to the Prime Minister on Climate Change subsequently 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 has promoted the project as a GoP priority at various national and international environment and climate change platforms, including the UNFCCC’s COPs — the proposed project (Recharge Pakistan) is one of the five initiatives on Pakistan’s five-point Green Agenda.

**Coherence with national climate strategy and existing policies**

274. The proposed project will contribute towards achieving priorities under relevant GoP policies, including the [National Climate Change Policy](#) and updated [Pakistan’s Nationally Determined Contributions](#) (NDCs). The project is a key adaptation priority within the updated NDCs and will contribute towards the short (2020–2025), medium (2030) objectives of the NDCs by: “enhancing integrated water resource management” and “harvesting rainwater and floodwater”; strengthening sub-national adaptation planning, building capacity, and investing in climate-resilient infrastructure; contributing to “additional water reservoir capacity on the river system to regulate water discharges during high floods”; and “promoting local rainwater harvesting and development of small storages on run of the rivers during peak flows”. Under the revised NDCs, Recharge Pakistan (the proposed project) is a priority initiative for which the GoP has already allocated 6 billion rupees (~US\$29.5 million). 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](#), and Water Council under the [National Water Policy](#)), and enhancing institutional capacity (prioritized under the [National Flood Protection Plan](#) — NFPP IV), was also stressed in the country’s NDCs and is incorporated in the proposed project. In the near term 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. At the international level, the project will also contribute towards all four priorities under the [Sendai Framework](#) for Disaster Risk Reduction (2015–2030): i) understanding disaster risk; ii) strengthening disaster risk governance to manage disaster risk; iii) investing in disaster risk reduction for resilience; and iv) enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction.

275. While remaining coherent with Pakistan’s climate change, natural resource and disaster risk reduction frameworks, the project will also contribute to policy and regulatory change. This will be achieved through: i) establishing a National Working Group to lead the development and adoption of updated procedures for Pakistan’s key regulations and policies for flood and water resources management on the proper execution of EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan; and ii) strengthening institutional and technical capacity at the national and sub-national levels to apply the updated procedures, as well as implement, scale up and replicate EbA and green infrastructure interventions across Pakistan. Coherence with other existing policies is presented in Table 19 below.

**Table 19.** Coherence of the proposed project with existing policies.

Policy, Plan or Strategy	Priorities contributed to by the proposed project
<p>The <a href="#">National Climate Change Policy</a> (2012) provides a framework for addressing the issues that Pakistan faces or will face in the future due to the changing climate. The goal of the policy is to ensure that climate change is mainstreamed in the economically and socially vulnerable sectors of the economy and steer Pakistan towards climate resilient development.</p>	<p><b>Relevant objectives:</b></p> <ol style="list-style-type: none"> <li>1. To pursue sustained economic growth by appropriately addressing the challenges of climate change — <i>Entire project</i></li> <li>2. To integrate climate policy with other inter-related national policies — <i>Outputs 2.1 and 2.2</i></li> <li>3. To focus on pro-poor gender sensitive adaptation will also promoting mitigation to the extent possible in a cost-effective manner — <i>Outputs 1.1, 1.2, 1.3, 3.1 and 3.2</i></li> <li>4. To ensure water, food and energy security of the country in the face of challenges posed by climate change — <i>Outputs 1.1, 1.2, 1.3 and 3.2</i></li> </ol>

	<p>5. To minimize the risks arising from the expected increase in frequency and intensity of extreme weather events such as floods, droughts and tropical storms — <i>Outputs 1.1, 1.2, 1.3, 2.1, 2.2, 2.3 and 3.2</i></p> <p>6. To strengthen inter-ministerial decision making and coordination mechanisms on climate change — <i>Outputs 2.1, 2.2 and 2.3</i></p> <p>7. To facilitate effective use of the opportunities, particularly financial, available both nationally and internationally — <i>Output 3.1</i></p> <p>8. To foster the development of appropriate economic incentives to encourage public and private sector investment in adaptation measures — <i>Outputs 2.1, 2.2 and 3.1</i></p> <p>9. To enhance awareness, skill and institutional capacity of relevant stakeholders — <i>Outputs 1.3, 2.1, 2.2, and 2.3</i></p> <p>10. To promote conservation of natural resources and long-term sustainability — <i>Entire project</i></p>
<p>The aim of the <a href="#">National Forest Policy (2015)</a> is to expand the national coverage of forests, protected areas, natural habitats and green areas for restoration of ecological functions and maximizing economic benefits while meeting Pakistan's obligations to international agreements related to forests. In view of Pakistan's high vulnerability to adverse impacts of climate change, in particular to extreme events, mitigation and adaptation measures are the focus of the Policy.</p>	<p><u>Relevant objectives:</u></p> <p>1. Enhancing public awareness on economic, social, ecological and cultural values of forests — <i>Output 3.1</i></p> <p>2. Implementing a national level mass afforestation programme to expand and maintain forest coverage to meet international standards — <i>Output 1.1</i></p> <p>6. Facilitating implementation of international conventions and agreements related to forestry, biodiversity and climate change — <i>Entire project</i></p> <p>7. Promoting standardized and harmonized scientific planning of forests, research and education — <i>Outputs 1.3, 2.1, 2.2, and 2.3</i></p>
<p>The National Water Policy provides the guiding principles and broad policy direction for the water sector in Pakistan and deals with some related issues such as climate change threats. The Policy seeks to respond to Pakistan's water crisis. The objective of the policy is to take cognizance of the emerging water crisis and provide an overall policy framework and guidelines for a comprehensive plan of action. The Policy is a national framework within which the provinces can develop their master plans for sustainable development and management of water resources.</p>	<p><u>Relevant objectives:</u></p> <p>2.1 Promoting sustainable consumption and production patterns throughout the water sector from exploitation to utilization — <i>Outputs 1.3 and 3.2</i></p> <p>2.7 Providing food security and expanding water availability to help adapt to climate change, population and other large-scale stresses — <i>Outputs 1.1, 1.2 and 3.2</i></p> <p>2.10 Improving watershed management through extensive soil conservation, catchment area treatment, preservation of forests and increasing forest cover — <i>Outputs 1.1, 1.2, 1.3, and 3.2</i></p> <p>2.11 Restoring and maintaining the health of the environment and water related ecosystems — <i>Outputs 1.1, 1.2, 1.3, and 3.2</i></p> <p>2.12 Flood management to mitigate floods and minimize their damages — <i>Outputs 1.1, 1.2, 1.3, and 2.2</i></p> <p>2.13 Drought management with emphasis on long term vulnerability reduction — <i>Outputs 1.1, 1.2, 1.3, and 2.2</i></p> <p>2.15 Promoting appropriate technologies for rainwater harvesting in rural as well as urban areas — <i>Output 3.2</i></p> <p>2.19 Encouraging beneficiary participation and public private partnerships — <i>Outputs 1.3, 2.3, 3.1 and 3.2</i></p> <p>2.20 Strengthening and capacity building of water sector institutions — <i>Outputs 2.2 and 2.3</i></p> <p>2.22 Protection of wetlands and Ramsar Sites — <i>Outputs 1.1, 1.2, 1.3, 2.2, 2.3 and 3.2</i></p>
<p>Pakistan's <a href="#">National Wetlands Policy (draft)</a> recognises the importance of Pakistan's wetlands, which include valuable ecosystem services, such as: water regulation, wetlands and climate, biodiversity importance, human health and livelihoods.</p>	<p><u>Relevant objectives:</u></p> <p>1. Addressing primary threats to Pakistan's wetlands — <i>Outputs 1.1, 1.2 and 1.3</i></p> <p>3. Greater co-ordination and collaboration between agencies and sectors on wetland issues encouraged from local to international levels — <i>Output 2.2</i></p> <p>4. Promoting wetland research, education and data management — <i>Outputs 2.1, 2.2 and 2.3</i></p> <p>5. Building Pakistan's capacity for sustainable wetland management — <i>Outputs 1.1, 1.3 and 2.3</i></p> <p>6. Promoting improved understanding, perceptions and attitudes towards wetlands conservation and wise use — <i>Outputs 1.3, 2.2, and 2.3</i></p>
<p>The <a href="#">National Disaster Risk Management Framework</a> (2007) has been formulated to guide the work of entire system in the area of disaster risk management. The Framework envisions, "To achieve sustainable social, economic and environmental</p>	<p><u>Relevant priority areas</u></p> <p>Training, education and awareness:</p> <ul style="list-style-type: none"> <li>• Technical skills and knowledge of district and municipal officials in hazard-prone areas enhanced on disaster risk production and preparedness — <i>Outputs 1.3, 2.2, 2.3 and 3.2</i></li> </ul> <p>Promoting disaster risk management planning:</p>



<p>development in Pakistan through reducing risks and vulnerabilities, particularly those of the poor and marginalized groups, and by effectively responding to and recovering from disaster impact”.</p>	<ul style="list-style-type: none"> <li>• Formulation of disaster risk management plans at the federal, provincial, district and municipality levels — <i>Outputs 1.3 and 2.2</i></li> </ul> <p>Community and local level risk reduction programming:</p> <ul style="list-style-type: none"> <li>• Technical capacity of community organizations, masons, schoolteachers enhanced to deal with disaster risk reduction and preparedness issues — <i>Outputs 1.3 and 2.3</i></li> <li>• Awareness of vulnerable communities and local stakeholders increased about hazards, risks, vulnerabilities, risk reduction and disaster preparedness — <i>Outputs 1.3 and 3.2</i></li> </ul> <p>Mainstreaming DRR into development</p> <ul style="list-style-type: none"> <li>• Technical capacity of selected federal line ministries increased on integrating risk reduction into development plans and programmes — <i>Outputs 2.2 and 2.3</i></li> </ul>
<p>The <a href="#">National Disaster Risk Reduction Policy</a> (2013) provides an overall guiding framework for addressing the high levels of disaster risk permeating Pakistani Society. It covers both natural and man-made hazards. The policy seeks to promote priority measures to ameliorate already existing vulnerability to hazards, and equally important measures to ensure future development processes and programs strengthen resilience. The policy serves as a guiding framework both for DRR and relevant development plans and programs to focus attention upon priority issues.</p>	<p><u>Relevant principles:</u></p> <ol style="list-style-type: none"> <li>1. Multi-hazard approach — <i>Outputs 1.1, 1.2, 1.3, 2.1, 2.2, 2.3 and 3.2</i></li> <li>2. Strengthening community participation and resilience — <i>Outputs 1.1, 1.2, 1.3, 2.1, 2.2, 2.3 and 3.2</i></li> <li>3. Strengthening the resilience of vulnerable groups — <i>Outputs 1.1, 1.2, 1.3, 2.1, 2.2, 2.3 and 3.2</i></li> <li>4. Compatibility with local customs and norms — <i>Outputs 1.3, 2.2, 2.3 and 3.2</i></li> <li>5. Clearly defined division of roles and responsibilities between different layers of government — <i>Outputs 1.3, 2.1, 2.2, and 2.3</i></li> <li>6. Promoting inter-organizational partnerships — <i>Output 2.2</i></li> </ol>

### Stakeholder engagement

276. The proposed project was designed following an extensive consultative process with MoCC — which is National Designated Authority (NDA) for Pakistan and is responsible for the overall management of the country’s GCF portfolio — as well as all other relevant project stakeholders. These stakeholders included representatives from:
- national and sub-national governments, such as the MoWR and the FFC, National Disaster Management Authority (NDMA), and Ministry of Planning Development and Special Initiatives (MoPDSI);
  - provincial government (line) departments, such as the Provincial Irrigation, Agriculture and Forestry Departments, Forestry, Provincial Planning and Development Departments;
  - Community-based Organisations (CBOs);
  - communities and tribal leaders;
  - Academic Institutions;
  - environmental experts;
  - social activists; and
  - private-sector actors.
277. During project development, WWF-Pakistan held numerous consultations with these national- and local-level stakeholders to: i) collect baseline information; ii) collect necessary climate data to strengthen the climate rationale of the project; iii) identify and validate potential project interventions — including appropriate EbA and green infrastructure interventions — in collaboration with relevant stakeholders; iv) engage with DFCD — as the link to the private sector— to discuss how the private sector could contribute to and benefit from the project; v) engage national and local governments to determine the most efficient and effective process for integrating climate change adaptation into Pakistan’s existing regulations for flood risk and water resources management; vi) discuss project financing — including co-financing; vii) determine roles and responsibilities of the relevant implementing entities for the project; and viii) define the implementation strategy. Details of these consultations along with stakeholder lists are presented in Annex 7.
278. These consultations included focus group discussions with women at the community level for better understanding of how they are impacted by climate-related disasters (specifically floods and droughts) to ensure the project interventions directly address their adaptation needs and promote gender-responsiveness. During this process, indigenous knowledge and best practices were also captured and incorporated in the design of the project interventions. To ensure the ongoing sensitization and consultation of stakeholders during project implementation, a project-specific Stakeholder Engagement Plan (Annex 7) has been developed in accordance with GCF and WWF ESS and stakeholder consultation guidelines.

279. The ESMF & Gender consultants held consultations and focus group discussions with over 300 stakeholders across six priority sites from which four were selected for the project. During field visit, the consultants also engaged with the community representatives in all the sites. Stakeholders involved during these sessions included villagers, tribal elders, farmers, livestock farmers, fishers, CBOs, local focal personnel and women leaders. Additionally, various government officials were also contacted at the District/Tehsil<sup>146</sup> level, officers from different departments (Agriculture, Livestock, Natural Resources, Forest, Environment, Community Development). The overarching objective of these consultations was to: i) inform communities about project objectives and activities; ii) discuss and assess possible adverse impacts and collect their views to avoid or mitigate them; and iii) discuss and assess potential project benefits and how these can be enhanced. The detailed outcome of these consultations is provided in Annex 6: ESMF and Annex 8: GAAP.

#### **D.6. Efficiency and effectiveness (max`. 500 words, approximately 1 page)**

280. The GoP is requesting US\$66 million in grant finance from the GCF to enhance the resilience of the most vulnerable people and ecosystems to the impacts of flooding and drought caused by climate change. The proposed project was originally designed to have a total of ~US\$67 million in public funds in direct co-finance committed to the project. This included ~US\$37 million from the NDRMF to finance the execution of EbA measures in the Indus Basin and ~US\$29 million from the MoWR's FFC for designing and building green infrastructure interventions, as described in Section B.3. However, the recent 2022 floods in Pakistan have required that these funds be repurposed for immediate disaster relief. As a result, the GoP is unable to commit co-financing to this project at this time<sup>147</sup>. Therefore, the total project size is US\$77.8 million (including a US\$66 million GCF grant, as well as co-financing of US\$5 million from USAID, US\$5 million from TCCF and US\$1.8 million from WWF-Pakistan). Annex 3: Economic analysis has been prepared to reflect this project size.

281. The GoP has highlighted the proposed project's important role of contributing to national adaptation objectives by codifying the proposed project and its interventions as a priority initiative under the country's updated NDCs (2021). Overall, the proposed project will serve as a key case study for Pakistan, providing critical lessons and validation of EbA and green infrastructure interventions as cost-effective and impactful adaptation options.

282. GCF financing will be used to overcome the barriers to adopting EbA and green infrastructure interventions to enhance flood and water resources management in Pakistan. With GCF grant funding, the proposed project will deliver several adaptation benefits that will contribute to achieving a paradigm shift in the country towards climate-resilient sustainable development. The combined amount of US\$77.8 million will be used efficiently and effectively to: i) implement EbA and green infrastructure interventions in the four project sites most at risk to climate change in the Indus Basin to reduce the impacts of climate change-induced floods and droughts on communities and key ecosystems; ii) support the national and provincial government to integrate EbA and green infrastructure interventions into Pakistan's existing regulations and policies for flood and water resources management, namely the Implementation Framework for the National Water Policy, the NAP, and Provincial Adaptation Plans of Sindh, Khyber, Balochistan, and Punjab; iii) enhance the climate resilience and livelihoods of the most vulnerable target communities in the Indus Basin to withstand current and future climate scenarios, including working with provincial governments to adapt their existing extension services to better support farmers impacted by floods and droughts caused by climate change; iv) develop a pipeline of sustainable businesses and help MSMEs access debt and equity finance to scale these businesses across Pakistan; v) assist CBOs to integrate flooding and drought planning within their operations; and vi) create WUGs to manage community water access and disputes, as well as community Watch and Watch (W&W) systems to manage the project's EbA and green infrastructure interventions natural ecosystems. The cost-effectiveness of proposed project interventions as well as a summary of the applicable international best practices and lessons learned are presented below.

#### **Cost-effectiveness of project interventions**

283. Pakistan's Indus Basin is particularly at risk to the increasing impacts of floods and droughts caused by climate change. The intensity and frequency of these events are projected to increase under future climate scenarios. Decision-making on the type of climate change adaptation measures that the GoP should employ to respond to increased flood and drought risks and impacts, should be informed by an understanding of the cost of such measures (e.g., EbA and green infrastructure), as well as the associated potential avoided costs. To inform decision-making on adaptation interventions, an economic analysis for the project has been undertaken using a cost-benefits analysis (CBA) approach. This economic analysis, assuming a 30-year lifetime for the project and a

<sup>146</sup> second-lowest tier of local government.

<sup>147</sup> <file:///C:/Users/jaudel/Downloads/Advocacy%20Brief%20Financing%20Climate%20Action%20in%20Pakistan.pdf>

social discount rate of 9.12%, is presented in Annex 3. Included in the economic analysis is an analysis of the costs, benefits and economic rates of return associated with the proposed project's interventions in each of the four project sites in the Indus Basin, namely DI Khan, Ramak, Chakar Lehri, and Manchar Lake. All assumptions underlying the analysis are clearly set out in CBA model in Annex 3a and reported on in Annex 3b.

284. The following five key steps were used to undertake the CBA for the project:
- **Definition of an appropriate baseline or 'without intervention' scenario** against which the impacts of the proposed project's interventions were compared over their lifetime. Two scenarios were assessed. The first considers the costs of damages and losses that would occur assuming no future climate change. The second examines the impacts (costs and damages) and associated costs assuming climate change over the period 2021-2050 but without the proposed project interventions. The baseline was also used to derive a measure of the opportunity costs associated with the proposed interventions.
  - **Estimation of the costs (including externality effects)** associated with each intervention type. The analysis considered costs across the lifetime of each intervention.
  - **Estimation of the economic, social and environmental benefits** of the proposed interventions. Adaptation benefits and co-benefits were quantified and valued in monetary terms as far as possible and where it is proportionate to do so. In cases where it was not possible to quantify and value certain material benefits, these benefits (and their likely significance) were described in either quantitative (where possible) or qualitative terms.
  - **Discounting and application of the appropriate decision rules.** The costs and benefits were estimated over a 30-year period, starting in 2024. Net benefits were calculated as the difference between the 'with project' and 'without project' scenarios converted to measures of economic net present value (NPV) and economic internal rate of return (EIRR) using a social discount rate of 9.12%<sup>148</sup>.
  - **Sensitivity analysis.** Sensitivity analysis was performed to test the sensitivity of the outcomes to changes in the underlying assumptions, focusing on key input variables with large uncertainties.

285. The results of the CBA at the project level are presented in Table 20. These suggest that, under the current set of assumptions, the total package of interventions is cost-beneficial, with the total project investment generating a NPV of US\$30 million, with a benefit to cost ratio (BCR) of 1:1 and an EIRR of around 13.6%. On this basis, there is a clear economic case for implementing the proposed project, as well as for the use of GCF grant funding to finance it. The EIRR for the project is 13.6%. This is higher than the EIRR hurdle rate of most international donor agencies. For example, the Millennium Challenge Corporation (MCC) of the USA employs a hurdle rate of 10% EIRR for projects<sup>149</sup>. This indicates the economic value of the proposed project in the context of climate change adaptation and flood and drought risk management in Pakistan. The results of the CBA also show that, for all project sites, the costs of flooding are expected to increase in future as a result of climate change in the absence of adaptation interventions. However, the results also show that under a 'with project' scenario, the benefits of adaptation interventions under a future climate are higher than the costs for all the types of intervention to be implemented in all project target areas.

**Table 20.** Cost-benefit metrics for the proposed project (base case).

Base case	
Total costs of interventions (US\$, millions, undiscounted)	82
NPV (US\$, millions)	30
BCR	1:1
EIRR (%)	13.6%

286. Significant benefits are associated with carbon sequestration, and biodiversity and cultural services provided by EbA and green infrastructure interventions which, together, are valued at around US\$282.3 million. According to the sensitivity analysis presented in the Annex 3, the economic summary statistics given above are robust to changes in input values. The results of the CBA are particularly sensitive to changes in the discount rate, the shadow price of carbon, and the biodiversity and cultural ecosystem services value of wetlands. These were, therefore, used to define a 'low scenario' and a 'high scenario' which are intended to reflect the lower and upper endpoints of the range within which the actual value of benefits is expected to lie and correspond to a 'worst case'

<sup>148</sup> The discount rate computed as the average of the deposit interest rate in Pakistan in 2020 (7.4745 percent) and the discount rate at which it lends to commercial banks (10.758 percent). This follows the approach used by the FAO in their GCF Funding Proposal for Climate Resilient Agriculture and Water Management in the Indus Basin (FP108) and is also consistent with the discount rate used by Pakistan's Federal Flood Commission (FFC) in its economic valuation of schemes proposed in the Flood Protection Sector Project (FPSP) under the National Flood Protection Plan-IV (NFPP-IV).

<sup>149</sup> Millennium Change Corporation. 2021. Guidelines for economic and beneficiary analysis. Available at: <https://www.mcc.gov/resources/story/story-cdg-guidelines-for-economic-and-beneficiary-analysis>

and ‘best case’ scenario respectively. Under the “high scenario”, the value for wetlands (taken from the TEEB Wetland Study) appears implausibly high when compared to the estimates derived from wetland valuation studies elsewhere and therefore represent an ‘extreme’ case which is considered highly unlikely. The results are shown in the table below.

**Table 21.** Sensitivity analysis results.

CBA inputs and outputs	Low (worst case)	High (best case)
Total costs of interventions (US\$, millions, undiscounted)	66	66
NPV (US\$, millions)	7.1	6,324
BCR	0.92:1	95:1
EIRR (%)	14.2%	570%

**Application of best practices in Pakistan’s water sector**

287. Best practices from similar projects as outlined in Section B.1 were used to inform the design of EbA and green infrastructure interventions to be implemented under the proposed project. Lessons learned from key planned and ongoing investments into climate change adaptation in Pakistan’s Indus Basin, including but not limited to the NDRMF-funded project and the two GCF-funded projects in the Indus Basin, FP108 *Transforming the Indus Basin with Climate Resilient Agriculture and Water Management (led by FAO)* and FP018 *Scaling-up of Glacial Lake Outburst Flood (GLOF) risk reduction in Northern Pakistan (led by UNDP)*, respectively, were also used to guide the design of all project interventions. Such lessons include appropriate mechanisms for ensuring that project activities are implemented in a participatory, gender-inclusive and sustainable way. The specific international best practices and lessons learned that were applied to the design of the proposed project and that will contribute to the efficiency and effectiveness of project interventions are summarised below.

288. International best practices and lessons learned identified for the project include:

- ensuring that landscape planning, implementation of policies, strategies and monitoring processes are integrated and iterative to account for the dynamic nature of landscape processes;
- acknowledging the need to engage tribal leaders, Indigenous Peoples, and all relevant stakeholders at the community level in an equitable and responsive manner to fairly distribute benefits and incentives of landscape management;
- incorporating traditional knowledge into training for smallholder farmers and local communities on climate-resilient agricultural practices, community-based natural resources management and the adoption of climate-resilient livelihoods;
- drawing on regional experiences to increase institutional capacity to respond to the impacts of climate change by using EbA and green infrastructure. This is evident in the GoP’s exposure visit (Ramsar Advisory Mission (RAM)) to China’s Yangtze Basin project, which integrates ecological solutions with ‘hard’ infrastructure to optimize water resource management. During this visit, the GoP recognised 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”<sup>150</sup>.
- acknowledging the need to account for the most vulnerable people who do not have sufficient collateral when developing strategies to access finance for adaptation;
- undertaking regular monitoring and evaluation of EbA, green infrastructure, climate-resilient agriculture and other climate-resilient interventions to ensure that these interventions continue to directly respond to the adaptation needs of the target communities;
- engaging and collaborating extensively and in a gender- and culturally-responsive way with relevant national and sub-national governments, as well as local-level stakeholders, to maintain buy-in to the project over the long term; and
- implementing effective financial and project management strategies to ensure the efficient use of financial resources and avoid delays during the implementation phase.

<sup>150</sup> Ali, 2013.



## E. LOGICAL FRAMEWORK

This section refers to the project/programme's logical framework in accordance with the **GCF's Integrated Results Management Framework** to which the project/programme contributes as a whole, including in respect of any co-financing.

### E.1. Project/Programme Focus

Please indicate whether this proposal is for a mitigation or adaptation project/programme. For cross-cutting proposals, select both.

- Reduced emissions (mitigation)  
 Increased resilience (adaptation)

### E.2. GCF Impact level: Paradigm shift potential (max 600 words, approximately 1-2 pages)

This section of the logical framework is meant to help a project/programme monitor and assess how it contributes to the paradigm shift described in section D.2 above by applying three assessment dimensions - scale, replicability, and sustainability.

Accordingly, for each assessment dimension (see the definition per assessment in the accompanying guidance note), describe the current state (baseline) and the potential scenario (target) and rate the current state (baseline) by using the three-point-scale rating (low, medium, and high) provided in the guidance note. Also describe how the project/programme will contribute to that shift/ transformation under respective assessment dimensions (scale, replicability and sustainability). In doing so, please refer to section B.2(a) (theory of change).

Assessment Dimension	Current state (baseline)		Potential target scenario (Description)	How the project/programme will contribute (Description)
	Description	Rating		
<b>Scale</b>	Current flood management efforts in Pakistan are largely reactive to increasing extreme climate events, relying on grey infrastructure interventions. These hard interventions are often unable to manage flood waters (which are increasingly surpassing anticipated flows and frequency because of climate change), have inconsistent levels of effectiveness, and are costly to repair and operate.	<u>Low</u>	The potential target scenario is a shift away from Pakistan's business-as-usual model for flood and water resources management that is reactive and reliant on inefficient and costly grey infrastructure interventions towards a climate-resilient sustainable pathway underpinned by scalable ecosystem-based interventions (particularly EbA and green infrastructure) that are implementable at national and sub-national levels across Pakistan's flood- and drought-prone landscapes, cost-effective, cross-sectoral and integrated into flood and water resources management and regulatory frameworks.	In addition to demonstrating the case for EbA and green infrastructure interventions in Pakistan and expanding the country's current policy and regulatory instruments for flood and water resources management to prioritise these interventions (see 'Replicability' below), the project will contribute to scaling up EbA and green infrastructure interventions in Pakistan by equipping policymakers, planners and communities with the necessary skills and capacity to implement, operate and maintain EbA and green infrastructure interventions at scale and in response to increasingly severe floods and droughts caused by climate change in Pakistan.

	<p>Additionally, Pakistan's current policy and regulatory instruments for flood and water resources management do not prioritise EbA and green infrastructure interventions as effective and efficient flood and drought risk reduction interventions, and do not consider the critical role of healthy freshwater ecosystems in increasing affected communities' resilience to climate change.</p>			
<p><b>Replicability</b></p>	<p>EbA and green infrastructure interventions have not yet been demonstrated as cost-effective flood and drought risk reduction options in Pakistan. Additionally, these interventions are not yet prioritised in the country's relevant regulatory frameworks for flood and water resources management (namely the Implementation Framework for the National Water Policy, National Adaptation Plan (NAP), and Provincial Adaptation Plans of Sindh, Khyber, Balochistan, and Punjab provinces). This makes replicating these interventions difficult.</p>	<p><u>Low</u></p>	<p>The potential target scenario is having an evidence base demonstrating EbA and green infrastructure as cost-effective interventions for reducing the impacts of floods and droughts, as well as well documented procedures backed by a rigorous scientific base that enables the GoP to channel future investments into EbA and green infrastructure interventions instead of grey infrastructure to respond to increasingly severe floods and droughts caused by climate change.</p>	<p>The project will contribute to replicating EbA and green infrastructure interventions for flood and water resources management in Pakistan by: i) implementing EbA and green infrastructure interventions at target sites in the Indus Basin; ii) generating an evidence base of these interventions' adaptation benefits; iii) using this evidence to expand Pakistan's regulations and policies for flood and water resources management through updated procedures that prioritise EbA and green infrastructure interventions; and iv) strengthening the capacity of national and sub-national staff, as well as community leaders/representatives, to apply the updated procedures. This will enable the GoP to channel future investments into EbA and green infrastructure interventions and replicate similar adaptation strategies in other flood- and drought prone areas in Pakistan to those demonstrated under the proposed project.</p>

<p><b>Sustainability</b></p>	<p>Because Pakistan's relevant regulatory frameworks for flood and water resources management do not prioritise EbA and green infrastructure interventions, they are not prioritised in government budgets and there is a lack of evidence, knowledge and awareness and capacity to implement and sustainably manage these interventions over the long term.</p>	<p><u>Low</u></p>	<p>The potential target scenario is to secure government commitment to implementing EbA and green infrastructure interventions instead of grey infrastructure in response to climate change-induced floods and droughts in Pakistan by expanding the country's regulations and policies for flood and water resources management to include EbA and green infrastructure in government mandates. This will enable existing/planned public funds that would likely otherwise have been allocated to grey infrastructure interventions to instead be channelled towards the implementation, operations and maintenance of EbA and green infrastructure interventions to address floods and droughts in Pakistan.</p>	<p>Sustainability of the project's interventions will be enhanced by expanding Pakistan's Implementation Framework for the National Water Policy, National Adaptation Plan (NAP), and four Provincial Adaptation Plans to prioritise EbA and green infrastructure interventions. The MoWR (through FFC) will require the application of the updated procedures for the Implementation Framework of the National Water Policy, while MoCC in collaboration with each province's Environment Protection Authority (EPA) will require the application of the updated procedures for the NAP and four Provincial Adaptation Plans. Integrating the implementation of EbA and green infrastructure interventions into these government mandates will enable future investments and country-driven flood and drought risk reduction efforts to prioritise these interventions instead of grey infrastructure. Finally, the GoP is committed to O&amp;M of the project's interventions during and beyond the project period (see Section B.6 for further details).</p>
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E.3. GCF Outcome level: Reduced emissions and increased resilience (IRMF core indicators 1-4, quantitative indicators)

Select appropriate IRMF core and supplementary indicators to monitor project/programme progress. More than one IRMF (core and or supplementary) indicators may be selected as applicable for each GCF results area and project/programme outcome (as defined in the table in section B.2(b)). If IRMF indicators are unable to measure any given project/programme outcomes, project/programme-specific indicators should be developed under section E.5 (project/programme specific indicators).

GCF Result Area	IRMF Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions / Note
				Mid-term	Final <sup>151</sup>	
ARA1 Most vulnerable people and communities	Core 2: Direct and indirect beneficiaries reached	Household survey; interventions' completion reports	0	Direct:	Direct:	<u>Assumptions</u> EbA and green infrastructure interventions are successful in

<sup>151</sup> The final target means the target at the end of project/programme implementation period. However, for core indicator 1 (GHG emission reduction), please also provide the target value at the end of the total lifespan period which is defined as the maximum number of years over which the impacts of the investment are expected to be effective.

				206,200 people (107,224 men, 98,976 women)	687,336 people (357,414 men, 329,922 women)	attenuating the impacts of floods and droughts on communities within and around the project sites.  EbA and community-based natural resource management interventions will improve the resilience of ecosystems, ecosystem service supplies and people depending on those systems for their lives and livelihoods.  <u>Notes</u> The methodologies used calculate targets for direct and indirect beneficiaries are presented in Section D.1.
Supplementary 3.1: Change in expected losses of economic assets due to the impact of extreme climate-related disasters in the geographic area of the GCF intervention	Government records <sup>152</sup> ;  Post disaster needs assessments will be used to supplement the government records mentioned above, as necessary.	USD15.39 million in DI Khan project site  USD2 million in Chakar Lehri and Manchar project sites	USD2.5 million in avoided losses of economic assets in DI Khan project site  USD480,000 in avoided losses of economic assets in Chakar Lehri and Manchar project sites	USD8.6 million in avoided losses of economic assets in DI Khan project site  USD1.6 million in avoided losses of economic assets in Chakar Lehri and Manchar project sites	<u>Assumptions</u> EbA and green infrastructure interventions are successful in attenuating the impacts of floods and droughts on communities, ecosystems, and infrastructure within and around the project sites.  The baseline and targets are based on modelled data presented in Annex 3.  <u>Notes</u> The avoided losses captured by this target include: avoided crop damages, livestock losses, damages to housing, damages to infrastructure, direct losses to crops, housing, infrastructure (road and railways), as well as	

<sup>152</sup> Government records include reports from Federal Flood Commission and disaster management authorities at district, provincial or national level. These reports are generated at least twice per year.

						<p>to irrigation networks, water supply, electricity distribution systems, telecoms network, etc., as well as indirect damages resulting from disruption of economic activities (e.g., because of transport severance) on or adjacent to the floodplain.</p> <p>The mid-term target represents the expected avoided losses in US\$ for the abovementioned categories as a result of the EbA and green infrastructure interventions by Year 4.</p> <p>The final target represents the expected avoided losses in US\$ for the abovementioned categories as a result of the EbA and green infrastructure interventions by Year 7.</p> <p>The total expected avoided losses in US\$ for the abovementioned categories is US\$20.2 million over the 30-year modelled period. See Annexes 3a and b for further details.</p>
	GCF Supplementary Indicator 2.1: Beneficiaries (female/male) adopting improved and/or new climate-resilient livelihood options	Farmers' list <sup>153</sup> Key informant interviews; Site surveys	0	<p>3,705 people (1,389 women, 2,316 men) adopt climate-resilient agricultural practices</p> <p>1,980 people (743 women and</p>	<p>7,410 people (2,779 women, 4,631 men) adopt climate-resilient agricultural practices</p> <p>3,960 people (1,485 women</p>	<p><u>Notes</u> The targets for GCF Supplementary Indicator 2.1 were determined using an assumed ~30% uptake rate for those people who will adopt new climate-resilient agricultural practices (Sub-activity 3.2.1.1) out of a total of 24,700 people.</p>

<sup>153</sup> This is housed within the Department of Agriculture and WWF-Pakistan.

				1,238 men) adopting climate-resilient crop varieties	and 2,475 men) adopting climate-resilient crop varieties	The targets for GCF Supplementary Indicator 2.1 were determined using an assumed ~30% uptake rate for those people who will adopt new climate-resilient crop varieties (Sub-activity 3.2.1.3) out of a total of 13,200 people.  The % of male beneficiaries is higher due to the agricultural sector being predominantly men.
	Supplementary 2.5: Beneficiaries (female/male) adopting innovations that strengthen climate change resilience	Farmers' list <sup>154</sup> Key informant interviews; Site surveys	0	3,350 people adopt improved irrigation (1,250 women and 2,090 men)	6,700 people adopt improved irrigation (2,513 women and 4,187 men)	<u>Notes</u> The % of male beneficiaries is higher due to the agricultural sector being predominantly men.
ARA4 Ecosystems and ecosystem services	Core 4: Hectares of natural resources brought under improved low-emission and/or climate-resilient management practice	GIS maps, design documents, site surveys and photographs	0	9,600 ha of natural resources under improved climate-resilient management	18,215 ha of natural resources under improved climate-resilient management	<u>Assumptions</u> Natural resource management is owned and driven by communities, ensuring its long-term success, including behaviour change at the community level that supports the implementation of climate-resilient management practices.  <u>Notes</u> The targets include: i) area under improved planning/decision making/management; and ii) area directly restored through afforestation activities under the project.
	Supplementary 4.1: Hectares of terrestrial forest, terrestrial non-forest, freshwater and coastal	GIS maps; site surveys; key informant interviews	0	1,600 ha of terrestrial forest brought under restoration	4,000 ha of terrestrial forest brought under restoration	<u>Assumptions</u> Ecosystem restoration (EbA) interventions are successful and supported by local

<sup>154</sup> This is housed within the Department of Agriculture and WWF-Pakistan.

	marine areas brought under resoration and/or improved ecosystems			and/or improved ecosystems  6,820 ha of terrestrial non-forest brought under restoration and/or improved ecosystems	and/or improved ecosystems  14,215 ha of terrestrial non-forest brought under restoration and/or improved ecosystems	stakeholders through the reduction of anthropomorphic drivers of ecosystem degradation (supported by community natural resource-based management interventions across project sites).  <u>Notes</u> 14,215 ha in DI Khan through active restoration, while an additional 4,000 ha will be brought under community-based natural resource management and watch and ward systems.
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E.4. GCF Outcome level: Enabling environment (IRMF core indicators 5-8 as applicable)

Select at least two relevant IRMF core (enabling environment) indicators to monitor and elaborate the baseline context and project/programme's targeted outcome against the respective indicators. Rate the current state (baseline) vis-à-vis the target scenario and select the geographical scope of the outcome to be assessed. Describe how the project/programme will contribute towards the target scenario. Refer to a case example in the accompanying guidance to complete this section.

Core Indicator	Baseline context (description)	Rating for current state (baseline)	Target scenario (description)	How the project will contribute	Coverage
Core Indicator 5: Degree to which GCF investments contribute to strengthening institutional and regulatory frameworks for low emission climate-resilient development pathways in a country-driven manner	Pakistan's current policy and regulatory instruments for water resource management — namely the National Water Policy, National Adaptation Plan (NAP), and Provincial Adaptation Plans — do not consider EbA and green infrastructure interventions as effective and efficient flood and drought risk reduction interventions. They also do not consider the critical role of healthy freshwater ecosystems in	low	Pakistan's institutional and regulatory frameworks for flood and water resources management are strengthened through the development and adoption of updated procedures for the Implementation Framework for the National Water Policy, National Adaptation Plan (NAP), and Provincial Adaptation Plans of Sindh, Khyber, Balochistan, and Punjab provinces on the cost-effective use of EbA and	Under Component 2, Pakistan's regulations and policies for flood and water resources management will be expanded from only focusing on using grey infrastructure to address the threats of floods and droughts to prioritising EbA and green infrastructure interventions. This will be achieved through a step-wise approach. An economic valuation of the project's EbA and green infrastructure interventions	National level (one country)

	<p>increasing affected communities' resilience to climate change. Instead, the current policies and regulatory instruments promote costly grey infrastructure interventions that do not optimise the potential adaptation and other environmental and social benefits.</p>		<p>green infrastructure interventions. This will lead to the creation of well documented procedures backed by a rigorous scientific base that enables the GoP to channel future investments into EbA and green infrastructure interventions instead of grey infrastructure to respond to increasingly severe floods and droughts caused by climate change.</p>	<p>will be undertaken which will include monitoring and analysis of these interventions' cost-effectiveness and efficiency in reducing the impacts of climate change-induced floods and droughts on vulnerable communities and ecosystems in Pakistan, and developing an evidence report of their adaptation benefits to initiate public sector reform in flood and water resources management at the national and provincial levels in Pakistan. Using this evidence, a National Working Group will be established to lead the development and adoption of updated procedures for Pakistan's key regulations and policies for flood and water resources management — namely the Implementation Framework for the National Water Policy, the National Adaptation Plan (NAP), and Provincial Adaptation Plans of Sindh, Khyber, Balochistan, and Punjab provinces — on the proper execution of EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan.</p>	
<p>Core indicator 7: Degree to which GCF Investments contribute to market</p>	<p>There is a need for business development and incubation assistance to</p>	<p>low</p>	<p>7 sustainable businesses in the Indus Basin access debt and/or equity finance</p>	<p>Under Component 3, due diligence will be conducted for businesses identified</p>	<p>Multiple sub-national areas within a country</p>



<p>development/transformation at the sectoral, local, or national level</p>	<p>incentivize businesses to deliver products and services with positive climate-resilient environmental impacts. Investors are not willing to finance the necessary origination and incubation work needed to identify such investments. Important foundational work in business sector and pipeline identification has been done by WWF-Pakistan through the forementioned DFCD Project.</p>		<p>to help these scale and access larger regional and national markets. This would provide an important signal that businesses which provide climate change and sustainability benefits can be viable helping to shift incentives away for environmentally destructive practices.</p>	<p>under the former DFCD project to identify the final pipeline of businesses to be supported by the Project. The businesses will receive technical assistance and incubation through the Project to strengthen their business practices and systems and access non grant investor finance.</p>	
<p>Core indicator 8: Degree to which GCF investments contribute to effective knowledge generation and learning processes, and use of good practices, methodologies and standards</p>	<p>The communities, public and private sector organizations in Pakistan have limited knowledge on the impacts of climate change, (such as increasingly severe and frequent floods and droughts) and how EbA and green infrastructure can be used as appropriate adaptation responses that are flexible and cost-effective alternatives to traditional grey-infrastructure interventions.</p> <p>As a result, the GoP has limited technical expertise required for designing, implementing, operating and maintaining EbA and green infrastructure interventions to respond to the impacts of floods and droughts. This is</p>	<p>low</p>	<p>Enhanced knowledge and capacity of communities, public and private sector organizations at national, provincial and district levels for planning, implementing and managing EbA and green infrastructure for flood and water resources management.</p> <p>Strengthened evidence base on the adaptation benefits of EbA and green infrastructure, including best practices and lessons learned, required not only for the development and adoption of the updated procedures described in Core Indicator 5 above, but also to foster investment into scaling up and replicating these interventions at national and provincial levels, and</p>	<p>New evidence and lessons learned on the flood and drought risk reduction benefits of EbA and green infrastructure will be generated under Component 2 of the project. This evidence will not only be used to expand Pakistan's existing flood and water resources management policies and regulations (described in Core Indicator 5 above), but also: i) used to inform the selection of additional opportunities and sites across Pakistan where the project's EbA and green infrastructure interventions could be scaled up and replicated; and ii) shared through the WWF International Network to practitioners in the climate change, freshwater,</p>	<p>National level (one country)</p>

	<p>compounded by the lack of a strong evidence base that demonstrates the benefits of these interventions.</p> <p>Consequently, EbA and green infrastructure are not prioritised in the GoP's current policy and regulatory instruments for water resources management, and adequate knowledge (including best practices and lessons learned) required to inform the implementation of effective EbA and green infrastructure interventions is not available.</p>		<p>secure uptake of these interventions by communities across Pakistan.</p>	<p>ecosystem planning, and development sectors to be replicated in other flood- and drought-prone areas.</p> <p>Finally, to secure uptake and sustainability of the EbA and green infrastructure interventions by national and provincial government, as well as communities, on the implementation, operation and maintenance of these interventions. Additionally, Component 3 will enable knowledge transfer and sharing for CBOs to improve their capacity to use EbA and green infrastructure interventions to respond to the impacts of increasingly severe and frequent floods and droughts in Pakistan.</p>	
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E.5. Project/programme specific indicators (project outcomes and outputs)

This section should list out project/programme-specific performance indicators (outcomes and outputs) that are not covered in sections above (E.1-E.4). List down tailored indicators to monitor /track progress against relevant project/programme results (outcomes/outputs). AEs have the freedom to decide against which outcomes they would like to set project/programme specific indicators. If any co-benefits are identified in sections B.2(a)(b), and D.3, AEs are encouraged to add and monitor co-benefit indicators under the "Project/programme co-benefit indicators" section in table below. Add rows as needed.

Please number each outcome and output as shown below to indicate association of outputs to the contributing outcome. The numbering for outputs under this section should correspond to the output numbering in annex 4 (detailed budget plan).

Project/programme results (outcomes/ outputs)	Project/programme specific Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions / Note
				Mid-term	Final	

<p>Outcome 1. EbA and green infrastructure interventions with improved community-led management reduce flood risk and enhance the climate resilience of the most vulnerable people in Pakistan's Indus Basin.</p>	<p>Area (ha) of flood extent reduced</p>	<p>Government records<sup>155</sup>; Watershed delineation and flood map analysis; and interventions completion reports</p>	<p>A baseline study will be undertaken in Year 1 of the project to determine a site-specific baseline that relates to this indicator.</p>	<p>15,250 ha of reduced flood extent (after completion of 30% EbA and GI Work)</p> <p>(This total area includes: <u>EbA</u>: 2,930 ha in DI Khan from EbA interventions; and <u>Green infrastructure</u>: 23 ha in Balochistan, 6,258 ha in Manchar, and 130 ha in DI Khan from green infrastructure interventions)</p>	<p>50,833 ha of reduced flood extent</p> <p>(This total area includes: <u>EbA</u>: 9,767 ha in DI Khan from EbA interventions; and <u>Green infrastructure</u>: 75 ha in Balochistan, 20,863 ha in Manchar, and 432 ha in DI Khan from green infrastructure interventions)</p>	<p><u>Assumptions</u> EbA and green infrastructure interventions are successful in attenuating the impacts of floods, reducing the area affected by flooding and the related risks on communities, ecosystems, and infrastructure within and around the project sites.</p> <p><u>Notes</u> Only a final target is available for this indicator as it was only possible to model the impact of complete, fully functional EbA and green infrastructure interventions. Progress for installing green infrastructure interventions can be tracked using the indicator for Output 1.2 below (<i>Number of green infrastructure solutions installed</i>).</p> <p>Inundation was calculated from simulating 30 years of rainfall over the catchments. The extreme flood scenario was selected as the indicative future (2020-2050 RCP4.5) flood event. The peak area inundated, and the depth of flood were calculated from this extreme event. Depths less than 30 cm were excluded as they were less likely to cause long-term significant</p>
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<sup>155</sup> Government records include reports from Federal Flood Commission and disaster management authorities at district, provincial or national level. These reports are generated at least twice per year.



					<p>damages. This filter is then more indicative of the areas being damaged by the floods rather than just the area being covered with very shallow water. The difference in areas was calculated between the future flood event with no interventions and the future flood events with the GI interventions and with the EbA interventions to show the changes in the areas (hectares) inundated as a result of the interventions in the future scenario.</p> <p>Green infrastructure refers to any vegetative or natural material infrastructure system which enhances the natural environment through direct or indirect means . It is the range of measures that use plant or soil systems, permeable surfaces or substrates, stormwater harvest and reuse, or landscaping to store, infiltrate, or evapotranspiration stormwater and reduce flows to sewer systems or to surface waters.</p> <p>Examples of green infrastructure interventions that will be implemented under the project include flood protection embankments, flood dispersal embankments,</p>
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						gabion bunds, small and large retention areas, and recharge basins. (See Annex 2 for further details.)  The number of ha represents the extent of flooding that will be reduced by the green infrastructure interventions.
	Amount (litres) of soil infiltration potential/water replenished through watershed management interventions	Water replenishment calculation reports	0	320 million litres	1,600 million litres	<u>Assumptions</u> EbA and green infrastructure interventions are successful in capturing and storing floodwater and increasing groundwater recharge in the project sites.  <u>Notes</u> A WWF-Pakistan report <sup>156</sup> on project impact on groundwater recharge, water availability & sediment load was used as a reference to set the targets for this indicator.
	Amount of water captured/retained by the EbA and green infrastructure interventions	Watershed delineation analysis reports, design and specification documents	0	4 million cubic meters	20 million cubic meters	<u>Assumptions</u> EbA interventions are successful in increasing the water retention capacity of landscapes in the project sites.  <u>Notes</u> This is the total water retention capacity of the EbA and green infrastructure interventions combined (including small retention areas, large retention areas, recharge basins, etc.)

<sup>156</sup> WWF-Pakistan. April 2019. Project impact on groundwater recharge, water availability & sediment load; Integrated watershed management and livelihood improvement in selected sub-catchments of Khanpur Dam.

<p>Output 1.1: EbA interventions implemented to restore floodplain and watershed ecosystems.</p>	<p>Length (km) of natural water flow paths restored disaggregated by site (Badri, Paniala, Sehwan)</p>	<p>Design documents, GIS maps, photographs</p>	<p>0</p>	<p>24 km (including 4 km in Paniala and 20 km in Sehwan)</p>	<p>34.3 km (including 0.3 km in Badri, 4 km in Paniala, and 30 km in Sehwan)</p>	<p><u>Assumptions</u> The restoration of degraded natural water flow paths is successful and leads to improved water supplies.</p> <p><u>Notes</u> Mid-term and final targets were calculated by adding the lengths the areas restored together.</p>
<p>Output 1.2: Green infrastructure interventions established in Pakistan's Indus Basin.</p>	<p>Number of people (disaggregated by women and men) protected from flooding</p>	<p>Watershed delineation and flood map analysis, GIS maps, household surveys</p>	<p>0</p>	<p>At least 138,780 people (93,390 directly and 45,390 indirectly) will be protected from flooding because of the green infrastructure interventions</p>	<p>At least 462,600 people (311,300 directly and 151,300 indirectly) will be protected from flooding because of the green infrastructure interventions</p>	<p><u>Assumptions</u> Green infrastructure solutions are successful installed and protect the surrounding communities from flooding.</p> <p><u>Notes</u> Designs and scale of green infrastructure solutions are presented in Annex 2.</p> <p>Methodologies for calculating project direct and indirect beneficiaries are provided in Section D.1 of the Funding Proposal.</p>
	<p>Number of green infrastructure interventions installed</p>	<p>Engineering design documents; engineering completion reports; photographs; government monitoring reports<sup>157</sup></p>	<p>0</p>	<p>4 flood protection embankments (dimensions: Length: 150 m Width: 150 m Height: 10 m)</p> <p>2 dispersal embankments (dimensions: Length: 150 m Width: 150 m Height: 10 m)</p> <p>18 gabion bunds (dimensions: Length: 150 m Height: 6 m)</p>	<p>9 flood protection embankments (dimensions: Length: 150 m Width: 150 m Height: 10 m)</p> <p>7 dispersal embankments (dimensions: Length: 150 m Width: 150 m Height: 10 m)</p> <p>45 gabion bunds (dimensions: Length: 150 m Height: 6 m)</p>	

<sup>157</sup> WWF-Pakistan will work with relevant government entities such as MoWR (FFC) and the Provincial Irrigation Departments to prepare these reports on an annual basis.

				<p>14 small retention areas</p> <p>(Dimensions for small retention areas in DI Khan Watershed: Length: 275 m Width: 275 m Height: 1 m</p> <p>Dimensions for small retention areas in Manchar Watershed: Length: 245 m Width: 245 m Height: 1 m</p> <p>Dimensions for small retention areas in Chakar Lehri Watershed: Length: 180 m Width: 180 m Height: 1 m)</p> <p>4 large retention areas</p> <p>(Dimensions for large retention areas in DI Khan Watershed: Length: 874 m Width: 874 m Height: 1 m</p> <p>Dimensions for large retention areas in Manchar</p>	<p>42 small retention areas</p> <p>(Dimensions for small retention areas in DI Khan Watershed: Length: 275 m Width: 275 m Height: 1 m</p> <p>Dimensions for small retention areas in Manchar Watershed: Length: 245 m Width: 245 m Height: 1 m</p> <p>Dimensions for small retention areas in Chakar Lehri Watershed: Length: 180 m Width: 180 m Height: 1 m)</p> <p>9 large retention areas</p> <p>(Dimensions for large retention areas in DI Khan Watershed: Length: 874 m Width: 874 m Height: 1 m</p> <p>Dimensions for large retention areas in Manchar</p>	
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				<p>Watershed and Chakar Lehri Watershed: Length: 1,000 m Width: 1,000 m Height: 1 m)</p> <p>6 recharge basins</p> <p>(Dimensions for recharge basins in DI Khan Watershed: Length: 150 m Width: 14.5 m Height: 2 m</p> <p>Dimensions for recharge basins in Manchar Watershed and Chakar Lehri Watershed: Length: 150 m Width: 14.5 m Height: 1 m)</p>	<p>Watershed and Chakar Lehri Watershed: Length: 1,000 m Width: 1,000 m Height: 1 m)</p> <p>15 recharge basins</p> <p>(Dimensions for recharge basins in DI Khan Watershed: Length: 150 m Width: 14.5 m Height: 2 m</p> <p>Dimensions for recharge basins in Manchar Watershed and Chakar Lehri Watershed: Length: 150 m Width: 14.5 m Height: 1 m)</p>	
<p>Output 1.3: Strengthened community-based natural resource management to support water supply and flood attenuation services provided by EbA interventions implemented in floodplains and watersheds.</p>	<p># Community-based management bodies (disaggregated by gender-responsiveness) supported through technical/institutional capacity building</p>	<p>Copy of community based NRM plans, minutes of CBOs meetings, List of WUGs, TORs of WUGs, membership details, minutes of meetings</p>	0	<p>6 CBOs</p> <p>6 Water User Groups</p> <p>3 Watch and Ward Systems</p>	<p>8 CBOs</p> <p>8 Water User Groups</p> <p>4 Watch and Ward Systems</p>	<p><u>Assumptions</u> Support for the maintained implementation of community-based natural resource management is continually built amongst local communities.</p>
	<p># Community-based natural resource management agreements signed between the Provincial Departments (Forestry, Irrigation, and Agriculture) and communities</p>	<p>Signed agreements</p>	0	<p>At least 3 agreements</p>	<p>4 agreements</p>	



<p>Outcome 2: Enabling environment for climate action that has new procedures for implementing EbA and green infrastructure interventions for flood and water resources management in Pakistan.</p>	<p>Level of integration of EbA and green infrastructure considerations into the Implementation Framework of the National Water Policy, National Adaptation Plan and four Provincial Adaptation Plans for Khyber Pakhtunkhwa, Punjab, Balochistan and Sindh</p>	<p>Scorecard<sup>158</sup></p>	<p>Level 0</p>	<p>Level 1</p>	<p>Level 3</p>	<p><u>Assumptions</u> Support from government for the integration of EbA and green infrastructure considerations into the relevant implementation frameworks remains strong.</p>
<p>Output 2.1: Evidence base to support the adoption of EbA and green infrastructure interventions by the Government of Pakistan.</p>	<p>Evidence of economic benefits of EbA and green infrastructure</p>	<p>Evidence Report</p>	<p>TBD<sup>159</sup>: Evidence base limited</p>	<p>Raw data collection ongoing</p>	<p>Evidence base for the economic benefits of EbA and green infrastructure results in plans and is used to leverage funding for replication and upscaling of project interventions</p>	<p><u>Assumptions</u> EbA and green infrastructure interventions implemented by the project produce cost-effective benefits that demonstrate an economic case for the approaches.</p>
<p>Output 2.2: Updated procedures for implementing EbA and green infrastructure in Pakistan.</p>	<p># of plans integrating EbA and green infrastructure interventions flood and drought risk management</p>	<p>Revised provincial adaptation plans; List of recommendations; Copies of provincial level climate-resilient Integrated Water Resource Management Plans; Supporting documents of implementation</p>	<p>0</p>	<p>Recommendations submitted for the integration of EbA into the National Water Policy focusing on flood risk and water resource management</p>	<p>Recommendations submitted via PSC to the National Working Group for EbA and green infrastructure to be integrated into the</p>	<p><u>Assumptions</u> The National Working Group, other government departments and relevant ministries maintain support and interest in adopting the updated procedures for implementing EbA and green infrastructure in Pakistan.</p>

<sup>158</sup> Scorecard showing the level of integration of EbA and green infrastructure interventions into the implementation framework of the National Water Policy, national and provincial adaptation plans. Level 0: The implementation framework of the National Water Policy, national and provincial adaptation plans do not include EbA and green infrastructure interventions. Level 1: Recommendations for integrating EbA and green infrastructure interventions into the implementation framework of the National Water Policy, National Adaptation Plan and four Provincial Adaptation Plans for Khyber Pakhtunkhwa, Punjab, Balochistan and Sindh are produced and presented to the National Working Group for endorsement. Level 2: Representatives from the National Working Group, including MoCC, MoWR (including FFC) and the Provincial Departments of Irrigation, Forestry and Agriculture review and endorse the recommendations for revising the implementation framework of the National Water Policy, National Adaptation Plan and four Provincial Adaptation Plans. Level 3: Representatives from the National Working Group, including MoCC, MoWR (including FFC) and the Provincial Departments of Irrigation, Forestry and Agriculture receive final recommendations for revising and implementing the updated Implementation Framework of the National Water Policy, National Adaptation Plan and four Provincial Adaptation Plans.

<sup>159</sup> Baseline survey to be conducted in Year 1.

				<p>National Adaptation Plan does not consider EbA and green infrastructure</p> <p>0 Provincial Adaptation Plans integrate EbA and green infrastructure</p>	<p>implementation framework of the National Water Policy and adopted by decision-makers</p> <p>National Adaptation Plan integrates EbA and green infrastructure</p> <p>4 Provincial Adaptation Plans for Khyber Pakhtunkhwa, Punjab, Balochistan and Sindh integrate EbA and green infrastructure</p>	
<p>Output 2.3: Strengthened capacity for implementing EbA and green infrastructure interventions in the Indus Basin for flood risk and water resources management.</p>	<p>Number of national and sub-national decision-makers and planners trained on the application of the updated Implementation Framework of the National Water Policy, National Adaptation Plan, and three Provincial Adaptation Plans</p>	<p>Training reports</p>	<p>0</p>	<p>64</p>	<p>64</p>	<p><u>Assumptions</u> A National Working Group will be established and collaborate with federal and provincial level advisory committees to create an enabling environment for integration of EbA and green infrastructure in the Implementation Framework of the National Water Policy, National Adaptation Plan, and three Provincial Adaptation Plans.</p>
	<p>% Change in knowledge and technical capacity of staff in the GoP on how to implement, operate and maintain EbA and green infrastructure interventions</p>	<p>Pre- and post-assessment questionnaires</p>	<p>Baseline study will be conducted in Year 1</p>	<p>Baseline + 25%</p>	<p>Baseline + 60%</p>	

	Number of community representatives/leaders trained on how to implement, operate and maintain EbA and green infrastructure interventions	Training reports	0	32	96	
Outcome 3: Enhanced resilience of community livelihoods in the Indus Basin.	Number of people benefiting directly from the adoption of climate-resilient livelihoods and sustainable business	Key informant interviews; Site visits/surveys; GIS maps	0	25,375 people (13,195 men, 12,180 women) benefiting directly from the adoption of climate-resilient livelihood practices  63 people (33 men, 30 women) benefitting directly from sustainable business	50,750 people (26,390 men, 24,360 women) benefiting directly from the adoption of climate-resilient livelihood practices  126 people (66 men, 60 women) benefitting directly from sustainable business	<u>Assumptions</u> Local farmers and communities support and actively adopt the improved and/or new climate-resilient livelihood options introduced by the project.  An adequate number of projects presented include a strong-enough business case to secure financing for businesses from FIs.  Support from FIs to finance climate-resilient businesses in maintained.
Output 3.1: Pipeline of feasible climate-resilient businesses.	Number of bankable projects (disaggregated by gender ownership/inclusion) financially supported under the project	Signed copy of agreements	0	3	7	<u>Assumptions</u> An adequate number of projects presented include a strong-enough business case to secure financing from FIs.  Support from FIs to finance climate-resilient businesses in maintained.
Output 3.2: Improved climate-resilient livelihoods among vulnerable target communities.	Area (ha) of land under improved climate-resilient agricultural management	Farmers' list <sup>160</sup> ; Key informant interviews, Site surveys	0	64 ha with drought-resistant crop varieties  20 ha with improved soil management	96 ha with drought-resistant crop varieties  32 ha with improved soil management	<u>Assumptions</u> Local farmers and communities support and actively adopt the improved and/or new climate-resilient livelihood options introduced by the project.

<sup>160</sup> Ibid.

Project/programme co-benefit indicators						
Co-benefit 1: GHG emission reduction from ecosystem restoration and improved ecosystem management	Estimated GHG emissions reduced/avoided	GHG assessment: National Forest Monitoring Systems and Greenhouse Gas Inventory Reports	0	0 (The project does not anticipate significant GHG emission reductions until Year 5)	52,900 tons over the project period (7 years) 1,037,928 tons over 40 years	<p><u>Assumptions</u> The project's ecosystem restoration and community-based natural resource management interventions are successful.</p> <p><u>Notes</u> The Removal Factors for different forest types/ ecological zones have been taken from the Sub-National Forest Monitoring Systems and Greenhouse Gas Inventory Reports for KP and Punjab Provinces developed by WWF-Pakistan for the Ministry of Climate Change (MoCC) under the National REDD+ Project, 2022.</p> <p>The CO2 mitigation potential calculations are based on IPCC methodology. See Section D.1 of the Funding Proposal for further details.</p>
Co-benefit 2: Improved biodiversity as a result of the project's EbA and green infrastructure interventions.	Percentage increase in migratory birds' population at Manchar Lake	Midwinter waterfowl census report <sup>161</sup>	22,176 migratory birds were recorded at Manchar Lake during the 2022 midwinter waterfowl census <sup>162</sup>	10% increase from the baseline for the Manchar Lake site	25% increase from the baseline for the Manchar Lake site	<p><u>Assumptions</u> Improved habitat will provide favourable roosting and feeding grounds for migratory birds. Targets will consider the population of species within and adjacent to the project boundaries.</p> <p><u>Notes</u></p>

<sup>161</sup> These reports will be produced annually by the Zoological Survey of Pakistan (ZSP) which is a department under the Ministry of Climate Change (MoCC).

<sup>162</sup> Zoological Survey of Pakistan (January 2022).



						WWF-Pakistan will verify the targets for the Manchar Lake site by joining the Zoological Survey of Pakistan and the Sindh Wildlife Department team during annual waterfowl censuses.
	Percentage increase in migratory birds' population at Indus Game Reserve (D.I Khan)	Midwinter waterfowl census report <sup>163</sup>	9,757 migratory birds were recorded at Indus Game Reserve (D.I Khan) during the 2022 waterfowl census <sup>164</sup>	10% increase from the baseline for the Indus Game Reserve (D.I Khan)	25% increase from the baseline for the Indus Game Reserve (D.I Khan)	<p><u>Assumptions</u> Improved habitat will provide favourable roosting and feeding grounds for migratory birds. Targets will consider the population of species within and adjacent to the project boundaries.</p> <p><u>Notes</u> WWF-Pakistan will verify the targets for the D.I Khan site by joining the Zoological Survey of Pakistan and the KP Wildlife Department team during annual waterfowl censuses.</p>

<sup>163</sup> These reports will be produced annually by the Zoological Survey of Pakistan (ZSP) which is a department under the Ministry of Climate Change (MoCC).

<sup>164</sup> KP Wildlife Department (January 2022).

<p>Percentage increase in fish species richness and abundance /Macro-invertebrates species richness</p>	<p>Annual fish survey and stock assessment studies<sup>165</sup></p> <p>Annual macroinvertebrate species richness and abundance estimations<sup>166</sup></p>	<p>32 species of fish<sup>167</sup> Manchar Lake; catches 500 metric ton/year<sup>168</sup></p>	<p>2% increase in the fish stocks in comparison to the baseline</p>	<p>10% increase in the fish stocks in comparison to the baseline</p>	<p><u>Assumptions</u> Improved water quality would result in the improvement of the health of the ecosystem which would lead towards the increased abundance in the fish population and/or species diversity. Targets will consider the population of species within and adjacent to the project boundaries.</p> <p><u>Notes</u> Biodiversity assessments would validate diversity and richness of candidate wildlife species at candidate sites Annual fish stock assessment would be carried by the Sindh Fisheries Department, WWF-Pakistan, Pakistan Museum of Natural History (PMNH), and academic partners.</p>
<p>Percentage increase in population abundance of the Indus River Dolphin (EN)<sup>169</sup></p>	<p>Five yearly population abundance estimation<sup>170</sup></p>	<p>160-170 individuals Between Chashma-Taunsa Barrages 2022</p>	<p>3% increase</p>	<p>8% increase in the population abundance</p>	<p><u>Assumptions</u> Improved habitat conditions and recharge capacity would ultimately lead towards the improved health of the Indus River and associated biodiversity. The population of a few indicator species may be useful to determine the visible change. Targets will consider the population of species within and</p>

<sup>165</sup> Annual fish stock assessment would be carried by the Sindh Fisheries Department, WWF-Pakistan, Pakistan Museum of Natural History (PMNH), and academic partners.

<sup>166</sup> Annual fish stock assessment would be carried by WWF-Pakistan, Pakistan Museum of Natural History (PMNH), and academic partners.

<sup>167</sup> Mahar et al 2020

<sup>168</sup> Mahar et al 2020

<sup>169</sup> <https://www.iucnredlist.org/> IUCN RED LIST STATUS

<sup>170</sup> Five yearly population abundance assessments would be carried out by the Punjab and KP Wildlife Departments and academic partners.

						adjacent to the project boundaries.  <u>Notes</u>  Biodiversity assessments would validate diversity and richness of candidate wildlife species at candidate sites. Five yearly population abundance assessments would be carried out by the Punjab and KP Wildlife Departments and academic partners.
Designation and nomination of restoration sites as sites of global ecological important such as Man and Biosphere Reserve and Ramsar Sites.	Ramsar Information Sheet (RIS) for Man Ramsar Site, Indus Flyways	Currently not designated as Ramsar site	RIS drafted in collaboration with Provincial Wildlife Department and WWF-Pakistan	RIS submitted and endorsed by Ministry of Climate Change (MoCC)	<u>Assumptions</u> Provincial wildlife department and MoCC have a priority to protect and effective management of the lake and its biodiversity.	
	Key Biodiversity Areas (KBAs) proposal	Currently not designated as a KBA	Key Biodiversity Areas (KBAs) proposal drafted in collaboration with Provincial Wildlife Department and WWF-Pakistan	Key Biodiversity Areas (KBAs) proposal submitted and endorsed by MoCC	<u>Notes</u> Biodiversity assessments would validate diversity and richness of candidate sites on the bases of which RIS would be developed in consultation with the Sindh Wildlife Department who are willing to enhance protected areas coverage within the wetland habitats.	
Percentage increase in freshwater turtles (hard-shelled and soft-shelled turtles)	Population abundance estimation surveys and turtle confiscation /seizure records <sup>171, 172</sup>	<u>Manchar</u>	3% increase in the population abundance	10% increase in the population abundance	<u>Assumptions</u> Improved water quality would resultant in the improvement of health of ecosystem which would lead towards the	

<sup>171</sup> These records will include: i) official seizures reports maintained by Provincial Wildlife Departments; and ii) WWF-Pakistan's independent data collected from multiple sources such as trade monitoring portals, social media channels and UNODC.

<sup>172</sup> Zoological Survey of Pakistan.

			<p>Brown roofed turtle <i>Pangshura smithii</i> (NT)<sup>173</sup> : 57<sup>174</sup></p> <p><u>D.I Khan</u> (Reference point: Chashma barrage)</p> <p>Brown roofed turtle <i>Pangshura smithii</i> (NT)<sup>175</sup> : 38<sup>176</sup></p> <p>Indian softshell turtle <i>Nilssonia</i> <i>gangetica</i> (EN)<sup>177</sup>: 07<sup>178</sup></p> <p>Black pond turtle <i>Geoclemys</i> <i>hamiltonii</i><sup>179</sup>(EN): 45<sup>180</sup></p> <p>Indian flapshell turtle <i>Lissemys</i> <i>punctata</i><sup>181</sup>(VU)<sup>182</sup>: 07<sup>183</sup></p>			<p>increases in abundance in the turtle population and/or species diversity</p> <p><u>Notes</u> Turtle population assessments following standard protocols engaging wildlife departments, zoological survey of Pakistan.</p>
Co-benefit 3: New jobs created through the project's EbA and green infrastructure interventions	Number of people benefiting from new jobs created and related new skills developed	Employment contracts/agreements; household surveys	0	4,000 people	8,000 people	<p><u>Assumptions</u> Local community members will be involved as permanent, part-time or temporary (e.g., daily) labours for the installation,</p>

<sup>173</sup> <https://www.iucnredlist.org/>Near Threatened

<sup>174</sup> Zoological Survey of Pakistan 2012

<sup>175</sup> <https://www.iucnredlist.org/> /Near Threatened

<sup>176</sup> Zoological Survey of Pakistan 2012

<sup>177</sup> <https://www.iucnredlist.org/>Endangered

<sup>178</sup> Zoological Survey of Pakistan 2012

<sup>179</sup> <https://www.iucnredlist.org/>

<sup>180</sup> Zoological Survey of Pakistan 2012

<sup>181</sup> <https://www.iucnredlist.org/>

<sup>182</sup> <https://www.iucnredlist.org/>Vulnerable

<sup>183</sup> Zoological Survey of Pakistan 2012



						<p>operations and maintenance of the project's EbA and green infrastructure interventions.</p> <p><u>Notes</u> Jobs created could be permanent, part-time, or temporary.</p>
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**E.6. Project/programme activities and deliverables**

All project activities should be listed here with a description and sub-activities. Significant deliverables should be reflected in annex 5 implementation timetable. Add rows as needed.  
Please number the activities as shown below to indicate association of activities to the related outputs provided above in section E.5. Similarly, please number sub-activities as shown below to associate to the related activity.

Activities	Description	Sub-activities	Deliverables
<b>Output 1.1: EbA interventions implemented to restore floodplain and watershed ecosystems.</b>			
Activity 1.1.1: Restore 14,215 ha of degraded agro-ecological landscapes in watersheds.	Block and linear plantations will be established along identified hill torrent and catchment areas (D.I. Khan) in collaboration with provincial Forest and Irrigation Departments. Through this activity vegetation cover will be restored (natural regeneration and afforestation) across 14,215 ha of degraded riverine forests in DI Khan project site. Revegetation of native species at this scale will help reduce flooding, erosion, flow velocities, and increase infiltration through enhancing soil porosity.	Sub-activity 1.1.1.1: Restore 14,215 ha of degraded riverine ecosystems in D.I. Khan.	1.1.1.1a: 14,215 ha of riverine ecosystems restored
Activity 1.1.2: Rehabilitate degraded wetlands, flow paths, and channels.	The project will restore ecosystems capable of holding and channelling water flows. This will improve ecosystem functioning and reduce flooding of nearby community agricultural lands and assets and increase water access especially during periods of drought for agriculture and domestic uses. 34,674 m of pathways/channels will be restored, and	<p>Sub-Activity 1.1.2.1: Excavate 264 m of flow paths in Badri Village, Ramak, to restore the natural hydrology of connected wetlands.</p> <p>Sub-Activity 1.1.2.2: De-silt the 2 ha Badri Pond in the Ramak wetlands to enhance its water-holding capacity.</p>	<p>1.1.2.1a: 264 m of natural flow paths rehabilitated</p> <p>1.1.2.2a: 2 ha (1 pond, i.e., Badri pond) de-silted</p> <p>1.1.2.3a: 410 m of embankment enhanced and reinforced</p>

	<p>50,000 m<sup>2</sup> of wetlands will be rehabilitated in and around the Ramak watershed and Manchar Lake.</p>	<p>Sub-Activity 1.1.2.3: Enhance and reinforce 410 m of embankments in Badri Village to reduce erosion.</p> <p>Sub-Activity 1.1.2.4: Excavate 4 km of flow paths in Paniala Village to restore natural hydrology of Karez Systems (surface and subsurface natural channels).</p> <p>Sub-Activity 1.1.2.5: Excavate 30 km of flow paths in the existing water channels of Manchar Lake to restore the natural hydrology of the 25,000 ha Manchar Wetland.</p>	<p>1.1.2.4a: 4 km of natural flow path restored</p> <p>1.1.2.5a: 30 km of flow path restored</p>
<p><b>Output 1.2: Green infrastructure interventions established in Pakistan's Indus Basin.</b></p>			
<p>Activity 1.2.1: Design and implement 127 green infrastructure interventions for flood risk reduction.</p>	<p>Under this activity, green infrastructure interventions will be designed and implemented to reduce the impacts of flooding on nearby communities and provide additional water for these communities during droughts. Green infrastructure interventions will include: i) 9 flood protection embankments spread across the DI Khan and Ramak Watersheds; ii) 7 dispersal embankments in the D.I. Khan and Ramak Watersheds; iii) 45 gabion bunds across the DI Khan, Ramak, Manchar, and Chakar Lehri Watersheds; iv) 42 small and 9 large retention areas, and 15 recharge basins across the DI Khan, Manchar, and Chakar Lehri Watersheds. These interventions will be implemented in close consultation with communities and the Provincial Departments of Irrigation.</p>	<p>Sub-Activity 1.2.1.1: Design the green infrastructure measures.</p> <p>Sub-Activity 1.2.1.2: Build 9 flood protection embankments</p> <p>Sub-Activity 1.2.1.3: Build 7 flood dispersal embankments.</p> <p>Sub-Activity 1.2.1.4: Build 45 gabion bunds.</p> <p>Sub-Activity 1.2.1.5: Build 42 small retention areas.</p> <p>Sub-Activity 1.2.1.6: Build 9 large retention areas.</p> <p>Sub-Activity 1.2.1.7: Build 15 recharge basins.</p>	<p>1.2.1.1a: 1 green infrastructure design report with the designs for all green infrastructure interventions</p> <p>1.2.1.2a: 9 flood protection embankments</p> <p>1.2.1.3a: 7 dispersal embankments</p> <p>1.2.1.4a: 45 gabion bunds</p> <p>1.2.1.5a: 42 small retention areas</p> <p>1.2.1.6a: 9 large retention areas</p> <p>1.2.1.7a: 15 recharge basins</p>
<p><b>Output 1.3: Strengthened community-based natural resource management to support water supply and flood attenuation services provided by EbA interventions implemented in floodplains and watersheds.</b></p>			
<p>Activity 1.3.1: Strengthen the capacity of CBOs to adopt EbA and green infrastructure interventions and undertake climate-resilient community-based natural resource management.</p>	<p>CBOs will be strengthened to implement community-based natural resource management. They will be trained and equipped to implement sustainable forest management practices to ensure</p>	<p>Sub-Activity 1.3.1.1: Strengthen CBOs to adopt EbA and green infrastructure interventions and implement community-based natural resource management.</p>	<p>1.3.1.1a: Training workshops to strengthen the capacity of 8 CBOs to protect, monitor and maintain the project's EbA and green infrastructure interventions, as well as</p>

	<p>sustainability of the project's EbA and green infrastructure interventions and health of ecosystems. The project team will work closely with the CBOs and local government departments to establish formal WUGs to standardize water use allocations for agriculture, domestic and disaster risk reduction measures. In addition, community-based Watch and Ward Systems will be established to facilitate the implementation, monitoring and protection of the project's EbA and green infrastructure interventions, including the required operation and maintenance.</p>	<p>Sub-Activity 1.3.1.2: Organize WUGs under CBOs and build their capacity for improved water resources management.</p> <p>Sub-Activity 1.3.1.3: Establish community-based watch and ward systems under CBOs to protect the project's EbA and green infrastructure interventions from degradation.</p>	<p>implement community-based natural resource management</p> <p>1.3.1.2a: Training workshops for 8 established WUGs on efficient and effective water resources management under future climate change conditions.</p> <p>1.3.1.3a: Training workshops for the 4 established community-based Watch and Ward Systems to protect the project's EbA and green infrastructure interventions from degradation.</p>
<p>Activity 1.3.2: Strengthen communities' knowledge and awareness of climate change impacts and the benefits of the project's EbA and green infrastructure interventions.</p>	<p>Under Activity 1.3.2, communities' knowledge and awareness of climate change impacts and the benefits of the project's EbA and green infrastructure interventions will be strengthened through a tailored communications strategy. The audience will include members of vulnerable communities, particularly women and children, students and academia, policymakers, and the general public. The objectives of the communication strategy include: i) educating communities, students, tourists and other project stakeholders on the impacts of climate change, particularly floods and droughts, on people and ecosystems, as well as on how to respond to these impacts through implementing EbA, green infrastructure and efficient community-based natural resources management; ii) informing relevant stakeholders about the project's EbA and green infrastructure interventions, their benefits and the progress made; and iii) communicating the successes and impacts of the project interventions to build a case for scaling up EbA and green infrastructure interventions.</p>	<p>Sub-Activity 1.3.2.1: Consult with tribal elders to support the sensitization of the project's adaptation interventions in beneficiary communities.</p> <p>Sub-Activity 1.3.2.2: Develop and implement awareness-raising campaigns for target communities to increase their knowledge and awareness of climate change impacts and the benefits of the project's EbA and green infrastructure interventions.</p>	<p>1.3.2.1a: Annual consultation reports</p> <p>1.3.2.2a: Annual awareness-raising campaigns communicated through, among other methods, digital and print, workshops, videos, pictures, and farmers' field days.</p>

**Output 2.1: Evidence base to support the adoption of EbA and green infrastructure interventions by the Government of Pakistan.**

<p>Activity 2.1.1: Develop an evidence-based case of the climate change adaptation benefits of EbA and green infrastructure in Pakistan.</p>	<p>The evidence will be generated under the project by monitoring and analysing the implementation and cost-effectiveness of EbA and green infrastructure interventions (described in detail in Component 1) in reducing the impacts of climate change-induced floods and droughts on vulnerable communities and ecosystems in Pakistan. The monitoring and analysis will consider: i) avoided costs and losses — impacts or losses that would otherwise occur in the absence of ecosystem services, such as increased flood extent, damages and/or losses to agricultural land and the subsequent reduced productivity, and reduced water resource quantity and quality; ii) alternative costs — the implication of implementing ‘grey’ artificial systems (as opposed to ‘green’ ecosystem-based adaptation solutions) that would be required to deliver the same adaptation benefits as ecosystems; and iii) a wide variety of sustainable development co-benefits, including but not limited to enhanced biodiversity, decreased pollution of water resources and improved access to clean water.</p> <p>The evidence generated under this activity will be used under Activity 2.2.1 for the development of updated procedures under Output 2.2 for Pakistan’s key regulations and policies for flood and water resources management — namely the Implementation Framework for the National Water Policy, the National Adaptation Plan (NAP), and Provincial Adaptation Plans of Sindh, Khyber, Balochistan, and Punjab provinces — on the proper execution of EbA and green infrastructure interventions</p>	<p>Sub-Activity 2.1.1.1: Prepare baselines and indicators for the biophysical benefits of EbA on ecosystems and their flood attenuation and water resource-related services.</p> <p>Sub-Activity 2.1.1.2: Monitor the biophysical benefits of EbA and green infrastructure on ecosystems and their flood attenuation and water resource-related services using the baselines and indicators prepared under Sub-activity 2.1.1.1.</p> <p>Sub-Activity 2.1.1.3: Conduct an economic valuation of the benefits of EbA and green infrastructure on ecosystems and their flood attenuation and water resource-related services.</p> <p>Sub-Activity 2.1.1.4: Identify additional opportunities and sites at the national level across Pakistan for scaling up and replicating the project’s EbA and green infrastructure interventions for flood risk and water resource management.</p> <p>Sub-Activity 2.1.1.5: Collate and store the data and information generated under 2.1.1.1–2.1.1.4</p>	<p>2.1.1.1a: 1 report on baselines and indicators</p> <p>2.1.1.2a 1 Monitoring reports of the biophysical benefits of EbA and green infrastructure on ecosystems and their flood attenuation and water resource-related services using the baselines and indicators prepared under Sub-activity 2.1.1.1.</p> <p>2.1.1.3a: 1 economic evaluation report</p> <p>2.1.1.4a: 1 report identifying sites for scaling up and replicating EbA interventions</p> <p>2.1.1.5a: 1 centralized data and knowledge management system is in place at the organization level</p>
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	to reduce the impacts of floods and droughts in Pakistan.		
Activity 2.1.2: Develop and disseminate an evidence report to national and provincial government for implementing EbA and green infrastructure interventions in response to flooding and droughts in Pakistan.	<p>The data and information generated under Activity 2.1.1 will be collated and synthesised into an evidence report, highlighting EbA and green infrastructure interventions' flood and drought risk reduction potential, economic value and environmental and social benefits. This report will: i) be used under Activity 2.2.1 to develop updated procedures for Pakistan's key regulations and policies for flood and water resources management on the proper execution of EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan; and ii) stand alone as an important knowledge product and decision-making tool for policymakers and planners in Pakistan to use in other decision making around climate change planning and flood and water resources management.</p> <p>WWF-Pakistan will work with FFC to disseminate this evidence report to the MoCC, the Provincial Irrigation Departments, Provincial Agriculture Departments, Provincial Forestry Departments, academic and research institutions, as well as other relevant national and provincial stakeholders.</p>	<p>Sub-activity 2.1.2.1: Prepare an evidence report on the use and benefits of EbA and green infrastructure interventions in response to flooding and droughts in Pakistan.</p> <p>Sub-activity 2.1.2.2: Disseminate the evidence report developed under Sub-activity 2.1.2.1 to national and provincial planners and regulators involved in flood and water resources management, as well as academic and research institutions.</p>	<p>2.1.2.1a: 1 evidence report</p> <p>2.1.2.2a: Evidence report disseminated to 41 institutions — Federal (3) and Provincial line departments (5 x 3 = 15 ), Academia (12) and Research Organizations (6).</p>
<b>Output 2.2: Updated procedures for implementing EbA and green infrastructure in Pakistan.</b>			
Activity 2.2.1: Develop updated procedures for the Implementation Framework of the National Water Policy, National Adaptation Plan and four Provincial Adaptation Plans for implementing EbA and green infrastructure interventions in Pakistan.	Using the evidence from Activity 2.1.1, a National Working Group will be established under the project, chaired by the MoCC and comprised of regulators within the MoWR and its Executive Department, the FFC, as well as the relevant Provincial Departments. This working group will lead the development and adoption of updated procedures for Pakistan's key regulations and policies for flood and water resources	<p>Sub-Activity 2.2.1.1: Establish a National Working Group to develop and adopt updated procedures for using EbA and green infrastructure interventions in flood and water resources management in Pakistan.</p> <p>Sub-Activity 2.2.1.2: Review the Implementation Framework of the National Water Policy, National Adaptation Plan and</p>	<p>2.2.1.1a: 1 National Working Group established</p> <p>2.2.1.2a: Report including identified gaps and opportunities for the consideration of EbA and green infrastructure as cost-effective adaptation interventions</p>

	<p>management — namely the Implementation Framework for the National Water Policy, the National Adaptation Plan (NAP), and Provincial Adaptation Plans of Sindh, Khyber, Balochistan, and Punjab provinces — on the proper execution of EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan. This will lead to the creation of well documented procedures backed by a rigorous scientific base that enables the GoP to channel future investments into EbA and green infrastructure interventions instead of grey infrastructure to respond to increasingly severe floods and droughts caused by climate change.</p>	<p>four Provincial Adaptation Plans for the four provinces of Khyber Pakhtunkhwa, Punjab, Balochistan and Sindh to identify entry points for EbA and green infrastructure as cost-effective adaptation interventions for addressing floods and droughts.</p> <p>Sub-Activity 2.2.1.3: Draft updated procedures for the Implementation Framework of the National Water Policy, National Adaptation Plan, and four Provincial Adaptation Plans on the proper execution of EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan.</p> <p>Sub-Activity 2.2.1.4: Validate the updated procedures within the National Working Group for adoption into the Implementation Framework of the National Water Policy, National Adaptation Plan, and four Provincial Adaptation Plans.</p>	<p>2.2.1.3a: Report with a draft of the updated procedures for the Implementation Framework of the National Water Policy</p> <p>2.2.1.3b: Report with a draft of the updated procedures for the National Adaptation Plan, and four Provincial Adaptation Plans</p> <p>2.2.1.4a: Final updated procedures for the Implementation Framework of the National Water Policy, National Adaptation Plan, and four Provincial Adaptation Plans drafted and submitted to the National Working Group for endorsement and adoption.</p> <p>2.2.1.4b: Validation consultations report</p> <p>2.2.1.4c: Validated set of final updated procedures for the Implementation Framework of the National Water Policy, National Adaptation Plan, and four Provincial Adaptation Plans drafted and submitted to the National Working Group for endorsement and adoption.</p>
<p><b>Output 2.3: Strengthened capacity for implementing EbA and green infrastructure interventions in the Indus Basin for flood risk and water resources management.</b></p>			
<p>Activity 2.3.1: Strengthen the capacity of national and sub-national staff, as well as community leaders/representatives, to apply the updated procedures under Activity 2.2.1 and implement, operate and maintain EbA and green infrastructure interventions for flood and water resources management.</p>	<p>Capacity-building interventions under this activity will include: i) developing a national pool of experts for scaling up EbA through investments in curriculum development, academic programmes, training of trainers approaches, and exposure visits; ii) training national and sub-national technical staff involved in flood risk and water resource management to implement EbA and green infrastructure interventions, including operations and maintenance; and iii) training local communities on the impacts of climate change, benefits of EbA and green infrastructure interventions and how to operate and maintain these interventions.</p>	<p>Sub-Activity 2.3.1.1: Train and raise awareness of national and sub-national policymakers and planners on the contents and application of the updated procedures developed under Activity 2.2.1.</p> <p>Sub-Activity 2.3.1.2: Train national and sub-national technical staff on the implementation, monitoring, operations, and maintenance of EbA and green infrastructure interventions.</p> <p>Sub-Activity 2.3.1.3: Train local community leaders/representatives on EbA and green infrastructure interventions and their benefits, as well as on the implementation,</p>	<p>2.3.1.1a: 80 national and sub-national policymakers and planners trained</p> <p>2.3.1.1b: 1 training report</p> <p>2.3.1.2a: 120 national and sub-national technical staff trained</p> <p>2.3.1.2b: 1 training report</p> <p>2.3.1.3a: 120 local community leaders/representatives trained</p> <p>2.3.1.3b: 1 training report</p>

		monitoring, operations, and maintenance of these interventions.	
<b>Output 3.1: Pipeline of feasible climate-resilient businesses.</b>			
Activity 3.1.1: Develop a pipeline of sustainable climate-resilient businesses.	Under this activity, due diligence and detailed needs assessments will be conducted over the existing DFCD Project identified businesses, and business development plans will be prepared for each business. Additionally, technical assistance, incubation, business support will be provided to each business based on their individual needs, with further support provided to these businesses in closing financial agreements with investors, including with the DFCD investment window. This activity will contribute to the project's efforts to enhance community resilience by providing important case studies for business models which create positive environmental impacts while creating economic resilience for vulnerable communities and business owners.	<p>Sub-Activity 3.1.1.1: Build on the initial study completed by WWF-Pakistan identifying bankable project opportunities in the Indus Basin in the agriculture, forestry, and water and sanitation sectors.</p> <p>Sub-Activity 3.1.1.2: Formulate technical assistance and business development plans for shortlisted climate-resilient DFCD businesses.</p> <p>Sub-Activity 3.1.1.3: Assist Bankable enterprises with financial close within the DFCD funding window (loaning application, investment pitch preparation, etc.).</p>	<p>3.1.1.1a: Report identifying community, micro and small business opportunities, including due diligence results</p> <p>3.1.1.2a: Technical assistance reports</p> <p>3.1.1.2b Business development plans</p> <p>3.1.1.2c: Readiness reports for DFCD Bankable Enterprises</p> <p>3.1.1.3a: Financial close documents and reports</p>
<b>Output 3.2: Improved climate-resilient livelihoods among vulnerable target communities.</b>			
Activity 3.2.1: Improve the climate resilience of vulnerable agricultural livelihoods.	Pakistan's agricultural sector is one of the most vulnerable to the impacts of floods and droughts in Pakistan. This activity will respond to this vulnerability by strengthening the climate resilience of small-sale farmers and vulnerable people in the Indus Basin that depend on agriculture for their livelihoods. Specifically, WWF-Pakistan will assist the Provincial Departments of Agriculture to deliver climate-responsive extension services on measures such as: i) improved water-efficient irrigation practices; ii) farming of drought-resistant crop varieties; iii) soil management practices responsive to changing climate conditions; and iv) installation and use of water storage tanks	<p>Sub-Activity 3.2.1.1: Strengthen the capacity of small-scale farmers and people dependent on agriculture on climate-resilient agriculture and sustainable practices.</p> <p>Sub-Activity 3.2.1.2: Improve the water efficiency of farming through improved farm management and irrigation systems.</p> <p>Sub-Activity 3.2.1.3: Introduce drought-resistant crop varieties.</p> <p>Sub-Activity 3.2.1.4: Improve the climate resilience of soil management practices.</p>	<p>3.2.1.1a: Annual training workshops for farmers, extension agents and staff from the Provincial Departments of Agriculture.</p> <p>3.2.1.2a: 8 efficient irrigation systems (2 per site in the 4 project sites)</p> <p>3.2.1.3a: Drought resistant crop varieties introduced on 40 ha of agricultural land</p> <p>3.2.1.4a: 14 ha of agricultural land under improved climate-resilient soil management</p> <p>3.2.1.5a: 15 water storage tanks installed</p>



	for vulnerable small-scale farming households.	Sub-Activity 3.2.1.5: Provide water storage tanks to vulnerable agricultural communities.	
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## E.7. Monitoring, reporting and evaluation arrangements (max. 500 words, approximately 1 page)

289. In addition to the AE's obligations set out in the Accreditation Master Agreement (AMA), project-specific monitoring and evaluation (M&E) will consist of the following arrangements:

### M&E Plan

290. The project includes monitoring and evaluation systems to track progress towards the planned outcomes over the seven-year term of the project. A Monitoring and Evaluation Plan (M&E Plan) has been prepared for the project and is included as Annex 11 to the Funding Proposal. Fund-level monitoring and evaluation of the project will be based on the Fund-level Indicators identified in Section E.3. above.

291. The AE will require adherence with the M&E Plan and the relevant monitoring and evaluation systems described in this Funding Proposal in its Subsidiary Agreements with the EEs. As such, WWF-Pakistan will be required to comply with their obligations to the AE, including for reporting on project indicators, implementation challenges, and financial status. See Section B.4, Implementing Arrangements, for an illustration of those agreements within the institutional arrangements for the project.

### Primary Responsibility for Monitoring & Evaluation

292. Primary responsibility for project M&E will rest with WWF-Pakistan, through a full-time **M&E Manager** within the PMU. WWF-Pakistan will be required to deliver reports to the AE on project indicators, implementation challenges, and financial status to allow the AE to monitor and evaluate the project, and to report to the GCF. The PMU will apply standard management tools such as work plans to monitor progress and financial reporting, as well as action plans for gender, stakeholder engagement, and environmental and social safeguards.

293. The M&E Manager will be the focal point for project-level M&E information as and when required by the AE, PSC, Project Manager (PM) and WWF-Pakistan (EE). The M&E Manager will conduct their work in accordance with GCF standards and WWF-Pakistan's M&E Manual<sup>184</sup>, which describes the standard operating procedures and protocols for M&E required in all WWF-Pakistan's projects and programmes. Technical support will be provided to the M&E Manager by WWF-Pakistan's M&E Unit, which forms part of its Programme Development Department, to ensure compliance with WWF Network standards, including linking the project with the Global Goals and Outcomes of the WWF Network.

294. The M&E Manager will be the custodian of all project-level M&E data, including the development and maintenance of a centralized database for data collation, consolidation, analysis and reporting. This manager will be supported by the following personnel:

- **Three full-time Provincial M&E Officers** (project staff) will report directly to and receive technical guidance from the M&E Manager. They will develop data collection tools for the project's interventions and train the project field teams on their use. The M&E Officers will monitor the project's progress against the targets specified in the Logical Framework (see Section E1–6) and be custodians of provincial-level M&E data.
- **Full-time Environment and Social Safeguards (ESS) and Gender Managers** (PMU staff) will collect M&E data related to the implementation of the ESMF (Annex 6) and Gender Action Plan (Annex 8), respectively, under the guidance of the M&E Manager.
- **Part-time independent consultants** will conduct interim and final evaluations for the project in accordance with AE and GCF requirements.

295. During the implementation phase, specific means of verification (MoVs) will be used to assess the: i) progress of project interventions towards achieving GCF Result Areas and Outcomes; and ii) performance of interventions against the project performance indicators presented in Section E.5 of the Funding Proposal. WWFUS The M&E costs, as well as the salaries of the project management staff are presented in Annex 4: Detailed budget. The M&E process for the proposed project is described below.

296. **First level:** The project field teams will collect M&E data on site-specific activities (based on the indicators, targets and means of verification presented in Sections E.1–6 and Annex 11). The collected information will be quality assured and validated by the Provincial M&E Officers, who will conduct quarterly monitoring visits to the

<sup>184</sup> Monitoring and Evaluation Manual. 2012. Monitoring and Evaluation Unit, Programme Development Department, WWF-Pakistan.

project sites and develop site-specific quarterly internal monitoring reports. M&E data as well as their sources will be validated by the M&E Manager who will conduct biannual field monitoring visits to the project sites.

297. **Second level:** The M&E Manager will consolidate the findings of site-specific quarterly monitoring reports (delivered by the Provincial M&E Officers) and present them in quarterly planning and progress review meetings. The M&E Manager will facilitate these meetings, which will be attended by the PM, ESS and Gender Managers, and Project Coordinators (based in the SIUs). During these meetings, the ESS and Gender Managers will present updates on the implementation of the ESMF (Annex 6) and Gender Action Plan (Annex 8), respectively. The M&E Manager will coordinate with provincial M&E Officers and ensure updated information is shared timeously with relevant project partners. The M&E Manager will also organize at least one reflection session per year with the PM, EEs and relevant technical project staff to assess the project monitoring data against the project's Theory of Change and Logical Framework to adaptively manage the project.

298. **Third level:** In accordance with GCF requirements, the M&E Manager will compile Annual Progress Reports (APRs) supported by project M&E staff, and ESS and Gender Managers. First, these reports will be submitted to WWF-Pakistan's M&E Unit (based at the Head Office) for clearance, with the findings presented at quarterly WWF-Pakistan's internal Programme Support Unit (PSU) meetings (WWF-Pakistan's PSUs will meet quarterly for project progress reviews and technical oversight.) After these internal presentations, the APRs will be submitted to WWF-Pakistan's Project Review Committee (PRC) for review and clearance. Following this review, the APRs will be shared with the AE as per agreed frequencies mentioned in the signed project agreements. The APRs will explain the progress of the project against result indicators, implementation challenges/delays, achievements against targets and financial status.

#### Periodic Reports

299. The PMU will submit an Annual Performance Report (APR) to the AE by January 31 each year of implementation, consolidating information from all EEs, subgrants, and subcontracts, including a narrative report on implementation progress based on the logical framework submitted in this Funding Proposal and considerations on the ongoing performance of the project against the GCF's investment framework criteria. This narrative report will include updates on the indicators described in the GCF's Results Management Framework, and a report on safeguards, that includes updates on the GRM, including any SEAH-specific grievances; gender; and co-benefits indicators. The PMU's Project Manager and M&E Manager will be responsible for preparing the APRs, for controlling quality, and for submitting them to the AE. The PMU will share these APRs with the PSC and other relevant stakeholders.

300. The PMU will submit semi-annual technical reports to the AE, one at the mid-year and one at the end of the calendar year, to allow the AE to make its reports to the GCF. Additionally, the PMU will submit to the AE quarterly financial reports that consolidate all financial information from the other EEs, to allow the AE to make its financial reports to the GCF. WWF-Pakistan will be responsible for preparing the financial reports, controlling their quality, and submitting them to the AE. M&E reports to be produced, including details of their frequency, authors and recipients are presented in Table 22 below.

**Table 22.** Project-specific M&E reporting summary.

M&E Report	Frequency	Responsibility	Recipient/s
Site-specific quarterly internal monitoring reports	Quarterly	Provincial M&E Officers	M&E Manager
Mid-year technical report	Mid-year	PM and M&E Manager (reviewed by WWF-Pakistan's PRC)	AE
Annual Progress Reports, including quarterly financial reports	Annually	PM and M&E Manager (reviewed by WWF-Pakistan's PRC)	AE, NDA. The AE will submit these reports to the GCF.
Interim evaluation report	At project mid-point	Independent consultant	AE, GCF, NDA, WWF-Pakistan's M&E Unit, PMU

Final evaluation report	At project end point	Independent consultant	AE, GCF, NDA, WWF-Pakistan's M&E Unit, PMU
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**AE Monitoring and Evaluation**

301. The AE will carry out the following project-level monitoring and evaluation activities:

- a. The AE will maintain and comply with an adequate system to monitor the performance of the EEs and contractually cause regular reporting from them in the Subsidiary Agreements in accordance with the AMA.
- b. The AE will carry out an inception workshop to: (a) inform project stakeholders of the project strategy and discuss any changes in the overall context that influence project implementation; (b) discuss the roles and responsibilities of the project team, including reporting and communication lines; (c) review the results framework, discuss reporting, monitoring and evaluation roles and responsibilities, and finalize the M&E plan; (d) review financial reporting requirements and procedures, and agree on the arrangements for the annual audit; (e) agree on templates and the timelines for technical and financial reporting with the PMU and executing partners; and (f) finalize the first year's work plan.
- c. The AE will carry out annual supervision missions during which, among other things, it will review the previous Annual Performance Report with stakeholders including the EEs and the NDA. During these missions, the AE will conduct workshops with the EEs, the NDA, and other stakeholders to (a) review whether the project strategies are having the expected results according to the project theory of change; (b) analyse risks and assumptions that hinder project success, to discuss modifications to make the project more efficient and effective; (c) discuss lessons from the past year(s) of project implementation; and (d) evaluate the project's gender responsiveness and application of social and environmental safeguards.
- d. The AE will submit a copy of the APR to the NDA by the end of February each year.
- e. During the project, based on the PMU's reporting to the AE described above, the AE will submit to the GCF Annual Performance Reports, including financial management reports, which will include, among other things, the dates and amounts disbursed for each funded activity and compliance with financial covenants.
- f. The AE will also provide to the GCF on an annual basis (a) a self-assessment of compliance with the GCF's Fiduciary Principles and Standards, Environmental and Social Safeguards, and Gender Policy; and (b) a report on its actions carried out or planned to be carried out to strengthen the capacities of, or otherwise support, potential subnational, national and regional entities.
- g. The AE will arrange and contract for independent interim and final evaluations that will contain the information described in Section 15.02(b) of the AMA and will apply the relevant GCF and AE policies identified in the AMA. The AE will, in collaboration with the PMU, prepare a formal management response to the findings of the independent evaluations, and will provide the evaluation reports and the management response to the GCF.
- h. The interim evaluation will take place at the mid-point of project implementation. This mid-term evaluation will evaluate progress towards the achievement of outcomes and will suggest corrective actions if needed. The findings of the interim evaluation and responses in the management response will be incorporated as recommendations for enhanced implementation during the second half of the project.
- i. The final evaluation will be submitted six months after the project's completion date. It will aim at identifying project outcomes, their sustainability, and future actions needed to assure continuity of these outcomes.
- j. Within three months of the project's completion date, the PMU will prepare the Project Completion Report for the AE's review and revision, and the AE will submit the final report to the GCF. This comprehensive report will also be made available to the public. It will summarize the results achieved (objectives, outcomes, outputs), lessons learned, problems met, and areas where results may not have been achieved. It will also provide recommendations for any further steps that may need to be taken to ensure sustainability and replication of the project's results.

## E. RISK ASSESSMENT AND MANAGEMENT

### F.1. Risk factors and mitigations measures (max. 3 pages)

Please describe financial, technical, operational, macroeconomic/political, money laundering/terrorist financing (ML/TF), sanctions, prohibited practices, and other risks that might prevent the project/program objectives from being achieved. Also describe the proposed risk mitigation measures. Insert additional rows if necessary.

For probability: High has significant probability, Medium has moderate probability, Low has negligible probability

For impact: High has significant impact, Medium has moderate impact, Low has negligible impact

Prohibited practices include abuse, conflict of interest, corruption, retaliation against whistle-blowers or witnesses, as well as fraudulent, coercive, collusive, and obstructive practices

#### Selected Risk Factor 1

Category	Probability	Impact
<u>Technical and operational</u>	<u>Low</u>	<u>Medium</u>

#### Description

The project includes a new mechanism for coordination among national agencies, provincial agencies, and non-government members through the National Working Group, created under Sub-Activity 2.2.1.1, to operationalize EbA and green infrastructure in Pakistan's Water Policy Implementation Framework, NAP, and Provincial Adaptation Plans.

#### Mitigation Measure(s)

The NWG will be established to lead the development and adoption of updated procedures for Pakistan's Implementation Framework for the National Water Policy, the NAP, and Provincial Adaptation Plans of Sindh, Khyber, Balochistan, and Punjab provinces — on the proper execution of EbA and green infrastructure interventions to reduce the impacts of floods and droughts in Pakistan. This working group will also ensure these procedures align with current national and provincial climate change planning frameworks. The NWG will include representation from the MoCC, MoWR (including FFC), the Provincial Departments of Irrigation, Forestry and Agriculture local NGOs, CSOs, and academic and research organisations<sup>185</sup>. The NWG members will be selected based on: (a) their subject matter expertise and capacity to influence government regulation and procedures, and/or (b) position within government and decision-making authority or influence to change government regulation and procedures.

The project Steering Committee (PSC) and Provincial Oversight Committees (POCs) will be critical in facilitating participation within the NWG, securing government and community buy-in, and driving approval/decisions at the national and provincial levels related to adopting an integrated approach to flood and water resources management under the project. The Project Manager will coordinate with the PSC and the NWG closely to ensure the timely formation of the NWG, selection of its members, routine scheduling of NWG meetings, progress on the review of recommended amendments to the Implementation Framework for the National Water Policy, the NAP, and Provincial Adaptation Plans following the implementation timetable in Annex 5.

#### Selected Risk Factor 2

Category	Probability	Impact
<u>Technical and operational</u>	<u>Medium</u>	<u>Medium</u>

#### Description

Extreme climate events, such as floods, may disrupt project implementation. Physical accessibility to the sites could be constrained for up to six months. The government's reprioritization on disaster recovery could reduce their attention and resources for implementation of project activities.

#### Mitigation Measure(s)

The project implementation plan (Annex 5) has been designed to accommodate potential delays in implementing project activities due to climate events. The Project Manager will be responsible for coordinating adaptive management planning and response with the PSC and POC.

#### Selected Risk Factor 3

Category	Probability	Impact
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<sup>185</sup> Such as the Pakistan Council for Research in Water Resources (PCRWR), Pakistan Agriculture Research Council (PARC), Lahore University of Management Sciences (LUMS), National University of Science and Technology (NUST), and University of Engineering and Technology (UET).

Technical and operational	Medium	High
<b>Description</b>		
The communities in DI Khan and Chakkar Lehri have high levels of autonomy from the national and provincial governments in Pakistan. Due to their special status, the communities' Tribal Elders and leadership may not maintain their commitment to participate in the project if engagement wanes		
<b>Mitigation Measure(s)</b>		
WWF Pakistan has engaged with the Tribal Elders in Di Khan and the Chakkar Lehri and secured letters of commitment to participate in the project, included in Annex 6. The ESMF (Annex 6) and SEP (Annex &) have established both safeguard and stakeholder engagement procedures which take into account local governance status. During implementation, activities in DI Khan and the Chakkar Lehri will be executed through local Site Implementation Units which will work with communities on the project activities included in Section B.3 following the agreed upon engagement mechanisms defined in Annexes 6 and 7.		
<b>Selected Risk Factor 4</b>		
Category	Probability	Impact
Technical and operational	Medium	High
<b>Description</b>		
The reforestation and revegetation activities under Output 1.1 may require limiting access to certain areas during planting and early maturation of saplings. Limiting access for local peoples to community areas which they traditionally access for food, fodder, and other uses could lead to wavering support for the project and ultimately disrupt activity delivery.		
<b>Mitigation Measure(s)</b>		
During development of the project ESMF, SEP, and GAP communities have been fully briefed on the project activities including the need to limit access to certain areas during activity execution. Community leaders have provided their approval of the project and will be essential partners for communicating the project's long-term benefits to their communities, and the need for temporary limitations to achieve these benefits. The ESMF and SEP outline measures to accommodate communities during execution of the project for any restrictions which may arise. During execution of the project and before planting begins, WWF Pakistan will use the Safeguard Eligibility and Impacts Screening, which can be found in Annex 6 to determine if any restrictions are necessary. The screening will assess community dependency on the project areas, and work with communities to create Alternative Livelihood Plans that are mutually agreed upon.		
<b>Selected Risk Factor 5</b>		
Category	Probability	Impact
Forex	Medium	Medium
<b>Description</b>		
Foreign exchange risk could affect the financial performance of the project. Significant fluctuation of exchange rate between the PKR to USD has been observed. In March 2022 1 USD = 178 PKR, whereas during July 2022 it went up to 1 USD = 239 PKR. Furthermore, the PKR gained 10% against the USD on Sept 1, 2022, from PKR = 239 to PKR = 219. Depreciation or appreciation of currencies could lead to under or overspending of the budget.		
<b>Mitigation Measure(s)</b>		
A clause in the agreement should be added that 'In case of significant exchange gain/loss, the implementer should immediately inform the donor and the donor will take appropriate action by mutual agreement with the implementer within <b>the approved financing amount</b> . The expected change in foreign exchange rates can also be analysed and incorporated into the project budget.		
<b>Selected Risk Factor 6</b>		
Category	Probability	Impact
ML/FT	Low	Medium
<b>Description</b>		
Money laundering or terrorist financing leads to improper use of property, assets, or GCF funding. Project actors fail to comply with all applicable anti-money laundering and countering financing of terrorism laws.		
<b>Mitigation Measure(s)</b>		
<ul style="list-style-type: none"> <li>As part of its financial and operational due diligence, the AE has assessed WWF-Pakistan in the areas of financial management, internal controls, accounting, human resources, procurement and procurement systems, equipment management, and the ability to comply with donor requirements, and will assess whether their overall policies and procedures, experience, and level of supervision proposed for this project are sufficient to mitigate any potential risks or vulnerabilities related to money laundering, terrorist financing, or prohibited practices.</li> <li>The AE's Subsidiary Agreements with the EE will require compliance with the AE's and the GCF's anti-money laundering and anti-terrorist financing policies described in the Funded Activity Agreement and AMA and will flow</li> </ul>		

down remedies for non-compliance. The Subsidiary Agreement will require that the EE in turn flow down those provisions to all project subrecipients.

- Before submission of the project to the GCF Board, the AE will compare the name of the EE and the known executing partners against UN and US sanctions lists, including sanctions established by the United Nations Security Council; sanctions administered by the Office of Foreign Assets Control within the U.S. Department of Treasury pursuant to the Global Terrorism Sanctions Regulations, the Foreign Terrorist Organizations Sanctions Regulations, and Counter Narcotics Trafficking Sanctions. At the time of submission of this proposal the AE is not aware of any individual or entity expected to receive project funds or material support or resources that is included on those lists.
- The following mechanisms will be available for the reporting of complaints and allegations of impropriety, wrongdoing or other related issues in the project and its activities (i.e., whistle-blower programs): [WWF's whistleblower system](#) is open to staff, partners, communities, and other stakeholders to report suspected illegal or inappropriate activity, or concerns about the implementation of WWF projects. This system is an online and phone mechanism hosted by a third-party provider, [WhistleB](#), which can receive reports online or by phone in multiple languages. All complaints submitted through the mechanism are investigated.

**Selected Risk Factor 7**

<b>Category</b>	<b>Probability</b>	<b>Impact</b>
<u>Technical and operational</u>	<u>Low</u>	<u>High</u>

**Description**

In Pakistan, there are both external and internal threats from terrorist activity related to Taliban activities in neighbouring Afghanistan spilling across the border, as well Taliban groups within Pakistan and separatist movements in the Balochistan region. Although no instances of terrorism have been reported in the project areas, possible future terrorism activities, especially in DI Khan, may lead to disruption of project activities.

**Mitigation Measure(s)**

- A conflict Sensitivity analysis has been prepared for the project, included under Annex 6, which outlines security measures for the project. These include engagement with security forces in the target provinces and detailed measures in the case of any security threats, including immediate withdrawal from project areas where security threats are identified.
- Additionally, the Stakeholder Engagement Plan in Annex 7 outlines how the project will work with Tribal elders in the DI Khan area to build trust and cooperation. While the project will not be working with those engaged in separatist activities, close collaboration with Tribal elders in the region can act as an additional mitigation measure by providing legitimacy to the work and offering advice to the Project team on how to avoid becoming unintentionally part of any conflict.

**Selected Risk Factor 8**

<b>Category</b>	<b>Probability</b>	<b>Impact</b>
<u>Technical and operational</u>	<u>Medium</u>	<u>Medium</u>

**Description**

Interference or delays with procurement or transportation of inputs/equipment and challenges with supply chains and labour could delay the development of green infrastructure interventions and the execution of agricultural activities requiring specific materials.

**Mitigation Measure(s)**

Local supply chains and locally available materials and labour will be used wherever possible. Similarly for other items and inputs, reputable suppliers will be engaged through a competitive procurement to ensure timely supply and transportation of inputs.

**Selected Risk Factor 9**

<b>Category</b>	<b>Probability</b>	<b>Impact</b>
<u>Prohibited practices</u>	<u>Medium</u>	<u>Medium</u>

**Description**

Corruption, fraud, or abuse leads to theft, misappropriation, waste, or improper use of property, assets, or GCF funding.

**Mitigation Measure(s)**

As part of its financial and operational due diligence, the AE has assessed WWF-Pakistan in the areas of financial management, internal controls, accounting, human resources, procurement and procurement systems, equipment management, the ability to comply with donor requirements, and whether their overall policies and procedures, experience, and level of supervision proposed for this project are sufficient to mitigate any potential risks or vulnerabilities related to prohibited practices.

The following controls are designed to assure that any materials or technology procured under this project are used only for the purposes intended and are not diverted or misused for unauthorized, improper or illicit purposes: The

covenants and warranties in the AE’s Subsidiary Agreements with the EE require, among other things, (a) that GCF funds are not used by the EE, or any entity to whom the funds are disbursed, for any illegal or improper purposes, including by incorporating in subrecipient and subcontractor agreements provisions corresponding to the EE’s own rules, policies, and procedures to comply with the GCF Policy of Prohibited Practices, (b) compliance with the GCF Policy of Prohibited Practices; and (c) compliance with the Recharge Pakistan Operating Manual.

In the case of disbursement of cash, vouchers, commodities, or other items of value directly or indirectly to individual beneficiaries, agreements will be signed with the relevant beneficiary or service provider that includes guidelines for distribution and reporting including proof of expenses and receipts. If that is not possible in some rural areas, it may be replaced by a declaration on the use of the funds that includes expense details. Administrative monitoring, including physical verification as appropriate, will be included in the relevant EE’s roles and responsibilities.

**Selected Risk Factor 10**

<b>Category</b>	<b>Probability</b>	<b>Impact</b>
<u>Prohibited practices</u>	<u>Low</u>	<u>Medium</u>

**Description**

Conflict arises between communities related to water management and planning and land use.

**Mitigation Measure(s)**

The mitigation measures include improved governance over water resources through the strengthening of CBOs and the formation of water user groups charged with the allocation of water among communities for household and agricultural use and resolving conflicts related to water access and use rights. As part of this process, Rod Kohi, the traditional method for managing water use and rights will be strengthened among project stakeholders. Additionally, as part of the ESMF requirements, the project-level screening in Appendix 1 of Annex 6 will be used to screen for community-based conflict potential, and any additional mitigation measures needed will be decided in consultation with the relevant communities. The screening will be supported by WWF-Pakistan’s FPIC process, which will be operationalised during project implementation to obtain the required consent and participation from tribes, particularly for project activities focused on water resources management. A conflict sensitivity assessment has also been prepared as Appendix 5 of Annex 6.

**Selected Risk Factor 11**

<b>Category</b>	<b>Probability</b>	<b>Impact</b>
<u>Prohibited practices</u>	<u>Low</u>	<u>Medium</u>

**Description**

WWF Pakistan will now also be responsible for executing Activity 1.2.1 following the removal of MoWR as an EE on the project. This could increase the risk of project management and execution challenges for WWF Pakistan, such as delays in activity delivery.

**Mitigation Measure(s)**

The AE conducted technical, financial, and operational due diligence over the EE, WWF Pakistan, to evaluate its capacity and to determine whether it has the financial ability, controls and policies and procedures to ensure the adequate financial management of GCF funds. Based on the findings of this assessment (Annex 9), the AE is assured that WWF Pakistan has the capacity, policies and procedures, systems and experience to execute the Recharge Pakistan project and provide adequate stewardship of GCF funding.

WWF Pakistan has included finance and operational teams to manage the service providers under the project within the PMU and the site implementation units including: an Operations and Finance Manager, a Contracts Manager, a Contracts Officer, and three Senior Finance Officers, one for each of the site implementation units.

**F. GCF POLICIES AND STANDARDS**

**G.1. Environmental and social risk assessment (max. 750 words, approximately 1.5 pages)**

302. The project will comply with GCF’s Environmental and Social Policy (ESP), including the Policy on the Prevention and Protection from Sexual Exploitation, Sexual Abuse, and Sexual Harassment (SEAH) and Indigenous Peoples Policy (IPP) through application of WWF’s Environmental and Social Safeguards Framework, as detailed in the Safeguards Integrated Policies and Procedures (SIPP) and Guidance Note on GBV & SEAH. The project has been screened as Category "B" given that this is a climate change mitigation and adaptation initiative, designed to create integrated approaches to flood and drought risk management in the Indus Basin while enhancing the resilience of vulnerable rural communities to climate change and enabling a paradigm shift towards Ecosystem-Based Adaptation in Pakistan. It is expected to generate significant positive and durable social,

economic, and environmental benefits. Any adverse environmental and social impacts are expected to be minor and site specific and can be mitigated.

303. An Environmental and Social Management Framework (ESMF) (Annex 6), including an Indigenous Peoples Planning Framework (IPPF), a Process Framework (PF), and a Grievance Redress Mechanism (GRM) has been prepared to define procedures for managing the project activities' potential environmental and social risks and impacts. Additionally, the project will have an ESS Manager within the PMU, 3 ESS/ M&E Sr. Officers at the landscapes levels and a male and female Community Engagement specialist at each landscape to manage ESS risks and ensure the project complies with all policies and mitigation measures. This is a complex project in a complex country and the level of staffing for ESS reflects that.

304. The proposal formulation process has involved consultations with a variety of stakeholders including communities, national and local governments, public entities and universities using a gender-responsive approach, to ensure equitable and meaningful participation from women and men.

305. A summary of the ESS risks and mitigation measures is given below, divided by the Standards found in WWF's SIPP. For full details on the environmental and social risks and mitigation measures, please refer to Section 4 in Annex 6 of the FP.

#### **Standard on the Protection of Natural Habitats**

306. The project-related activities associated with this standard include re-vegetation of riverside and wetland habitat, excavation of flow paths and water channels, creating water retention areas in river systems and de-silting of riverbeds. Mitigation measures include ensuring the use of native species adapted to the ecosystems being re-vegetated, preparing a proper plan for the excavation and dumping of excavated material, and where possible / mentioned, using the debris from de-silting as the building block for retention areas to avoid leaving it elsewhere in the landscape.

#### **Standard on Restriction of Access and Resettlement**

307. There will be no land acquisition or involuntary resettlement under the project. This standard is triggered because there is the possibility of access restriction to fishing or use changes in water access if unmitigated. A Process Framework has been prepared as part of the ESMF and a stakeholder engagement plan (Annex 7) has been prepared. Any restrictions on use or access will only come with the full and effective participation of communities and their leaders. In the case of a few project areas, an FPIC Process as outlined in the IPPF will be followed as well.

#### **Standard on Indigenous People**

308. This standard is triggered because there are indigenous and tribal peoples in several project landscapes- the Indigenous Mohana peoples of Lake Manchar, and Kehal, Mor, and Pakhtoon tribes in the DI Khan area. An Indigenous Peoples Planning Framework has been prepared as part of the ESMF. Once project implementation begins and landscape-level ESS Screenings have been conducted, IPPs will be created through an FPIC process in partnership with the relevant communities. Stakeholder engagement has already begun in these areas during the FP stage, and tribal elders have expressed their interest in participating in the project. More details about the consultation process to date and stakeholder engagement during implementation can be found in Annex 7: Stakeholder Engagement Plan.

#### **Standard on Community Health and Safety**

309. This Standard is triggered due to activities involving small-scale construction works involving pond retention areas, gabion bunds used to stabilize riverbeds and banks, de-silting of riverbeds and wetland restoration. These will take specialized knowledge and labour and the Project will use a competitive process to hire environmental engineers with a strong safety record. The selected firm will be required to comply with WWF's guidance note on Labour and Working Conditions.

#### **Standard on Cultural Heritage**

310. This Standard has been triggered on a precautionary principle only, as there are a few shrines of cultural significance in the Kaha region, although they are not anticipated to be within the range of project activities. The ESS landscape screening during implementation will verify this, and any project activity that may impact those shrines will be relocated.

#### **Grievance Mechanism**



311. The gender and SEAH-responsive project-level grievance mechanism as detailed in Section 5.8 of Annex 6 will be implemented within the first 3 months of implementation. WWF-Pakistan's (EE) grievance mechanism and WWF US's (AE) grievance mechanism will be available throughout the project lifecycle, and accessible to stakeholders and project-affected peoples. The GCF's IRM will also be socialized.

#### **Country-level Conflict**

312. Country-level threats including ongoing conflict along the Afghanistan border and internal threats within some tribal areas in DI Khan and Balochistan have been addressed in F.1. However, there are also inter-tribal threats that will require extensive stakeholder engagement with tribal elders, and close collaboration with security officials to maintain the safety of project staff and ensure project success. More details can be found in Section 4.2 and Appendix 5 of Annex 6.

313. The final ESMF (including IPPF and PF) and the SEP will be translated into Urdu, Pashto, Balochi, and Sindhi before GCF Board Submission allowing for the 30-day public disclosure required by GCF's Information Disclosure Policy and final documentation will be disclosed in country in a locally accessible manner for 45 days per WWF policy before AE approval.

#### **G.2. Gender assessment and action plan (max. 500 words, approximately 1 page)**

314. **Gender Assessment:** A detailed Gender Assessment was conducted on gender-related issues in the project sites to understand the gender situation in Pakistan in general and more specifically in the project sites as it pertains to the proposed project's objectives. To ensure gender is given due consideration and is integrated into the design and implementation phases of the project, a Gender Action Plan (GAP) has been developed (see the Gender Assessment and Action Plan, Annex 8).

315. The framework for the Gender Assessment was based on an "Assessment Grid" containing 26 questions, outlining the secondary and primary data requirements. A mixed method approach (qualitative and quantitative research techniques) was adopted to conduct the gender assessment and to collect gender-specific data to identify gaps, opportunities, challenges, and to provide an analysis of the prevalence of Gender-based Violence (GBV) and Sexual Exploitation and Abuse and Sexual Harassment (SEAH's) risks. This was to understand the roles women and men play at various levels and the decision-making processes among them at the community level; access and control over the management of natural resources and the types of resources; and access to land by women and men in the project sites. The following methods were used for the collection of primary data: 311 household surveys, 14 focus group discussions (FGDs) with male and female respondents of the local communities, and 10 key informant interviews (KII) with government officials were conducted to assess the gender situation of each project site. To collect the secondary data, a literature review / desk study was conducted of the academic literature and development sector reports covering legal frameworks, laws, policies, institutional practices on gender equality, and women's empowerment in the wider socio-cultural context. The main documents used for the Gender Analysis were the National Gender Policy Framework 2022; the Climate Change Policy 2012; the proposed GCF Funding Proposal; the GCF Gender policy; and the WWF Gender Policy and Annual Reports 2019, 2020, and 2021.

316. The following is a summary of the gender assessment:

- Gender equality is provided in various forms in legal documents, including the Constitution and international treaties signed by Pakistan. However, the position and status of women in Pakistan have historically been inconsistent. Over the last three decades, the status of women has progressed, remained static, regressed, and is constantly changing depending on many factors that are beyond women's control. Numerous laws have been promulgated to ensure women's rights and protection, but their implementation and lack of political will render them ineffective. Therefore, women have generally not benefited from these declarations. As Pakistan is a patriarchal society, men are consistently given favour where women are given an inferior status before or at birth, which leads to their lower human development and more unfavourable socioeconomic circumstances, especially in rural areas.
- Communities in the project sites have been facing the brunt of climate change with their livelihoods being adversely affected. Pakistan is among those countries that are most vulnerable to the risks associated with climate change. In the focus group discussions, the impact of climate change was explored, and it was reported that there are changes in weather patterns and that different diseases including heart diseases, skin and stomach diseases are more prevalent now in the communities especially among women and children. The rapid changes in weather and the feared migrations associated with these changes, poverty and loss of

livelihoods are a reality to different degrees in all four project sites. Therefore, it can be clearly summed up that climate change has already negatively affected the equation and balance between people and nature.

- Women lack exposure, confidence, knowledge, skills, information about opportunities, and play a limited role in politics, policies and programs regarding their aspirations and lives. Formal institutions fall short of facilitating women's access to human, financial and physical capital i.e. education, skills, health facilities, loans and physical assets. Informal institutions (family, community, religion, segregation, marriage) define and affirm norms that give precedence to marriage/child marriage over education and employment, prescribe gendered roles, and condone domestic violence. Laws in place to support gender equality and women's empowerment have therefore not had the expected impact.
- In the project areas, women literacy level is low as compared to men. Women are fully responsible for livestock including goats and chickens and are reported to fulfil all tasks in the management of livestock. Women grow food for their families and have a role in some part of the tasks involved in field crops. However, women generally do not earn wages or cash incomes from these or other tasks that they perform. They also have limited decision-making power over natural and management resources including crops, livestock and associated household income.
- No report or data sets under the title SEAH (sexual exploitation, abuse and harassment) were found for Pakistan. Therefore, it was determined that in Pakistan Sexual Exploitation, Abuse and Harassment (SEAH) are subsumed under the laws and terms of Gender Based Violence (GBV), 'honour killing' and 'domestic abuse'. The assessment showed that the situation in Pakistan regarding GBV and SEAH is alarming, and it exists at different levels and at varying degrees in all provinces. The focus group discussions revealed the existence of various forms of GBV in the project. It can also be assumed that within the ambit of GBV, sexual exploitation, abuse, and harassment also exist. Even though direct questions were not asked about SEAH and GBV (investigating issues related to GBV and SEAH is difficult, as it is a sensitive issue and, in most cases, men usually deny the existence of any aspects of GBV, whereas women recognize it and subtly acknowledge it as part of traditional family norms) physical violence was reported by female respondents.

317. **Gender Action Plan:** The results obtained through the gender assessment and the stakeholder consultations during project design and development have been used to produce a detailed GAP for the project (see Gender Assessment and Action Plan, Annex 8) that covers the following:

- Equitably and inclusively strengthening and building the capacity and resilience of the vulnerable communities towards climate change. It also focuses on promoting gender inclusiveness in the design and implementation of project activities.
- Builds on the differences in tasks and interests, implementing trainings for women at separate locations, as appropriate for each site, that focus on subjects that are specifically tailored to women's interests, roles and responsibilities. These include raising awareness, providing capacity building and various skills such as leadership and entrepreneurship, of the vulnerable groups, addressing constraints and issues and aiming to improve livelihood activities at the project sites.
- Ensures gender mainstreaming processes actively involve men and women at different levels of management, who are trained in the subject, including how to recognize and address GBV and SEAH through the GRM reporting mechanism.
- Strengthening institutional capacity of local Government departments and extension services for gender orientation, sensitization and mainstreaming for planning and implementing project interventions.

318. The GAP's implementation and monitoring will be the responsibility of the Gender Manager hired in the PMU, and supported by the three Coordinator, Gender Empowerment and Livelihood Development, one in each landscape. This staff will work closely with the community mobilizers (male and female), ESS Manager and M&E Manager to provide the necessary support and capacity building to staff, partners and stakeholders to ensure the gender mainstreaming goals of the project are achieved. Ultimately, the Project Manager will be responsible for leading his/her whole team for proper implementation of the GAP as a cross-cutting theme in the project.

### G.3. Financial management and procurement (max. 500 words, approximately 1 page)

319. WWF grants management and subrecipient monitoring is supported by a grants management system that is integrated across its donor management, accounting, and budgeting systems. This system provides notifications for due dates of deliverables (from the grant recipient and to the donor), tracks disbursements, project expenses, milestones, audit findings (if applicable) and identified risks so that project supervision as a whole is informed and documented.

320. During project implementation, WWF will provide oversight and quality assurance in accordance with its policies and procedures, and any additional specific requirements contained in the subsidiary agreement (in the form of a grant agreement). This may include, but is not limited to, monitoring missions, spot checks, facilitation, and participation in project steering committee meetings, quarterly progress and annual implementation reviews, and audits at project level on the resources received from WWF.
321. WWF will advance funds to WWF-Pakistan, (for the implementation of agreed and approved project activities), through quarterly disbursements based on spending projections included with the quarterly financial reports, in accordance with WWF standard grants management policies. Consolidated project expenses will be reported semi-annually to the GCF (at the mid-year financial report and the Annual Performance Report (APR)). A dedicated project account will be setup by WWF-Pakistan to receive these disbursements, and any interest accrued during the project will be reflowed to the GCF, as will any unused funds at the time of the project's financial close. A statement of Investment Income earned on GCF Proceeds, as well as the amount of such Investment Income paid to the Fund for each calendar year of the project will be submitted annually by March 30 along with an unaudited financial statement per WWF's AMA. GCF.
322. All projects are audited annually following the WWF project audit guidelines. The project will have two annual audits: (1) WWF engages Grant Thornton (an internationally recognized audit firm, who was identified from an RFP) to conduct the annual audit of GCF-funded activity contained within its accounts; and (2) WWF will require that WWF-Pakistan engage an internationally recognized audit firm (approved by the AE) to complete an annual audit on all activities funded by GCF. A scheduled audit is used to determine whether the funds transferred to the Executing Entity were used for the appropriate purpose and in accordance with the approved project work plan and budget and the EE's assessed policies and procedures. The annual project audit, based on the calendar year will be submitted to the GCF by June 30 for each year of execution.
323. *For this project, the PMU will submit reports, annual work plans, budgets and annual procurement plans to the AE. WWF-Pakistan will submit requests for disbursements. WWF will then submit Annual Performance Reports (APRs) and financial reports to the GCF as defined within the AMA and FAA. Procurement will be executed according to the approved annual procurement plans. The Accredited Entity has assessed and confirmed that the procurement rules, policies and procedures of the Executing Entity are equivalent with the procurement rules, policies and procedures of the Accredited Entity to the extent and scope of its Accreditation. Furthermore, WWF-Pakistan has requirements in their procurement policies that exceed the requirements of the WWF AE. Because of this, all procurement, whether by the Executing Entity or by an Involved Third Party with the Executing Entity, will be done in accordance with the rules, policies and procedures of the Executing Entity (including by those governmental entities involved with the Executing Entity, which will comply with the applicable laws and regulations on public procurement, subject to the Executing Entity's review and final approval over such procurement and selection processes, in accordance with clauses 10.02 and 8.01 of the AMA. For the avoidance of any doubt, the Accredited Entity shall ensure that overall management, implementation and supervision of such procurement is in accordance with clause 8.01 of the AMA.) The project will also follow WWF's financial reporting templates and formats which are in line with internationally recognized reporting standards, as well as the GCF's required reporting templates.*
324. *Procurement will be executed according to the approved annual procurement plan and the EE's policies and procedures.*

#### G.4. Disclosure of funding proposal

*Note: The Information Disclosure Policy (IDP) provides that the GCF will apply a presumption in favour of disclosure for all information and documents relating to the GCF and its funding activities. Under the IDP, project and programme funding proposals will be disclosed on the GCF website, simultaneous with the submission to the Board, subject to the redaction of any information that may not be disclosed pursuant to the IDP. Information provided in confidence is one of the exceptions, but this exception should not be applied broadly to an entire document if the document contains specific, segregable portions that can be disclosed without prejudice or harm.*

*Indicate below whether or not the funding proposal includes confidential information.*

**No confidential information:** The accredited entity confirms that the funding proposal, including its annexes, may be disclosed in full by the GCF, as no information is being provided in confidence.

**With confidential information:** The accredited entity declares that the funding proposal, including its annexes, may not be disclosed in full by the GCF, as certain information is being provided in confidence. Accordingly, the accredited entity is providing to the Secretariat the following two copies of the funding proposal, including all annexes:

- full copy for internal use of the GCF in which the confidential portions are marked accordingly, together with an explanatory note regarding the said portions and the corresponding reason for confidentiality under the accredited entity's disclosure policy, and
- redacted copy for disclosure on the GCF website.

The funding proposal can only be processed upon receipt of the two copies above, if containing confidential information.

## G. ANNEXES

### H.1. Mandatory annexes

- Annex 1 NDA no-objection letter(s) ([template provided](#))
- Annex 2 Feasibility study - and a market study, if applicable
- Annex 3 Economic and/or financial analyses in spreadsheet format
- Annex 4 Detailed budget plan ([template provided](#))
- Annex 5 Implementation timetable including key project/programme milestones ([template provided](#))
- Annex 6 E&S document corresponding to the E&S category (A, B or C; or I1, I2 or I3):  
  - Environmental and Social Impact Assessment (ESIA) or
  - Environmental and Social Management Plan (ESMP) or
  - Environmental and Social Management System (ESMS)
  - Others (please specify – e.g. Resettlement Action Plan, Resettlement Policy Framework, Indigenous People's Plan, Land Acquisition Plan, etc.)
- Annex 7 Summary of consultations and stakeholder engagement plan
- Annex 8 Gender assessment and project/programme-level action plan ([template provided](#))
- Annex 9 Legal due diligence (regulation, taxation and insurance)
- Annex 10 Procurement plan ([template provided](#))
- Annex 11 Monitoring and evaluation plan ([template provided](#))
- Annex 12 AE fee request ([template provided](#))
- Annex 13 Co-financing commitment letter, if applicable ([template provided](#))
- Annex 14 Term sheet including a detailed disbursement schedule and, if applicable, repayment schedule

### H.2. Other annexes as applicable

- Annex 15 Evidence of internal approval ([template provided](#))
- Annex 16 Map(s) indicating the location of proposed interventions
- Annex 17 Multi-country project/programme information ([template provided](#))
- Annex 18 Appraisal, due diligence or evaluation report for proposals based on up-scaling or replicating a pilot project



- Annex 19 Procedures for controlling procurement by third parties or executing entities undertaking projects financed by the entity
- Annex 20 First level AML/CFT (KYC) assessment
- Annex 21 Operations manual (Operations and maintenance)
- Annex 22 Assessment of GHG emission reductions and their monitoring and reporting (for mitigation and cross cutting-projects)<sup>186</sup>
- Annex 23 Methodology for calculating project beneficiaries

*\* Please note that a funding proposal will be considered complete only upon receipt of all the applicable supporting documents.*

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<sup>186</sup> Annex 22 is mandatory for mitigation and cross-cutting projects.