



**GREEN
CLIMATE
FUND**

Meeting of the Board

6 – 8 July 2019

Songdo, Incheon, Republic of Korea

Provisional agenda item 20

GCF/B.23/02/Add.02

14 June 2019

Consideration of funding proposals - Addendum II

Funding proposal package for FP108

Summary

This addendum contains the following seven parts:

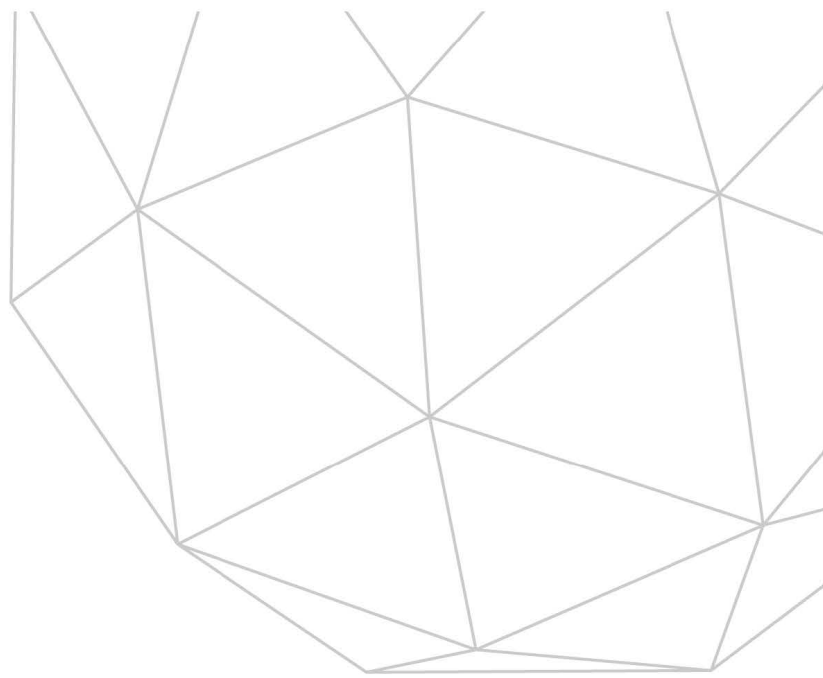
- a) A funding proposal titled "Transforming the Indus Basin with Climate Resilient Agriculture and Water Management";
- b) No-objection letter issued by the national designated authority(ies) or focal point(s);
- c) Environmental and social report(s) disclosure;
- d) Secretariat's assessment;
- e) Independent Technical Advisory Panel's assessment;
- f) Response from the accredited entity to the independent Technical Advisory Panel's assessment; and
- g) Gender documentation.

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Funding Proposal

Version 1.1

The Green Climate Fund (GCF) is seeking high-quality funding proposals.

Accredited entities are expected to develop their funding proposals, in close consultation with the relevant national designated authority, with due consideration of the GCF's Investment Framework and Results Management Framework. The funding proposals should demonstrate how the proposed projects or programmes will perform against the investment criteria and achieve part or all of the strategic impact results.

Project/Programme Title: Transforming the Indus Basin with Climate Resilient Agriculture and Water Management

Country/Region: Pakistan

Accredited Entity: Food and Agriculture Organization of the United Nations

Date of Submission: 22 June 2018

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Note to accredited entities on the use of the funding proposal template

- Sections **A, B, D, E** and **H** of the funding proposal require detailed inputs from the accredited entity. For all other sections, including the Appraisal Summary in section F, accredited entities have discretion in how they wish to present the information. Accredited entities can either directly incorporate information into this proposal, or provide summary information in the proposal with cross-reference to other project documents such as project appraisal document.
- The total number of pages for the funding proposal (excluding annexes) is expected not to exceed 50.

Please submit the completed form to:

fundingproposal@gcfund.org

Please use the following name convention for the file name:

"[FP]-[Agency Short Name]-[Date]-[Serial Number]"

Abbreviation and Acronyms

ACWA	Agri-Climate Water Portal
ADB	Asian Development Bank
AMA	Accreditation Master Agreement
AWPB	Annual Work Plan and Budget
AE	Accredited Entity
ASIS	Agriculture Stress Index System
AXEN	Assistant Executive Engineer
BRACED	Building Resilience and Adaptation to Climate Extremes and Disasters
CABI	Centre for Agriculture and Bioscience International
CAEWRI	Climate Alternate Energy Water Resources Institute
CBFS	Climate Business Field School
CIAT	International Centre for Tropical Agriculture
COP 22	22nd Conference of the Parties
CRA	Climate Resilient Agriculture
CSO	Civil Society Organization
DFID	Department for International Development of the Government of the United Kingdom
DPIU	District Project Implementation Unit
EIRR	Economic Internal Rate of Return
ERP	Enterprise Resource Planning
ET	Evapotranspiration
EWS	Existing Early Warning Systems
EX-ACT	Ex-Ante Carbon Balance Tool
FAO	Food and Agriculture Organization of the United Nations
FFS	Farmer Field Schools
GCF	Global Green Climate Fund
GCISC	Global Change Impact Studies Centre
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GiZ	Gesellschaft für Internationale Zusammenarbeit (German Development Agency)
GRMS	Global Resources Management System
HEIS	High Efficiency Irrigation System
HQ	Headquarters
ICIMOD	International Centre for Integrated Mountain Development
ICT	Information and Communication Technology
IFC	International Finance Cooperation
IFPRI	International Food Policy Research Institute
ILO	International Labour Organization
IPM	Integrated Pest Management
IRIS	Indus River Irrigation System
IRR	Internal Rate of Return
IRSA	Indus River System Authority
IWMI	International Water Management Institute
GLOF	Scaling-up of Glacial Lake Outburst Flood risk reduction Project in Northern Pakistan
MIS	Management Information System
MoCC	Ministry of Climate Change
MOSAICC	Modelling System for Agricultural Impacts of Climate Change
MoFSR	Ministry of Food Security and Research

MoPD	Ministry of Planning and Development
MoWR	Ministry of Water Resources
MPI	Multidimensional Poverty Index
NARC	National Agricultural Research Centre
NCCP	Pakistan's National Climate Change Policy
NDA	National Designated Authority
NDC	Nationally Determined Contribution
NGO	Non-governmental Organization
NPV	Net Present Value
OFWM	On-Farm Water Management
PAIS	Pakistan Agriculture Information System
PARC	Pakistan Agricultural Research Council
PCAIS	Pakistan Climate Agriculture Information System
PCRWR	Pakistan Council of Research in Water Resources
PIPIP	Punjab Irrigated-Agriculture Productivity Improvement Project
PMD	Pakistan Meteorological Department
PMU	Project Management Unit
POs	Partner Organizations
POC	Project Oversight Committee
PPIU	Provincial Project Implementation Unit
PPTC	Provincial Project Technical Committee
RAP	Regional Office for Asia and the Pacific of FAO
R&D	Research and Development
RSP	Rural Support Programme
SDGs	Sustainable Development Goals
SDO	Sub Divisional Officer
SHARP	Self-Evaluation and Holistic Assessment of Climate Resilience of Farmers
SIAPEP	Sindh Irrigated Agriculture Productivity Enhancement Project
SIDA	Sindh Irrigation and Drainage Authority
SMART	Strengthening Markets for Agriculture and Rural Transformation project in Punjab
SSCP	FAO South-South Cooperation Programme
SWSIP	Sindh Water Sector Improvement Project
TA	Technical Assistance
TCP	Technical Cooperation Programme
ToT	Training of Trainers
WWF	World Wildlife Fund
UNFCCC	United Nations Framework Convention on Climate Change
UNDP	United Nations Development Programme
UNDSS	United Nations Department of Safety and Security
UNICEF	United Nations Children's Fund
USDA	United States Department of Agriculture
UTF	Unilateral Trust Fund

A.1. Brief Project / Programme Information		
A.1.1. Project / programme title	Transforming the Indus Basin with Climate Resilient Agriculture and Water Management	
A.1.2. Project or programme	Project	
A.1.3. Country (ies) / region	Pakistan	
A.1.4. National designated authority (ies)	Ministry of Climate Change	
A.1.5. Accredited entity	Food and Agricultural Organization of the United Nations (FAO)	
A.1.5.a. Access modality	<input type="checkbox"/> Direct <input checked="" type="checkbox"/> International	
A.1.6. Executing entity / beneficiary	Executing Entity: FAO Beneficiaries: 1.3 million vulnerable people	
A.1.7. Project size category (Total investment, million USD)	<input type="checkbox"/> Micro (≤ 10) <input type="checkbox"/> Medium ($50 < x \leq 250$) <input checked="" type="checkbox"/> Small ($10 < x \leq 50$) <input type="checkbox"/> Large (> 250)	
A.1.8. Mitigation / adaptation focus	<input type="checkbox"/> Mitigation <input checked="" type="checkbox"/> Adaptation <input type="checkbox"/> Cross-cutting	
A.1.9. Date of submission	22 June 2018	
A.1.10. Project contact details	Contact person, position	Daniel Gustafson, Deputy Director General
	Organization	FAO
	Email address	Daniel.Gustafson@fao.org ; DDG-P@fao.org
	Telephone number	+39 0657056320
	Mailing address	Viale delle Terme di Caracalla 00153 Rome, Italy

A.1.11. Results areas
<p>Reduced emissions from:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Energy access and power generation (E.g. on-grid, micro-grid or off-grid solar, wind, geothermal, etc.) <input type="checkbox"/> Low emission transport (E.g. high-speed rail, rapid bus system, etc.) <input type="checkbox"/> Buildings, cities and industries and appliances (E.g. new and retrofitted energy-efficient buildings, energy-efficient equipment for companies and supply chain management, etc.) <input type="checkbox"/> Forestry and land use (E.g. forest conservation and management, agroforestry, agricultural irrigation, water treatment and management, etc.) <p>Increased resilience of:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Most vulnerable people and communities (E.g. mitigation of operational risk associated with climate change – diversification of supply sources and supply chain management, relocation of manufacturing facilities and warehouses, etc.) <input checked="" type="checkbox"/> Health and well-being, and food and water security (E.g. climate-resilient crops, efficient irrigation systems, etc.) <input type="checkbox"/> Infrastructure and built environment (E.g. sea walls, resilient road networks, etc.) <input type="checkbox"/> Ecosystem and ecosystem services (E.g. ecosystem conservation and management, ecotourism, etc.)

A.2. Project / Programme Executive Summary (max 300 words)

Modelling of climate change scenarios for Pakistan shows that if agriculture and water management in the Indus River Basin continue in a 'business as usual' mode, increasing temperatures and changes in precipitation will pose serious threats to the future livelihoods of farmers and to the Pakistani agricultural sector. This project was designed to change that by moving away from 'business as usual' in the Basin, shifting agriculture and water management to a new paradigm in which producers are successfully adapting to climate change and are able to sustain their livelihoods. The project objective is to transform agriculture in the Basin by increasing resilience among the most vulnerable farmers and strengthening Government's capacity to support their communities to adapt. To do this, the project will develop the country's capacity to get and use the information it needs to cope with the impacts of climate change on agriculture and water management by putting in place state-of-the art technology (Component 1). It will build farmers resilience to climate change through skills, knowledge and technology (Component 2), and create a wider enabling environment for continuous adaptation and expanded sustainable uptake of climate-resilient approaches (Component 3). The project will be implemented in eight districts in Punjab and Sindh Provinces over a six-year period at a total cost of USD 47.69 million. The Ministry of Climate Change, currently Pakistan's National Designated Authority, will provide general oversight while selected responsible entities from federal, provincial and local government will work with project staff to implement specific activities. They will collaborate with partners from civil society and the private sector, particularly at the field-level, to provide training and other services to agricultural producers. About 1.3 million rural people will be direct project beneficiaries, including women farmers as well as professionals involved in project capacity development. The project will have an economic rate of return of about 16.5 percent and costs per beneficiary of about USD 37. At the request of the Government of Pakistan, FAO will function as both the Accredited Entity and Executing Entity for the project.

A.3. Project/Programme Milestone

Expected approval from accredited entity's Board (if applicable)	n/a
Expected financial close (if applicable)	n/a
Estimated implementation start and end date	Start: 01/10/2019 End: 30/09/2025
Project/programme lifespan	20-year lifespan of project outcomes

B.1. Description of Financial Elements of the Project / Programme

Component	Sub-component (if applicable)	Amount (for entire project)	Currency	Amount (for entire project)	Local currency	GCF funding amount	Punjab co-financing	Sindh co-financing	Currency of disbursement to recipient
Component 1 – Enhancing information services for climate change adaptation in the water and agriculture sectors	Sub-component 1.1 – Developing a water accounting system	6.30	<u>million USD (\$)</u>	697	Million PKR	5.50	0.41	0.39	<u>million USD (\$)</u>
	Sub-component 1.2 – Establishing an evapotranspiration-based water management system	7.24	<u>million USD (\$)</u>	801	Million PKR	6.83	0.28	0.13	<u>million USD (\$)</u>
	Sub-component 1.3 – Improving availability and use of information services	1.24	<u>million USD (\$)</u>	137	Million PKR	1.20	0.02	0.02	<u>million USD (\$)</u>
Component 2 – Building on-farm resilience to climate change	Sub-component 2.1 – Improving practices for climate resilience	9.24	<u>million USD (\$)</u>	1,023	Million PKR	5.95	2.37	0.92	<u>million USD (\$)</u>
	Sub-component 2.2 – Training of trainers on CRA and OFWM	0.32	<u>million USD (\$)</u>	35	Million PKR	0.07	0.18	0.07	<u>million USD (\$)</u>
	Sub-component 2.3 – Developing farmers' capacity to transform agriculture practices with CRA and OFWM	15.44	<u>million USD (\$)</u>	1,710	Million PKR	8.93	4.11	2.40	<u>million USD (\$)</u>
Component 3 – Creating an enabling environment for continued transformation	Sub-component 3.1 – Improving information and awareness raising campaigns	3.55	<u>million USD (\$)</u>	394	Million PKR	3.22	0.10	0.23	<u>million USD (\$)</u>
	Sub-component 3.2 – Supporting policy implementation by federal and provincial governments	1.24	<u>million USD (\$)</u>	139	Million PKR	1.08	0.08	0.08	<u>million USD (\$)</u>
	Sub-component 3.3 – Developing services that enable farmers to adopt climate resilient practices	0.96	<u>million USD (\$)</u>	106	Million PKR	0.91	0.02	0.03	<u>million USD (\$)</u>
Project management		2.16	<u>million USD (\$)</u>	239	Million PKR	1.30	0.43	0.43	<u>million USD (\$)</u>
Total project financing		47.69	<u>million USD (\$)</u>	5,281	Million PKR	34.99	8.00	4.70	<u>million USD (\$)</u>

B.2. Project Financing Information						
	Financial Instrument	Amount	Currency	Tenor	Pricing	
(a) Total project financing	(a) = (b) + (c)	47.69	million USD (\$)			
	(i) Senior Loans	0	Options	() years	() %	
	(ii) Subordinated Loans	0	Options	() years	() %	
	(iii) Equity	0	Options		() % IRR	
	(iv) Guarantees	0	Options			
	(v) Reimbursable grants *	0	Options			
(b) GCF financing to recipient	(vi) Grants *	34.99	million USD (\$)			
	<p>* Please provide economic and financial justification in section F.1 for the concessionality that GCF is expected to provide, particularly in the case of grants. Please specify difference in tenor and price between GCF financing and that of accredited entities. Please note that the level of concessionality should correspond to the level of the project/programme's expected performance against the investment criteria indicated in section E.</p>					
	Total requested (i+ii+iii+iv+v+vi)	34.99	million USD (\$)			
(c) Co-financing to recipient	Financial Instrument	Amount	Currency	Name of Institution	Tenor	Pricing
	Grant	8.00	million USD (\$)	Punjab Gvt		
	Grant	4.70	million USD (\$)	Sindh Gvt		
(d) Financial terms between GCF and AE (if applicable)	Lead financing institution:					
	* See Section I. Supporting documents for Funding Proposal, cofinancing letter of commitment.					
	In cases where the accredited entity (AE) deploys the GCF financing directly to the recipient, (i.e. <u>the GCF financing passes directly from the GCF to the recipient through the AE</u>) or if the AE is the recipient itself, in the proposed financial instrument and terms as described in part (b), <u>this subsection can be skipped</u> .					
	If there is a financial arrangement between the GCF and the AE, which entails a financial instrument and/or financial terms separate from the ones described in part (b), please fill out the table below to specify the proposed instrument and terms between the GCF and the AE.					
	Financial instrument	Amount	Currency	Tenor	Pricing	
	Choose an item.	Options	() years	() %	
B.3. Financial Markets Overview (if applicable)						
Not applicable						

C.1. Strategic Context¹

Pakistan's Vulnerability to Climate Change – Agriculture in the Indus River Basin

1. **Pakistan was ranked 7th, just after the Philippines and Bangladesh, on the 2017 Global Long-Term Climate Risk Index published by German Watch and it is expected to be severely impacted by the negative effects of climate change in the future.** Much of the country's vulnerability is linked to its dominant arid to semi-arid climate, as well as its high dependency on a single river system and snow and glacial meltwater for the supply of water for agriculture. Agriculture consumes roughly 90 percent of all available fresh water supplies. It employs more than 40 percent of the labour force, produces more than 90 percent of the country's food supply and generates 75 percent of the country's export revenues. The agricultural sector is the second largest contributor to the national Gross Domestic Product (19.5%). In the context of a changing climate, the nexus between water and agriculture is of primary importance for Pakistan as a country.

2. **About 94 percent of the surface dedicated to agriculture in Pakistan is irrigated agriculture, and about 90 percent of the country's agriculture in terms of land area takes place in the Indus River Basin.** The Indus River Basin is home to the world's largest contiguous irrigated area comprised of 60 000 km of canals that irrigate 18 million ha. Agriculture in the Basin is governed by a complex set of interactions involving the timing and volume of meltwater discharge from snow and glacial sources, patterns and location of precipitation and agricultural seasonality. Water in the basin comes from three major sources: (i) monsoonal rainfall; (ii) melting of seasonal snowfall; and (iii) glacial ice, with the release of water from snowmelt and the more than 5 000 glaciers providing 60-75 percent of the total flow. From the peaks of the Hindu Kush-Karakoram-Himalaya at over 8 000 meters, water in the Indus travels over 3 000 km in its passage to the Indian Ocean. The expanse of this irrigated surface, the arid nature of the region (150-250 mm average precipitation per year), and the dominant sources of water (snow and ice melt) define both the Indus Basin's exposure and sensitivity to climate change.

Climate Change Scenarios and Impacts

3. **Various emission scenarios predict that climate change will have an increasingly serious effect on the hydrology of the Indus Basin, largely as a result of rising temperatures and changing patterns of precipitation.** Rainfall in the basin is projected to increase, although the amount of increase exhibits large variability both spatially and temporally. Temperatures in the basin have already increased 0.6 °C over the past century and are projected to increase a further 3–9 °C by 2100,² above the global average, with a higher rate of increase occurring in the winter months and in mountainous Northern areas that are the source of most meltwater discharge (Ikram et al., 2016).

4. **Analysis of available research data indicates that climate change, manifested through significant temperature increases and uncertain changes in precipitation, will impact the Indus River Basin hydrology and agriculture in numerous ways.** A detailed overview of these climate change projections and anticipated impacts – drawing on available literature and additional analysis done by FAO – is outlined in Section II-3 of the Feasibility Study and its Appendix 2. Seven of these impacts can be considered to be especially important determinant factors. They are briefly summarised below and elaborated in more detail in the Feasibility Study.

- **First, temperature increase will shift the proportion of precipitation falling as snow versus rainfall.** The proportion of precipitation falling as rain is expected to increase from 58 percent (1971–2000) to between 66 percent and 75 percent in 2071–2100 (Palazzi et al., 2014; Lutz et al., 2016). This shift is of particular concern given the basin's reliance on snowmelt for the slow replenishment of river flow during the agricultural season.

¹ Contributors to the Funding Proposal and the Feasibility Study included: Gulzar Ahmad, Mehwish Ali, Faizul Bari, Jennifer Braun, Asad Butt, Ashraff Chaudhary, Zhijun Chen, Cora Dankers, Mina Dowlatchahi (FAO Representative), Muhammad Ali Durrani, Alessandra Gage, Takayuki Hagiwara (Team Leader), Nasar Hayat (Assistant FAO Representative), Ana Heures, Muhammad Jam, Aisha Jatta, Ahmed Javed, Hideki Kanamaru, Banaras Khan, Shakeel Khan, Zohra Khanum, Matthias Leitner, Nazar Mahar, Mumtaz Mangi, Giulio Marchi, Ghulam Murtaza, Arif Nadeem, Junko Nakai, Obinna Ogboso, Chase Palmeri (Assistant Team Leader), Abdul Wajid Rana, Nicholas Ross, Abdullah Saqib, Asif Shah, Ashfaq Sheikh, Brent Simpson, Gerard Sylvester, Robina Wahaj, Louise Whiting, Bingfan Wu, Munazza Zia.

² This range accounts for the various GCMs and RCPs used for this analysis (see Appendix 2 of the Feasibility Study for more detail).

- **Second, temperature increase will cause snow and glacial melting to start earlier and continue later** each year, augmenting stream flow in the early spring and autumn – an increase in flow that is out of sync with the agricultural calendar.
- **Third, temperature increase is projected to significantly reduce glacial extent** by 2071–2100, eventually reducing the contribution of glacial melt and therefore total water availability across the entire basin (Lutz et al., 2016).
- **Fourth, the location and timing of water availability within the Basin will shift**, with the availability in upstream sub-basins of Hunza, Shigar and Shyok increasing, and the availability in lower altitude sub-basins decreasing, with more acute decreases from spring through to mid-summer (Ali et al., 2015; Lutz et al., 2016).
- **Fifth, temperature increase will increase basin-wide evapotranspiration and decrease diurnal temperature range, resulting in increased crop water requirements.** A study using the CROPWAT model for the major crops and evapotranspiration projections by Pakistan Meteorological Department (PMD) estimated that a +3 °C increase in temperature would result in agricultural water requirements increasing by 6 percent by 2025 and 12–15 percent by 2050 (Amir and Habib, 2015). This translates into increased demand of more than 10 Billion Cubic Meters (BCM) of additional water required to sustain crops by 2050.
- **Sixth, temperature increase will decrease crop yields by** between 6–12 percent for cereal crops, and 5–13 percent for vegetables and tropical fruits by 2050, and will begin crossing critical thresholds in crop tolerance to high temperatures. Crops are particularly sensitive to temperature extremes above or below a certain threshold. An analysis of temperature-based extreme indicators projects that Punjab will experience a larger rate of increase in the number of days with maximum temperatures above 25 °C than other parts of the country (see Appendix 2 of the Feasibility Study for more detail).
- **Seventh, there is an increased risk of extreme weather events.** Due to the highly uncertain nature of precipitation projections and the complex hydrological regime in the Indus Basin, it is difficult to predict the frequency and severity of future floods and droughts. However, FAO's analysis of historical climate data finds a higher frequency of very heavy rain days, particularly in the rainy season, increasing the risk of excess rain and floods (see Appendix 2 of the Feasibility Study for more information).

5. **These changes will significantly impact the yields of the main staple crops grown in the Indus Basin: cotton, wheat, rice and sugarcane.** Baseline (climate-vulnerable) agricultural production in the Indus Basin is described in more detail in Section C.2 (below). A more detailed analysis of how these cropping systems are likely to be affected by the aforementioned climate change challenges is outlined in Section II-4 of the Feasibility Study.

6. **The impacts of climate change on agriculture could also have serious socio-economic implications for the 158 million rural and urban people living in the Indus Basin.** 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. Smallholders are most vulnerable to the impacts of climate change due to their lack of assets to buffers shocks and limited access to the information, new technologies, finance and government services needed to undertake adaptive actions. Repeated shocks could also aggravate existing social inequalities and access to resources, which can in turn intensify social friction leading to instability, conflict, displacement of people and changes in migration patterns.

7. **In recognition of the threats that climate change poses to the country's economy, the Ministry of Planning, Development and Reforms explicitly proposed to 'climate-proof economic growth from the impacts of climate change, paying particular attention to the agricultural, water and energy sectors'** in its key planning document, the Pakistan Framework for Economic Growth developed in 2011. Towards this goal, the Government issued a National Climate Change Policy (NCCP) with an emphasis on agricultural development in 2012. At the 22nd Session of the Conference of the Parties (COP22) to the UN Framework Convention on Climate Change (UNFCCC) in 2016, Pakistan highlighted its National Climate Change Policy, its National Disaster Risk Reduction Policy, and its commitment to the Sustainable Development Goals (SDGs) as key parts of its development agenda. Subsequently in 2017, the Government approved the Pakistan Climate Change Act with provisions for the Pakistan Climate Change Council headed by the Prime Minister.

8. **In response to these climate change threats, several measures are needed to sustain agricultural production and enable sustainable growth of the sector in a manner that reduces poverty, increases resilience and achieves food and nutrition security.** These are presented in a schematic diagram of the theory of change of this project (see Attachment 3), which summarises how the project addresses barriers that are currently inhibiting the transition to a climate-resilient pathway for Indus Basin agriculture. The first and most important step is to enable Pakistan to rationally manage its water resources in a changing climate, which requires expanding and strengthening the country's capacity to continually measure, monitor and model its hydrologic systems taking into account the impact of climate change. The country's agriculture is extremely dependent on surface water systems predominantly fed by snow/glacial sources, which account for more than 50 percent of water flow. These systems are highly vulnerable to rising temperatures. The near certain continued rise in temperature, and the likely combined and synergistic effects that this will trigger, make critical the availability of timely, robust and accurate information upon which to base decisions and carry out long-term water use planning that will affect the future of the entire nation. The impacts of a changing climate on Indus Basin hydrology will make such information services and systems an essential pillar of Pakistan's broader effort to adapt to climate change. As the principal water users in the Indus Basin, farmers must also begin to shift towards the use of water-conserving technologies and practices, transitioning toward cropping systems, practices and varieties that are capable of thriving in new and evolving climate regimes. To support this transition, public and private stakeholders in the agricultural sector will require enhanced awareness of climate change risks and adaptation needs/options. Similarly, information needed to make important adaptation and investment decisions must become readily available, and be provided in appropriate forms. The links between these actions and the seven key climate change impacts & challenges outlined above are summarized in the table below.

Table 1. Key climate change impacts, associated challenges and immediate response measures needed

Key climate change (CC) impacts identified by the project	Major challenges associated with key CC impacts	Immediate response measures needed
1) Temperature increase will shift the proportion of precipitation falling as snow versus rainfall.	Indus Basin stakeholders who manage and use water for agriculture must contend with:	Support Indus Basin stakeholders – particularly relevant government authorities – to adopt cutting-edge systems to measure, monitor and model water resources, and build their capacity to use such systems to inform policy, investment and farm management decisions.
2) Temperature increase will cause snow and glacial melting to start earlier and continue later each year.		
3) Temperature increase will significantly reduce glacial extent by 2071-2100.		
4) The location and timing of water availability within the Basin will shift.		
5) Temperature increase will increase basin-wide evapotranspiration and decrease diurnal temperature range, resulting in increased crop water requirements.	Farmers (and their farming systems) must contend with:	Support farmers to adopt cropping systems, practices and varieties that:
6) Temperature increase and associated heat stress will decrease crop yields.		
7) There is an increased risk of extreme weather events (droughts, floods).		

C.2. Project / Programme Objective against Baseline

9. **The project objective is to increase resilience to climate change among the most vulnerable farmers in the Indus Basin and to strengthen government's capacity to support communities in adapting to climate change.** The project outcomes that will result in the achievement of this objective are:

- Strengthened institutional and regulatory systems for climate-responsive planning and development (A5.0)
- Increased generation and use of climate information in decision making (A6.0)
- Strengthened adaptive capacity and reduced exposure to climate threats on-farm (A7.0)
- Strengthened awareness of climate change threats and risk reduction processes (A8.0)

10. These are directly aligned with the outcomes of the GCF Adaptation Performance Measurement Framework, as numbered above.

Baseline Agriculture, Support Services and Livelihoods in the Target Districts

11. The project area is composed of the districts of Dera Ghazi Khan, Khanewal, Lodhran, Multan and Muzaffargarh in Punjab Province, and Badin, Sanghar and Umer Kot in Sindh. The vulnerability to climate change of households, natural resources and socio-economic conditions in the project area at baseline is high. The project area was defined and drawn up expressly to include the most vulnerable districts within the Indus Basin considering the vulnerability of the people and their agricultural systems.

12. The number of vulnerable households in the project area is estimated at 2.6 million, with a total of about 16.1 million rural people living in the 8 targeted districts. **Their vulnerability to climate change is partly a function of their poverty. About 39 percent of the households in the Punjab project districts fall into the lowest quintile in terms of wealth. The corresponding figure in Sindh project districts is about 49 percent.** This is high by national standards. According to the National Nutrition Survey (2011), Sindh is the poorest and most food-deprived province in Pakistan. In this 2011 survey, about 72 percent of Sindh households were classified as food insecure, of which over 50 percent experienced moderate or severe hunger. In Punjab, almost 60 percent of households were classified as food insecure, of which 27 percent experienced hunger. Data from the Punjab Bureau of Statistics show that in 2016, about 55 percent of the population in the five Punjab districts targeted by this project were severely to moderately underweight. Literacy is low overall in the districts targeted by this project, at 46 percent in Punjab and 34 percent in Sindh. Literacy rates are particularly low among women, at only 33 percent in Punjab and 16 percent in Sindh. The absence of children from school remains a problem throughout both provinces. About 20 percent of children in Punjab and 43 percent of children in Sindh are working in the form of child labour – considered detrimental to children according to the International Labour Organization (ILO) and the United Nations Children's Fund (UNICEF) definitions – or are combining work and school.

13. **In the project area, an estimated 63-85 percent of farmers work small farms. This is defined as less than 5 acres (2.0 ha) in Punjab and less than 12 acres (4.9 ha) in Sindh. Sharecropping arrangements are most common on small and medium-sized parcels of land in Pakistan** and usually provide the landowner with half of the total production, although arrangements are reported to vary with the provision of inputs. Productivity of sharecropped land is generally reported to be about 20 percent lower than owner-operated land, and decision-making on production matters by sharecropping farmers can be quite limited. Most farmers in the project area are landless or near landless tenant farmers, with only 35.8 percent of farmers in Punjab and 22.7 percent in Sindh reported to own agricultural land. However, the majority of households – 62.5 percent in Sindh and 59.2 percent in Punjab – own some livestock, typically 1-2 animals including cattle, buffalo, sheep or goats.

14. **Farming work is done by both men and women**, and can involve landowners and tenants as well as general labourers not living on the farm. Both men and women practice integrated farming as a main source of livelihood. Livestock, agriculture and agroforestry play an important role in the daily livelihoods of the people. Women are generally not considered to be farmers despite their widespread presence in farming work. In terms of the division of farm labour, men generally manage any pesticide use, machinery, and on-field irrigation, whereas women focus more frequently on planting, in particular sugarcane, as well as harvesting crops, especially cotton. Women generally do not have ownership over their own productive assets and rarely access household income derived from their labour inputs to farm work.

15. **The total cropped area of the eight districts is about 3 million hectares, which is equivalent to about 60 percent of the total area (about 5 million hectares) in the target districts.** Wheat, rice, cotton and sugarcane are among the most common crops grown in the targeted districts. A detailed overview of the predominance of these crops within each of the eight project districts is included in Section III of the Feasibility Study.

16. **Agricultural development in the Indus Basin is shaped by a range of extension and advisory services.** Provincial agriculture departments bear primary responsibility for extension services. Extension methods continue to rely predominantly on traditional, top-down and technology-driven approaches. Provincial agriculture departments also include On-Farm Water Management wings that provide important extension and advisory services to farmers related to water management. Large inputs companies, NGOs and a range of other non-state actors also provide extension and advisory services. However, outreach to vulnerable smallholder farmers has been limited, in part because of staffing constraints among some service providers. Additional information about extension services (and gaps therein) is included in Section III of the Feasibility Study, as well as Appendix 14, *Options for Extension and Advisory Services to Disseminate Improved Practices*.

17. **The availability of financial services also has a significant bearing on patterns of agricultural development in the Indus Basin.** In 2016-17, the formal banking sector in Pakistan disbursed about USD 6.4 billion in agricultural credit. The State Bank of Pakistan – a key actor in this area – has set a target of USD 9 billion in agricultural credit disbursement in the upcoming financial year. While agricultural credit provided through the formal sector reaches around 3.27 million farmers across Pakistan, small and vulnerable farmers – who comprise a large share of the agricultural producers in the Indus Basin – encounter difficulties in accessing credit on favourable terms. Instead, many smallholders continue to rely on (often exploitative) middlemen, who are often among the few available sources of credit for remote smallholder farmers perceived as high risk by the formal banking sector. Additional information about financial services for agriculture in the Indus Basin is included in Section III of the Feasibility Study, as well as Appendix 16, *Financial Services and the Enabling Environment*.

18. **Within the eight target districts, baseline agriculture and on-farm water management practices leave the production of predominant crops highly sensitive to the anticipated impacts of climate change.** Particularly problematic are increasing temperatures and changing hydrological conditions, which will reduce soil moisture and increase heat stress on crops. Additionally, increasingly variable and unpredictable weather will increase the risk of crop failure. As ranked by the National Drought Monitoring Centre in PMD, taking into consideration the magnitude, duration, intensity, severity and frequency of drought experienced to date, all project area districts have a very high exposure to drought and flood risks. Sanghar in Sindh, and to a lesser extent Muzaffargarh in Punjab, are especially prone to flooding judging by available global flood map data from the European Commission. These challenges are not limited to farmers living in the eight target districts; they apply to agricultural production throughout the Indus River Basin. Given the importance of these cropping systems for livelihoods and food security in the Indus Basin – as well as their central role in Pakistan's economy and food security – there is an urgent need to support farmers to transition away from current baseline approaches and toward climate resilient alternatives.

A Climate Resilient Development Pathway for Indus Basin Agriculture

19. **As part of Pakistan's broader effort to adapt to a changing climate, there is a pronounced and urgent need for farmers in the Indus Basin to adopt agricultural and on-farm water management practices that are more resilient to the anticipated impacts of climate change.** Given the baseline crops and practices that currently predominate in the Indus Basin, as well as their specific vulnerabilities, an initial set of climate resilient cropping systems and practices has been identified as offering important adaptation benefits while also being financially viable – thus increasing the likelihood of adoption and sustainability. These cropping systems and practices, as well as the technical justification for supporting them, is summarised in Section F.2 and explained in detail in the Feasibility Study Appendix 13, *Climate Resilient Agriculture in Pakistan – Selected Practices*. As outlined in Section C.3 (see sub-component 2.1), the project will also work with subject matter specialists, research institutes and universities at project start-up to refine the types of cropping systems and practices to be supported through the project, ensuring all supported practices are ideally suited to the agro-ecological conditions in the target districts.

20. **Enabling sustained and widespread adoption of climate-adapted agriculture and water management practices throughout the Indus Basin also requires working beyond the farm level.** Public sector planning and

support is essential to changing behaviour and practices in agriculture. Similarly, public and private providers of extension, advisory, financial and other support services play a key role in shaping patterns of agricultural investment and development. At present, these entities not only face barriers that prevent them from mainstreaming climate change into their support and operations (further described below), but must also contend with the fact that climate change impacts on agriculture and water in the Indus Basin are extremely complex and will vary over time. There is also a high degree of uncertainty in current climate change projections and models, particularly with regards to medium- and long-term impacts. Any effort to support widespread adaptation in the Indus Basin must address these challenges. The Theory of Change (see Attachment 3) shows how the project will do this along three lines. First, it will equip government and other stakeholders with the information services, systems and capacity needed to continuously monitor and assess climate change risks and adaptation needs, and translate these insights into action on the ground. Second, it will work with farmers and extension services to build on-farm resilience. Third, it will improve the enabling environment to ensure agricultural advisory, financial and support services facilitate the necessary changes in behaviour and practices at farm level.

21. **In responding to the above-mentioned needs, the proposed project aims to go beyond achieving a one-off impact to catalyse a broader process of sector transformation in the Indus Basin.** It will initiate this process of transformational change by directly supporting farmers, government and other stakeholders to respond to short- and medium-term climate change challenges on the ground, while also equipping government and other stakeholders with the systems, services and capacity needed to sustain and scale up this sector transformation beyond project closure.

Barriers to adaptation

22. **There are a number of barriers preventing stakeholders in the Indus River Basin from adapting to the climate change threats that Pakistan faces.** There is a lack of integration of information and analytical tools on climate, water and agriculture. Responsibilities for hydrologic information collection, monitoring and communication are spread across different ministries, water management entities and research institutions. These include the National Ministry of Water Resources, Water and Power Development Authority, Indus River System Authority, National Disaster Management Authority (and Provincial Disaster Management Authorities), Provincial Irrigation and Drainage Authorities, Flood Commission of Pakistan, and Provincial Irrigation Departments. Limited coordination across institutions hampers the effective and efficient management of the country's most critical natural resource. Agricultural water use at the farm level has historically been difficult to regulate due to outdated policies, limited integration of water monitoring efforts and subsequent enforcement and lack of information. A broader set of policy and institutional issues and weaknesses have further impeded the transition toward climate-resilient agriculture and water management in the Indus Basin (as explained in Appendix 17 of the Feasibility Study).

23. **Another barrier is posed by the fact that, at the provincial level, agricultural extension suffers** from insufficient numbers of personnel, lack of a proven mechanism to reach the vast number of farmers, and a very low ratio of female agriculture extension staff to support women. In addition, current extension personnel possess an inadequate understanding of climate change threats and responsive practices and technologies that are suitable for local contexts. Extension service providers lack policy-to-practice guidelines and know-how for mainstreaming and disseminating the modest climate change information they have. Nor are they sufficiently aware of or equipped to deal with the effects of climate change on the vulnerable groups of society, who require support specifically tailored to them. Limited mobility of extension staff is also an issue.

24. **Private sector operators, including input suppliers, traders and financial service providers also face barriers to change.** These entities are increasingly aware of growing constraints linked to climate change. They have also shown signs that they are willing to respond. However, market signals for technologies that would facilitate adaptation are weak, again due to limited information and uncertainty. Farmers themselves are observing and seeking to respond to climate change impacts but have little knowledge of what to expect in the future and what their options might be. They have limited access to climate-focused information and little understanding of adaptation opportunities in light of the climate information that is available to them from direct experience or from other stakeholders.

Complementary baseline projects

25. **The Punjab and Sindh provincial governments are making a concerted effort to address development issues related to water, agriculture and poverty reduction, in part through projects financed with development**

assistance. The proposed GCF project has been designed in consultation with responsible provincial-level government staff implementing those projects to provide technology and software that will be complementary. Its outputs – including information resource materials, public services and skills – will increase the benefits from those larger scale infrastructure investments by making them more responsive to climate change. The most important projects include: (i) the Punjab Irrigated-Agriculture Productivity Improvement Project (PIPIP), which is working to improve the productivity of water use in irrigated agriculture projects; (ii) the Sindh Water Sector Improvement Project (SWSIP), which aims to improve the efficiency and effectiveness of irrigation water distribution through key hydraulic works; and (iii) the Sindh Irrigated Agriculture Productivity Enhancement Project (SIAPEP), which seeks to improve irrigation water management at tertiary and field levels. The proposed GCF project will also complement on-going work in the provinces on specific crops such as the Better Cotton Initiative being implemented with support from WWF; on poverty reduction such as the Strengthening Markets for Agriculture and Rural Transformation (SMART) in Punjab; and the Sindh Agricultural Growth Project focusing on productivity, market access and value chains. For more detail on these projects, see Attachment 7.

Without project scenario

26. **By supporting stakeholders in the Indus Basin to be more resilient, the proposed project will enable Pakistan to mitigate the negative impacts of climate change that would otherwise undermine agriculture, food security and rural livelihoods in a ‘without project scenario’.** Without the proposed support, agricultural production throughout the Indus Basin will remain poorly equipped to cope with the cascading impacts of climate change on the Basin’s already complex and sensitive hydrology. Shifts in the timing and availability of water, as well as projected increases in crop water requirements, could significantly undermine agricultural yields and livelihoods unless government and other stakeholders are equipped to monitor these challenges and mount an appropriate response. Without support for the adoption of climate-resilient cropping systems and practices, biophysical impacts of climate change on crops (i.e. increasing temperatures and heat stress) could lead to declines in yields for essential staple crops. This could have severe and far-reaching implications for food security and rural livelihoods throughout the Indus Basin, which is already characterised by high levels of poverty, food insecurity and malnutrition. The corresponding impacts at the macro level could also be significant. In the absence of significant investments in adaptation, several studies indicate that climate change will steadily undermine Pakistan’s trade position, as well as its overall GDP, agriculture GDP and household income. More information is available in Section II-4 of the Feasibility Study.

C.3. Project / Programme Description

27. The project is composed of three technical components, which are described in more detail below. The project area and beneficiary selection process and criteria are described at the end of Section C.3.

1. **Enhancing Information Services for Climate Change Adaptation in the Water and Agriculture Sectors.**
2. **Building on-Farm Resilience to Climate Change.**
3. **Creating an Enabling Environment for Continued Transformation.**

Component 1: Enhancing Information Services for Climate Change Adaptation in the Water and Agriculture Sectors.

28. The purpose of this component is to develop capacity in Pakistan to use state-of-the-art technology to cope with climate change and its impact on agriculture and water management through better monitoring, analysis, and dissemination of information on climate, water and agriculture. It is aligned with GCF outcome A6.0 ‘Increased generation and use of climate information in decision making.’ The investments, activities and training under this component are urgently needed to upgrade the available information and its use in responding to the ways that a changing climate is affecting agriculture and water management. The complex impacts of climate change on Indus Basin hydrology make such information services and systems an absolute necessity for Pakistan. The component is designed to make adaptation to climate change more effective by providing real time data and making it readily available to people making decisions about the distribution and use of resources in light of climate change. The use of digital technologies, remote sensing and collaborative compilation and sharing of data, information and knowledge under this component are part of the *e-agriculture* approach through which this project aims to utilize Information and Communication Technologies (ICT) to support adaptation to climate change in agriculture and water management.

29. Under this component, the project will provide a range of support to build government capacity to master key technologies – those involved in the Activities under sub-components 1.1-1.3, as described below – to enable them to monitor climate change and its impacts on water and agriculture. Importantly, each activity under this component will not only help establish/strengthen key systems and technologies, but will also train about 30 national experts (including from

the Agriculture and Irrigation Departments in Punjab and Sindh, SIDA, PMD, PCRWR, and relevant universities/water centres) to build their capacity to use/apply such systems and technologies during and after the six-year project implementation period. Under this Component, technical assistance will be provided to the Professional Beneficiaries, through training and implementation support to be provided by FAO staff and international consultants procured by FAO. The component is comprised of three sub-components:

1.1: Developing a Water Accounting System.

1.2: Establishing an Evapotranspiration (ET) based Water Management System.

1.3: Improving Availability and Use of Information Services.

Sub-component 1.1: Developing a Water Accounting System.

30. The outcome of this sub-component will be that relevant institutions in Pakistan are using a scientifically sound national water accounting system at basin, province, and canal system levels that is compliant to international standards and based on satellite technology and ground measurement.

Activity 1.1.1: Develop and establish a water accounting system, including the equipment needed to operate this system in two canals. The project will support the development of a water accounting system for the Indus Basin carried out after consultation with the Ministry of Water Resources (MoWR) and the Indus River System Authority (IRSA). Four water accounting assessments will be undertaken (two in each province) at province and canal command level using a methodology defined through an existing FAO-led Technical Cooperation Programme (TCP) project.³ In Punjab, the Department of Irrigation, and in Sindh the Department of Irrigation with SIDA will carry out provincial water accounting at lower resolution (250–500 m images) with support from the PCRWR. This will include the procurement and installation of acoustic water level sensors in two canals to assess discharges entering canals, and be connected with operational telemetry systems displaying data in IRSA and PCRWR offices. Water accounting results and all technical and reference materials related to the system will be made available online on concerned agency websites and be accessible through the Agri-Climate Water (ACWA) Portal, described below in sub-component 1.3. The two canals that have tentatively been selected are Khipro canal in Sindh and Lower Bari Doab canal in Punjab. This selection will be validated during the inception phase of the project to ensure full alignment with the latest government priorities.

Activity 1.1.2: Conduct risk-based assessments of aquifer vulnerability, and procure and install automatic groundwater level sensors to enable continued monitoring. For more proactive aquifer management, the project will undertake a set of risk-based assessments of aquifer vulnerability to depletion and salinization in the Project Area based on hydro-geological mapping and improved monitoring and modelling of the anticipated impacts of climate change. The project will procure and install 20 automatic groundwater level sensors in four districts (Khanewal and Dera Gazi Khan in Punjab, and Umer Kot and Sanghar in Sindh) connected with already operational telemetry systems managed and operated by PCRWR and IRSA. It will also train relevant national experts (including from the provincial Departments of Agriculture and Irrigation in Punjab and Sindh, as well as SIDA) to conduct these assessments, to be used in deployment of precision-based irrigation techniques and complement aquifer management to reduce pumping intensities and skim freshwater lenses in aquifers otherwise vulnerable to saline intrusion.

Activity 1.1.3: Support the development of local aquifer management plans and participatory aquifer management at field level. The results of the aquifer assessments undertaken in Activity 1.1.2 will be used to develop local aquifer management plans in the districts of Khanewal and Dera Gazi Khan in Punjab, and Umer Kot and Sanghar in Sindh. Under this activity, the project will also promote a participatory approach to groundwater monitoring and management whereby farmers will be trained in hydrology monitoring, including provision and training in the use of piezometers and associated data collection, recording and analysis (“Aquifer Management Plan Beneficiaries”). These Aquifer Management Plan Beneficiaries will be selected by FAO among the Farmers Beneficiaries in accordance with the following two additional eligibility criteria:

- 1) Farmers must be located in close proximity to one of the vulnerable aquifers for which a management plan is developed; and

³ FAO- TCP project: “Accounting of water for improved management of water resources (TCP/PAK/3606).”

2) Farmers must possess basic reading and writing skills, as they will be required to use piezometers, collect data and perform basic analysis of this data.

They will be assisted in developing groundwater management action plans to preserve the critical buffering function of aquifers in coping with the extreme events predicted to increase in intensity and frequency with climate change. For Aquifer Management Plan Beneficiaries, training will be combined with support for Climate and Business Field Schools (CBFSs) under Activity 2.3.1 at the areas identified in Activity 1.1.2.

Sub-component 1.2: Establishing an Evapotranspiration (ET) based Water Management System

31. The outcome of this sub-component is that PMD, PCRWR and the Departments of Irrigation in both Punjab and Sindh and SIDA will have the capacity to implement and use a robust evapotranspiration (ET)-based system for monitoring of actual water consumption in agriculture. This will permit these entities to rationalise the distribution of increasingly variable water resources according to actual crop water requirements.

Activity 1.2.1: Develop and deploy an ET monitoring system. This activity will procure and set up the software needed to generate actual ET information at PMD, PCRWR, and the Departments of Irrigation in Punjab and Sindh. The activity will also calibrate and validate this software using a combination of freely available satellite imagery from NASA, ESA and other space agencies, as well as data from flux instruments and automatic weather stations, including those to be procured and installed under this Activity. The software will generate ET information at basin scale using low-resolution remote sensing images (250-1000m), as well as higher resolution sensing images (30m or 10m) in two selected canal command areas (the same canals supported in Activity 1.1.1) – one in each province.

Activity 1.2.2: Design, develop and build capacity to use ET-based water management software applications/tools to guide planning at policy and field levels. Once the ET monitoring system is fully validated by FAO under Activity 1.2.1, this activity will finance the development of ET software applications to use the ET monitoring data. The project will provide technical assistance for the design and development of the ET-management software applications. It will also provide training to the Departments of Irrigation, as well as Departments of Agriculture in Punjab and Sindh with SIDA to use the tools in collaboration with the Area Water Boards, Farmer Organizations and Water User Associations to use the data generated from the system to understand and supervise water distribution according to water consumption patterns. The ET-management software will be used to: (i) determine near real-time crop water requirements; (ii) plan crop pattern adjustments for increasing water productivity and efficiency; (iii) optimise water allocation for major canal and sub-canals according to crop requirements; and (iv) supervise water withdrawn and consumed at each farm or outlet.

Activity 1.2.3: Strengthen the network of agrometeorological stations in the Project Area by installing and upgrading stations. To improve the accuracy of weather data collection and analysis as well as use of ET monitoring data, water accounting, and irrigation planning, but also to upgrade the existing early warning systems for floods and droughts, the project will procure and install six new agrometeorological stations that include lysimeters, and upgrade two existing weather stations (by procuring and installing lysimeters), to serve the project districts and improve the currently scant coverage for the Basin overall. The locations to install these stations have been selected. One new station (with lysimeter) will be installed in each of the following districts: Muzaffargarh, Lodhran, Multan, Dera Gazi Khan, Khanewal, and Sanghar. Meanwhile, one existing station will be upgraded (i.e. procurement and installation of lysimeters) in each of the following districts: Badin and Umer Kot.

These agrometeorological stations will be connected to the already existing network of weather and hydro-met stations in the country, mostly operated by the PMD. The information generated by these stations will be shared with stakeholders working on the early warning system, and irrigation advisory services.

Sub-component 1.3: Improving Availability and Use of Information Services.

32. The outcome of this sub-component will be that real time data and analysis are readily available to the people facing the consequences of climate change in the Indus River Basin, and that those people have the capacity to use the information, tools and knowledge made available. Climate change related information in the country is abundant but

fragmented among many different agencies, varies in analysis and is poorly coordinated. The objective of this sub-component is to make adaptation to climate change possible by providing real time data and analysis and ensuring the results of this analysis are readily available to the people who are making decisions about the allocation and use of resources, including policy-makers, irrigation scheme managers and farmers. The results of this sub-component will directly support sub-component 3.2 on policy implementation.

Activity 1.3.1: Train Professional Beneficiaries in the water and agriculture sectors to use IT tools to inform planning and decision-making related to climate change, agriculture and water. The project will introduce a series of IT tools that have been developed by FAO and are freely/readily available, and which will enable professionals working in Pakistan to better monitor and analyse climate change and its impacts. To introduce these tools, the project will train personnel from (at least) MoCC, PMD, GCISC, and the Departments of Agriculture and Irrigation in Punjab and Sindh on how to use these tools (about 30 people trained on each tool). The project will then support these individuals to form working groups to support one another and share lessons. In addition, the project will supervise the finalization and validation of the analysis done using these tools to generate information that is relevant to the local context and can be applied to inform future policy, planning and service delivery. Four tools have been pre-identified by FAO, though others may also be considered. The first is the Agriculture Stress Index System (ASIS), an earth-based observation system designed to enhance early warning systems with global near-real-time information on drought. It will be used to improve communication of early warning to farmers in Components 2 and 3. The second is the Collect Earth and Collect Mobile tool that can be used to produce assessments of land-use changes over time through the monitoring of sample plots. The third is Earth Map, which can generate spatially-explicit climate risk assessments based on past weather and satellite observation data using environmental and climate parameters available in the Google Earth Engine platform. Both Collect Earth and Earth Map are created under the FAO-Google collaboration. The fourth is the Modelling System for Agriculture Impacts of Climate Change (MOSAICC), an interdisciplinary modelling system that allows users from disciplines including climatology, hydrology, agronomy, forestry and economics to evaluate the impacts of climate change on agriculture, crop productivity, river water resources, forests and the economy at large. For detailed descriptions of these tools and their uses, see Appendix 12 of the Feasibility Study.

Activity 1.3.2: Development of the Agri-Climate-Water (ACWA) Information Portal. The project will develop a portal on the internet to be referred to as the ACWA Portal. It will provide a gateway to access the above-mentioned technologies, and display data and results prepared by the project through a user-friendly dashboard. The portal will also include data generated from Component 1 on water accounting, aquifer vulnerability assessments, aquifer management, ET monitoring and ET management. It will also include all training and technical reference materials produced for practitioners and farmers developed under Component 2, as well as the contents developed for the awareness and outreach campaigns under Component 3. In parallel, the project will develop capacity to analyse and use content among policy-makers, government operations staff, irrigation scheme managers, water user associations and farmers.

Activity 1.3.3: Develop a consortium for information management and the ACWA Portal. A coordination mechanism will be set up for governance and collaboration in the operation of the portal, enlisting support from various stakeholders involved in the collection and curation of data, tools and materials to be hosted on the ACWA portal. This will take the form of a Consortium of national and provincial level stakeholders, including: the Departments of Agriculture and Irrigation in Punjab and Sindh, MoCC, PMD, GCISC, MoFSR, MoWR, PARC, NARC, PCRWR, CABI and key research institutes and universities. Training activities and other knowledge sharing events are planned and budgeted under this component to promote the use of portal tools, and contents will be held under the aegis of the ACWA Consortium for associated partners and their staff.

Component 2: Building on-Farm Resilience to Climate Change.

33. The purpose of this component is to build on-farm resilience to climate change by supporting farmers to acquire skills on climate resilient agriculture (CRA) and on-farm water management (OFWM), adopt technologies and engage with stakeholders that provide services relevant to climate change adaptation in agriculture. The component is aligned with GCF outcome A7.0 'Strengthened adaptive capacity and reduced exposure to climate threats.' It will deliver to vulnerable farmers tested pathways to climate-resilient agriculture and on-farm water management practices that draw

on experiences and lessons learned from on-going activities and previous FAO and government initiatives in Pakistan and elsewhere in the region.

34. This component will focus specifically on the eight districts targeted by this project: Dera Gazi Khan, Khanewal, Lodhran, Multan and Muzaffargarh in Punjab, and Badin, Sanghar and Umer Kot in Sindh. It will utilise the full range of both innovative and traditional outreach extension mechanisms to build on-farm resilience, drawing on more traditional face-to-face learning approaches (i.e. under Sub-component 2.3) and more innovative approaches (i.e. under Sub-component 3.1). These will include experience-based face-to-face extension approaches including demonstration plots, field schools, and field days that allow farmers to see, touch, and experiment as methods for acquiring the adaptive capacity required to be resilient. The project will demonstrate the economic benefits of adopting such practices for adaptation to climate change, in order to sustain new agriculture practices that the farmers will learn from the project. While the project will implement field schools targeting the most vulnerable farmers using its own project staff as facilitators, the project will also enter into results-oriented agreements with a number of public sector organisations, non-governmental organisations and private sector stakeholders working in the Project Area to implement extension activities using project-developed curricula. This approach will allow the project to tap into the expertise, existing networks and infrastructure of the partners. In addition, the use of ICT in extension will be undertaken to enhance the learning process and access to support services for those farmers included in face-to-face activities. The component will be comprised of the following sub-components:

2.1: Improving Practices for Climate Resilience.

2.2: Training of Trainers on CRA and OFWM.

2.3: Developing Farmers' Capacity to Transform Agriculture Practices with CRA and OFWM.

Sub-Component 2.1: Improving Practices for Climate Resilience.

35. The outcome of this sub-component will be widespread availability of up-to-date information and learning materials on agricultural and on-farm water management practices for increased resilience and more resilient producers in the Project Area. Tested CRA and OFWM have been tentatively identified through a screening of the practices and field level results reported under on-going government and donor initiatives in the Indus Basin.⁴ They include: (i) rice–wheat cropping system – direct seeding combined with alternate wet and dry rice production system with zero tillage wheat cropping; (ii) cotton–wheat cropping system – ridge sowing with zero tillage; (iii) sugarcane intercropping system; (iv) high value multiple cropping system with fallow; and (v) homestead gardening including vegetable production and agroforestry, fruit trees and animal husbandry. The final CRA and OFWM practices to be promoted through the project will be selected by FAO during project implementation through Activity 2.1.1. These will also be combined with other best farming practices to improve resilience and water use efficiency such as heat, drought and salt tolerant varieties, laser levelling, mulching, and integrated pest management, among others. Details on the compendium of practices that have been identified during project design are found in Appendix 14 – *Climate Resilient Agriculture in Pakistan – Selected Practices* of the Feasibility Study.

Activity 2.1.1: Develop and improve training materials to support adoption of CRA and OFWM practices.

At project start-up, the project will put in place arrangements with subject matter specialists, research institutes and universities (to be selected by FAO) for a final review and refinement of the identified practices for the specific sites and agro-ecosystems where extension sites/demonstration plots (selected in accordance with the description above) will be established under Activity 2.1.2. This review of practices will be completed during the first year of project implementation. Subsequently, in consultation with provincial staff of the Departments of Agriculture and the Departments of Irrigation, FAO will develop training curricula and compile, revise and update materials to be used to support farmer learning and adoption of project-promoted CRA and OFWM practices (including under sub-component 2.3), in parallel to the establishment of demonstration sites, which will also be used as the training sites for the project training staff (see Activity 2.1.2 and 2.2.2). To ensure the material is relevant and appropriate for the groups most vulnerable to climate change, women and minority farmers will be consulted and where necessary, separate materials for women and minorities will be developed. Materials will

⁴ These draw heavily on best practices developed together with farmers in the project entitled Multi-Year Humanitarian Programme in Pakistan-Pillar One Consortium for Natural Disaster Preparedness, Response and Recovery and in the project entitled Technical Support to Stakeholder Capacity Development for effective Implementation of Pakistan's National Disaster Risk Reduction Policy. Both were collaborative efforts financed by the Department for International Development of the United Kingdom (DFID) and implemented by FAO together with the Aga Khan Foundation and the National Disaster Management Authority.

include a teaser introductory video of one minute each, and full-length videos of 7-10 minutes per practice. These videos will form part of the project's *e-agriculture* strategy. The training and communication materials will also include gamified contents of the issues associated with the practice to be delivered via mobile telephones. They will also include very simple handout materials that staff may use during training activities or in connection with demonstrations or field day events. During the life of the project, materials will be reviewed regularly and refined and updated based on field experiences with farmers, new practices, new varieties, and new information from Component 1 (or others). In this regard, the role of the Provincial Project Technical Committees (described in more detail in Section C.7) will be a crucial platform to review and share new experiences for adaptation.

Activity 2.1.2: Set up project demonstration plots and support adaptive research to underpin delivery of climate-informed extension services. The project will finance the establishment of on-farm demonstration plots selected in accordance with the selection process and eligibility criteria set out above to display the key technologies on CRA and OFWM to the public. During the first year, the project will develop around 16 demonstration plots on Farmer Beneficiaries' land (with their consent) – two per district: one for CBFS and the other for WOS, to be selected after consultation with the Departments of Agriculture in Punjab and Sindh, among other stakeholders. In order to sustain the demonstration plots and ensure that circumstances are close to real farming conditions, the project will prepare and maintain them with the partner farmers. The demonstration plots will be used for training of extension workers under sub-component 2.2. The number of plots will increase each year, as farmers, stakeholders and partners are trained. Locations for plots will be selected with an aim to represent the key agro-ecological zones determined by FAO after consultation with representatives of the Departments of Agriculture in Punjab and Sindh based on their in-depth understanding of the various agro-ecological zones (and distinct conditions of these zones) in the Project Area. The project will also develop an agreement with one or more research institutions, procured by FAO in accordance with its policy, to carry out adaptive research at the demonstration plots so that the results of adaptive research can be used to improve recommended practices in time.

Activity 2.1.3: Develop a CRA and OFWM practice repository – the Pakistan Climate Agriculture Information System (PCAIS). Training materials produced under Activity 2.1.1 as well as data and analysis gathered through adaptive research under Activity 2.1.2 will be made available through the ACWA. The project will consolidate the information now available in the Pakistan Agriculture Information System (PAIS) developed by the Government of Pakistan, USDA and FAO. The project will incorporate the content of the PAIS and results of Activity 2.1.1 and 2.1.2 and upgrade it to become the Pakistan Climate Agricultural Information System (PCAIS),⁵ which will constitute a unit of the ACWA.

Sub-component 2.2: Training of Trainers on CRA and OFWM.

36. The outcome of this sub-component will be that skilled professionals working in the Project Area will be able to promote CRA and OFWM practices. The project will have a core team of 48 full-time facilitators – 6 in each district of the Project Area, procured by FAO in accordance with its procurement policy. These facilitators will conduct Training of Trainers (ToT) to develop capacity of about 1 600 extension workers, just over 200 per district (see Table 12 of the Feasibility Study). They will be trained in training methods and CRA and OFWM. As a result, they will be in a position to impart skills and conduct training of intended project beneficiaries directly reaching around 102 000 farmers during the project implementation period.

Activity 2.2.1: Train the core facilitators/staff who will lead climate-informed extension service delivery in each of the eight project districts. This Activity will train the 48 individuals (6 in each targeted district of the Project Area) who will constitute the core facilitators in the Project Area for the duration of this project ("Facilitators"). In each district of the Project Area, the Facilitators will include: (i) two Climate Business Field School (CBFS) facilitators; (ii) two Women Open School (WOS) facilitators; and (iii) two Partnership Facilitators. Under Activity 2.2.1, these individuals will be trained by subject-matter specialists. This will be a one-year on-the-job programme carried out during the first year through establishing and working on the project demonstration plots. The training will cover the technical contents of the selected practices as well as facilitation skills, farmer training curricula, CRA, OFWM, Business FFS, use of ICT, monitoring methods, and others. This staff training will be used to validate the training materials as well as the proposed CRA and OFWM technologies.

⁵ It will also share contents with the Pakistan Climate Change Portal managed by the Civil Society Coalition for Climate Change with financing from the European Union.

Activity 2.2.2: Training of Trainers (ToT) on CRA and OFWM Practices. The project full-time facilitators will conduct ToT for extension officers, staff and/or employees from Partner Organisations ("POs") that are interested in collaborating with the project and using CRA and OFWM practices in their own extension activities ("Extension Workers"). Training will be provided to Extension Workers from partner entities only if the participating entities are in agreement with the agreed outputs (number of farmers to be trained by their extension workers), the cost sharing mechanism, the project policy and the implementation procedure. As part of these agreements, the project's field staff in each district of the Project Area will train the field staff of these partners on the project's demonstration plots. Selection of government extension staff to be trained under this Activity will focus first on the Extension Workers who are active in the tehsils to be targeted by the project for direct farmer training under sub-component 2.3 (which themselves will be determined during project inception, as outlined further above). Such organisations would include: (i) government extension departments; (ii) the Rural Support Programme (RSP); (iii) non-governmental organization (NGOs); (iv) on-going projects; (v) universities; (vi) research institutes; and (vii) private sector companies including input marketing, output marketing, processing or others. This activity will start from the second year after the project is ready to launch with the 48 Facilitators who will serve as the ToT facilitators. The Extension Workers from POs trained by this project will undertake beneficiary training and demonstrations during the project implementation period through agreements that will be made with the project. This will allow the project to draw on existing resources and experienced staff in the Project Area and extend the reach of this project to producers in their networks. It will also contribute to the sustainability of the training benefits as the people doing training under agreements with this project will remain in the Project Area and will be able to carry on applying the knowledge they have to work in the sector. This will include, for example, the Punjab and Sindh government staff that are extension officers at the province level and who will be working in the Strengthening Markets for Agriculture and Rural Transformation (SMART) in Punjab, a planned follow on project to the Sindh Water Sector Improvement Project (SWSIP), both financed by the World Bank, as well as the WWF Better Cotton Initiative specifically for cotton.

Sub-component 2.3: Developing Farmers' Capacity to Transform Agriculture Practices with CRA and OFWM

37. The outcome of this sub-component will be that farmers are skilled in using CRA and OFWM practices suited to their agro-ecosystems. Sub-component 2.3 will develop the coping and adaptation capacity of Farmers Beneficiaries – predominantly poor and vulnerable farming households who are living in selected communities (to be selected during inception) within the Project Area – through: (i) CBFSs; (ii) WOSs; and (iii) Farmer Beneficiaries training by Partner Organisations (POs). The POs will be selected in accordance with FAO's procurement policy. A total of 101 600 Farmer Beneficiaries will be directly trained through this structured extension support delivered through Activities 2.3.1-2.3.3. In addition, around 148 000 farmers will be exposed to project-promoted CRA and OFWM practices through occasional visits to these CBFS and WOS sites and demonstration plots through field days organized under Activity 2.3.4 ("Field Day Farmer Participants"). As such, a total of about 250 000 farmers (sum of Farmer Beneficiaries and Field Day Farmer Participants), of whom at least 48 000 are women (about 24 000 trained through WOS organized under Activity 2.3.2 ("Women Farmer Beneficiaries"), and another 24 000 exposed to WOS under Activity 2.3.4 ("Women Field Day Farmer Participants")), will directly benefit from these capacity building activities. Trained Farmer Beneficiaries will be included in partner networks for dissemination of agriculture advisory services and early warning system alerts through mobile phone networks. The use of ICTs will be promoted to complement and strengthen the capacity of farmers to observe on the ground, deduce from observations, and apply the findings.

Activity 2.3.1: Train and support Farmer Beneficiaries to adopt CRA and OFWM through Climate and Business Field Schools (CBFS). Using the FFS approach, CBFSs will be set up using a participatory adult learning methodology where participants will observe weather, soil characteristics, plant development, costs and yield. To demonstrate the economic benefits of adopting recommended practices, the project will also develop farm management and marketing skills, numeracy and financial literacy, adopting FAO's methodology of on-going Farmer Business School projects in the country. As a part of their business development capacity, the project will also introduce participants to private sector partners that are providing services that can help them take adaptation measures and establish possible links to business opportunities in connection with multiplication of seeds needed for climate change adaptation, where FAO also has other on-going initiatives. To facilitate adoption of new practices, field schools will provide input support and production services such as the direct seeding service. Initially, the CBFS will be implemented by project staff, but from the third year onwards, more and more CBFS will be run by farmer-facilitators under the supervision of project staff. Approximately 15 600

Farmer Beneficiaries (of the total estimated 101 600 Farmer Beneficiaries) will be trained through the CBFSS organized under Activity 2.3.1.

Activity 2.3.2: Train and support Women Farmer Beneficiaries to adopt CRA and OFWM through Women Open Schools (WOS). As cultural norms make it difficult to train women and men together, an approach to learning for women in rural areas called WOSs has been successfully piloted in connection with home gardening. RSPs and NGOs have a long history of working with women in Pakistan. Using their network and existing human resources and infrastructure, the project will work with organisations to develop home gardening among participating women. Using this approach, this activity will directly train approximately 24 000 Women Farmer Beneficiaries (of the total estimated 101 600 Farmer Beneficiaries) in practices relevant to adaptation in their agricultural activities, with a strong focus on improving resilience by raising income and family health through animal husbandry, vegetable production and fruit trees. The project will support one home garden per WOS, providing initial inputs to each learning site including seeds, equipment and small livestock such as chickens and goats.

Activity 2.3.3: Training of Farmer Beneficiaries on CRA and OFWM organized by partners on their demonstration plots. This activity will be carried out by Extension Workers who have been trained under sub-component 2.2. The activity will be open to any organisations, including government extension departments, NGOs, RSPs, private sector companies, universities, research institutions and farmer organizations interested in working with the project. Partners will be given training on CRA and OFWM, under sub-component 2.2. The project will also cover demonstration establishment costs and field days costs. Partners will conduct regular (e.g. weekly) training sessions on their plots. Prior to engaging in activities, the project and partner organisations will sign an agreement with FAO outlining the curriculum to follow, training frequency, target participant numbers, cost-sharing methods and reporting obligations. Approximately 62 000 Farmer Beneficiaries will be trained through these efforts.

Activity 2.3.4: Organize field days for additional farmers to visit CBFSS, WOSs and demonstration plots to gain exposure to CRA and OFWM practices ("Field Day Farmer Participants"). Information on the extension activities will be included in the mass media and mobile phone-based campaigns under sub-component 3.1 as part of the project's *e-agriculture* strategy. Through these channels, the project will reach out beyond target areas following regular training and will invite Field Day Farmer Participants in the vicinity to visit the CBFSS and WOSs open days or to visit partner demonstration plots that are most relevant to their cropping system. It is estimated that another 148 000 Field Day Farmer Participants, of whom at least 24 000 will be Women Field Day Farmer Participants (invited to visit WOSs), will be reached through such occasional visits.⁶

Component 3: Creating an Enabling Environment for Continued Transformation

38. The purpose of this component is to create a wider enabling environment for the sustained uptake of climate resilient agriculture by farmers in the Indus Basin. This component is essential to the broader process of transforming Indus Basin agriculture to a progressively more climate-resilient pathway in the future. The component is aligned with GCF outcomes A8.0 'Strengthened awareness of climate change threats and risk reduction process', and A5.0 'Strengthened institutional and regulatory systems for climate-responsive planning and development'. The component is comprised of the following three sub-components:

3.1 Improving Information and Awareness Raising Campaigns.

3.2 Supporting Policy Implementation by Federal and Provincial Governments

3.3 Developing Services that Enable Farmers to Adopt Climate Resilient Practices

Sub-component 3.1: Improving Information and Awareness Raising Campaigns.

39. The project will run information and awareness raising campaigns on the impact of climate change in the Indus Basin and options for farmers to adapt to these changes. As part of an integrated *e-agriculture* approach, campaigns will be developed at federal, provincial and district level with a mix of communication channels. This sub-component will

⁶ This is a conservative estimate based on available demographic data for the Project Area. Final figures for the number of Field Day Farmer Participants who may benefit from the project may be higher than this estimate.

expand the project outreach to all potentially interested producers in the Indus Basin and reinforce the message for those farmers reached under Component 2. This sub-component will contribute directly to outcome A8.0 'Strengthened awareness of climate threats and risk reduction processes'.

40. To be effective in delivering this awareness raising campaign, the project will work with mobile phone network companies (to be in accordance with FAO's procurement policy) to identify the right segment of the population in the Project Area and reach them in combination with the delivery of relevant radio programmes. For example, the project will send SMS and/or voice messages in the Project Area to announce the project radio programme. The radio programme, which can provide substantial information, will also provide a telephone number through which farmers can get more information. Farmers who respond to the telephone number will also be invited to the project demonstration plots and/or market days for face-to-face sessions by receiving SMS and/or voice messages.

Activity 3.1.1: Organize and launch a multimedia information and awareness raising campaign on climate change, CRA and OFWM.

This activity will start with multimedia content creation. This will include the preparation of themed episodes/shorts on crop advisory and climate smart best practices for video, radio, print, SMS and voice and audio dramas on key themes. These will be coupled with SMS and voice messages for knowledge retention. Based on the gamification concept, the content of the radio and mobile phone campaigns will be coupled with interactive and incentivised quizzes to be disseminated through mobile phones. Songs and jingles will be used to reinforce important aspects. Later in the project, videos and podcasts will be made of the demonstration plots implemented under Component 2. These will be used in the radio campaigns as well as by extension staff during face-to-face Component 2 activities. Provincial campaigns in local languages will focus on rural populations, with a prominent role for radio, as this is the most important external source of information for farmers. Messages will be carefully adapted to farmers' realities, for example using local units of measurement.

The initial campaigns will use the currently available knowledge on the impact of climate change on the agriculture sector in Punjab and Sindh provinces in particular. These initial campaigns will therefore be quite generic in nature. During the life of the project, new knowledge will be acquired through Components 1 and 2. Rather than developing a mobile-based interactive campaign from scratch, the project will collaborate with existing services to improve their messages or incorporate climate resilient messages. The project will work with mobile phone companies to identify how to match radio audiences and phone subscribers with the messages that would be most useful to them and also linked to the project demonstration plots being set up under Component 2.

The project activities in such campaigns will include sending SMS and/or voice messages in the Project Area to announce the project radio programme. The radio programme, which can provide substantial information, will inform the listeners of the telephone number that the farmers can call to get more information directly from the project. Through the targeted mobile phone campaign using SMS and voice message, farmers will also be invited to the project demonstration plots, people can be reached and/or market days can be organised for face-to-face sessions. SMS and/or voice messages, as well as radio programmes are also used to lead farmers to other forms of social media and use of mobile phone apps.

To enable providers of phone-based information and advisory services to include more content related to climate change, actionable information will be provided in user-oriented displays and formats. This will include information from the ACWA portal under Component 1, proven climate resilient agricultural practices from Component 2, and activities and services by partners developed under sub-component 3.3. For example, the new information generated by the upgraded agro-met and flux instruments and ET monitoring in Component 1 will be used to improve the accuracy and reliability of existing early warning services to farmers. Information content will also include updates on project activities – including invitations to farmers to visit demonstration plots in their vicinity. Furthermore, staff employed in phone-based on-demand advisory services will receive training from the project on climate resilient practices to improve their technical advice to the farmers. Youth in the villages will be mobilised to collect queries from local farmers and channel it to the experts collaborating with the project through mobile and ICT platforms. Links with the CABI Plantwise knowledge bank and plant doctors will also be established.

Sub-component 3.2: Supporting Policy Implementation by Federal and Provincial Governments

41. This sub-component will support policy makers to use project results and data from Component 1 for evidence-based decision making to support the transition of the agriculture sector in the Indus Basin toward the necessary climate-resilient development pathway. It will also focus on helping the two provinces translate the new National Water Policy approved in 2018 into operational policy and procedures, and thus also respond to the existing National Climate Change Policy and the Climate Change Council established under the 2017 Pakistan Climate Change Act. This sub-component will facilitate the strengthening of institutional arrangements needed to: (a) upscale beyond the Project Area; (b) mainstream climate change resilience across relevant policies; and (c) sustain project benefits in the long term. This sub-component will contribute to the realisation of GCF outcomes A5.0 'Strengthened government institutional and regulatory systems for climate-responsive development planning', and A6.0 'Increased generation and use of climate information in decision-making'.

Activity 3.2.1: Increasing Collaboration between Institutions through Knowledge Sharing for Evidence-based Policymaking. The project will facilitate collaboration among relevant government departments working on water and agriculture in the Indus Basin. It will support provincial governments to establish mechanisms for greater collaboration between different departments and wings that are necessary for adequate policy responses to climate change. Specifically, the project will facilitate closer working relationships between the Departments of Agriculture, Irrigation, Livestock and Women's Development in each province, including support in matters of joint responsibilities in addressing climate change and implementing their work in accordance with Pakistan's policies and objectives on climate change issues. This will include knowledge sharing, work planning and harmonising procedures. Facilitation of the broadening of the responsibilities of the provincial Department of Irrigation from irrigation to water resource management is an area where provincial authorities may seek to draw on FAO experiences in other countries in the region and beyond. The project will also facilitate harmonisation of objectives and activities on climate change adaptation and steps to promote resilience-focused interventions amongst the Extension, Field and On-Farm Water Management wings of the provincial Departments of Agriculture. The project will connect the relevant government departments with organisations working at the grass roots level with experience in gender and minority issues in agriculture so that the policies will benefit from their knowledge and better respond to their needs.

This activity will support evidence-based policymaking for climate change adaptation and assist policymakers to use the elements of the ACWA Portal developed under Component 1. Under this activity, the project will share analytical findings with fellow projects working on climate change issues such as the Scaling-up of Glacial Lake Outburst Flood Risk Reduction, Phase II project financed by GCF (GLOF Project)⁷, and with the World Bank and WWF projects present in Sindh and Punjab with which it will already be sharing technologies and findings on water monitoring, water management and agricultural practices.

In the context of knowledge sharing, the project will facilitate discussions on approaches to water charges based on the water accounting system and actual water consumed. A review of subsidies and price support programmes will explore whether shifts may be warranted to stimulate more climate resilient cropping patterns.

Activity 3.2.2: Mainstreaming Climate Resilient Agriculture and Water Management across All Policy Areas. A special effort will be made to further mainstream policies in support of climate resilient agriculture across a wider range of institutions. This will be undertaken in connection with project work in this sub-component to build collaboration amongst government institutions and partners working with the project, and to share information and knowledge gained by the project. The activity will accomplish this in part through an annual climate policy forum timed to feed directly into existing budgeting and/or reform processes (envisaged to be held annually from year 2 of the Project). It will also work to achieve mainstreaming by conducting a study with line ministries to identify opportunities for modifying managerial functions, working structures, norms, job descriptions, institutional configuration, personnel and financial assets, to better address climate resilient agriculture. Furthermore, this activity will develop new policy indicators and tools to review existing policies, regulations and laws (not just agriculture and water policy but also policies related to food security, environment, trade, etc.) and consistently identify where coherence with regard to climate change can be increased.

⁷ This project will share its analytical findings with UNDP and the staff working on the GLOF Project. Beyond this, additional linkages are not foreseen, as the two projects respond to different climate change challenges in different geographic areas.

Sub-component 3.3: Developing Services that Enable Farmers to Adopt Climate Resilient Practices

42. To expand farmers' access to services that facilitate increased resilience to climate change, the project will develop partnerships with NGOs, the private sector and selected on-going development programmes. In this way, the project will leverage resources, existing delivery mechanisms and networks that partners offer, both to enhance support to producers directly targeted by the project and to extend its reach to other farmers. This sub-component will contribute to GCF outcome A7.0 'Strengthened adaptive capacity and reduced exposure to climate risks'.

Activity 3.3.1: Develop a searchable online database (and associated application and map) of locally available financial and value chain services to support adoption and sustained use of CRA and OFWM practices. The project approach to this activity will be to leverage existing financial and value-chain services in the agricultural sector for uses that can improve on-farm resilience to climate change in the Project Area, and thereby avoid providing such services directly through the project. This activity will undertake a mapping of financial and value-chain services per district and at tehsil/taluka level and even specifically at union council level⁸ for those locations where the project is providing extension services/trainings for farmers under sub-component 2.3. This will identify which financial and value-chain service providers are located nearby the farmer, which products they offer, how much they charge and what are the criteria for eligibility, etc. In connection with (and building on the results of) this activity, the project will conduct financial and value-chain literacy training under the CBFS and WOS of Component 2. This will improve farmers' resilience to climate change, by diversifying their own partnerships and sources of financing for them to develop their own adaption and risk management strategies.

Activity 3.3.2: Support financial service providers to access and apply climate information and knowledge of CRA and OFWM to inform credit and insurance products. The project will collaborate with the selected financial service providers in an effort to make them more responsive to the needs of producers facing the threats of climate change. These financial service providers will be selected by FAO after consultation with the State Bank of Pakistan in accordance with the following criteria: (i) their presence in the Project Area (based on mapping done under Activity 3.2.1); and (ii) their interest to collaborate with the project. This will largely take the form of technical assistance, the use of ACWA and tools (Activity 1.3.1) and knowledge sharing to provide them with findings of the monitoring and analytical work of the climate change monitoring and analysis tools introduced under Component 1, as well as the field data collected under sub-component 2.1. In addition, the project will train risk officers from the selected financial service providers to increase their capacity to properly factor the above-mentioned data and analysis into their credit risk ratings for farmers who use project-promoted CRA and OFWM practices. This will help financial institutions to better evaluate risk and possibly reduce current barriers to lending and borrowing by producers, including by women and minorities, in the Project Area. Awareness raising will also be conducted on the possibilities of profitably servicing women and farmers belonging to minority and other disadvantaged groups, with differentiated financial products. Technical assistance and analytical support will be especially useful for financial institutions in the case of insurance services. The project will also help financial institutions to know their potential customers. In addition, it may assist them in taking decisions on possible new financial products/packages that may be introduced to meet short term operating capital and longer-term investment needs related to adaptation efforts for different segments of their potential client base. The project will work in collaboration with the World Bank-financed SMART project to also help its partners to make use of data generated under Component 1 for the development of agricultural insurance products. In response to local demand and recommendations from the SMART project, this activity will also explore possibilities to develop new insurance products such as weather index insurance based on satellite indexes.

Activity 3.3.3: Train and support local companies, young people and women to deliver services to farmers to facilitate adaptation to climate change. The project will also take steps to foster the development of new production-related services to facilitate adaptation. In particular, this activity will inform and train input companies, processors and other buyers to enable them to adapt their product range or their sourcing strategies to climate change. This will ensure that farmers who adopt climate resilient cropping patterns and practices have access to appropriate inputs and still find buyers. The project will prioritize working with locally-

⁸ In Pakistan, the administrative structure is as follows: each province and territory is sub-divided into multiple divisions, which themselves are sub-divided into districts. Each district comprises multiple tehsils/talukas, while each tehsil/taluka comprises multiple union councils.

owned input companies and buyers under this activity. Beyond this basic criterion for prioritization, the input companies and buyers will self-select based on their willingness to collaborate with the project and willingness to cover their own travel expenses.

This Activity will also train about 1170 Youth Beneficiaries (of whom at least 1000 will be young women, or “Women Youth Beneficiaries”) to enable them to provide climate-responsive services within the Project Area. This includes training 120 Youth Beneficiaries to enable them to become agrotechnicians who offer services for climate resilient land preparation and irrigation practices. Similarly, another 50 Youth Beneficiaries will be trained as farm management consultants⁹ equipped to advise on climate resilient practices. Training will also be provided to approximately 1000 young women to serve as consultants who are able to advise members of their communities on e-agriculture services (“Women Youth Beneficiaries”). These Women Youth Beneficiaries will be selected through existing community organizations based on their gender, literacy, quality of their connections within their communities, as well as the selection/eligibility criteria for all Youth Beneficiaries (as outlined above).

Furthermore, under this Activity the project will establish a database of these agrotechnicians and consultants and link it to the ACWA Portal.

Project Management

43. The purpose of this work is to ensure the smooth implementation of all of investments and activities undertaken in components 1-3. The outcome will be that funds will have been used effectively and efficiently to produce the results for which they were intended. To achieve this, a central Project Management Unit (PMU) will be set up in Islamabad. Provincial Project Implementation Units (PPIUs) will be set up in each Province, and District Project Implementation Units (DPIUs) in each District. The main activities of these units will include: planning and budgeting; procurement; monitoring and reporting. The PMU will prepare the project Annual Work Plan and Budget (AWPB) for clearance by a Project Oversight Committee each year and will report on the progress of the project against the AWPB on a semi-annual and annual basis. These will feed in to the Annual Performance Reports and financial management reports that FAO (as Accredited Entity) will provide to GCF. The PMU procurement activities will include procurement of staff, consultancy services, equipment and materials required for project implementation. PMU procurement activities will also include procurement of any goods and services to be provided directly to all beneficiaries by the project. The PMU will set up and implement a project monitoring system to monitor planned outputs, outcomes and objectives based on the project Logic Framework, shown below in Section H.1, as described in part H.2. A computerised Management Information System (MIS) will be created under this component for use by the PMU, PPIUs, and DPIUs to track and compile information on project implementation, physical and financial progress, and outcomes.

Project area and beneficiary selection

44. Project support will be delivered in eight districts: Dera Ghazi Khan, Khanewal, Lodhran, Multan and Muzaffargarh in Punjab Province, and Badin, Sanghar and Umer Kot in Sindh. The selection of these districts, as well as the selection of sites and beneficiaries, is further summarized in Table 2 below.

Table 2. Selection of districts, sites and beneficiaries

Level / type	Criteria / process	Stage / timing
District selection	Districts in Punjab and Sindh were rated using a number of criteria (and data sets) and ranked to prioritize the 8 (eight) most vulnerable districts – those most exposed to climate change risks, those most sensitive to such risks, and those where the capacity of rural people to adapt is most limited. The indicators used to discern these characteristics were:	Completed during project design. The following districts have been prioritized, and constitute the ‘Project Area’.

⁹ This subset of the Youth Beneficiaries may be either existing farm management consultants or young graduates from agricultural universities with the ambition to become a consultant.

	<ul style="list-style-type: none"> - Cropping area - Drought hazard - Flood hazard - Poverty - Food consumption levels - Number of agricultural households - Percentage of farms that are small farms - Prevalence of undernourishment <p>The multi-criteria analysis is further summarized in Section 3 of the Feasibility Study, and described in detail in Appendix 5 of the Feasibility Study.</p>	<p><u>In Punjab Province:</u> Dera Ghazi Khan, Khanewal, Lodhran, Multan and Muzzafargarh.</p> <p><u>In Sindh Province:</u> Badin, Sanghar and Umer Kot.</p>
Initial demonstration plots / site selection	<p>The initial sites in which the project will deliver support at field level within the eight targeted districts will be determined based on the selection of the initial demonstration plots established in Project Year (PY) 1. Two such demonstration plots will be established in each targeted district in PY 1. The sites for these demonstration plots will be selected by FAO, after consultation with the Departments of Agriculture in Punjab and Sindh, and based on the following criteria:</p> <ul style="list-style-type: none"> - The selection of sites for demonstration plots within each of the eight targeted districts will account for any diversity in agro-ecological zones within that particular district (as assessed by FAO experts and experts from the Departments of Agriculture in Punjab and Sindh). - Selected sites for demonstration plots must be accessible to farmers, accounting for the heterogeneous geographies and means of transportation available in each district (note that this qualitative assessment will be made by FAO experts and experts from the Departments of Agriculture in Punjab and Sindh). - The farmers/landowners must consent to the use of the farm as a demonstration plot for the entire duration of the project. 	<p>Selection of initial demonstration plots to be done during the project inception phase, and completed before the end of PY 1.</p> <p>The project will steadily expand the number of demonstration plots and geographic locations of these plots over the course of the project, eventually reaching areas throughout the targeted districts. The selection of sites for these subsequent demonstration plots (in PY 2-6) will be subject to the same criteria as those established in PY 1.</p>
Professional Beneficiaries (various sub-components)	<p>Professional staff who will benefit from support for the establishment and/or strengthening of systems, services and capacity under sub-components 1.1-1.3 will be selected by FAO according to the following criteria ("Professional Beneficiaries"):</p> <ul style="list-style-type: none"> - Organizations have been and/or will be identified based on alignment between the proposed activities and the organizations' mandates, expertise and/or services delivered (note that these determinations have been/will be made by FAO experts); - Identified organizations will be invited to nominate staff to participate in the activities based on the alignment between the contents of the proposed activity (e.g. technical focus of the training) and the respective individuals' responsibilities and expertise within their organization; and - FAO staff will review the lists of nominated participants, and either confirm or reject their nomination based on an assessment of the alignment between the activity and the participants' responsibilities and expertise. 	<p>This will be conducted during the early stages of executing each of the relevant activities.</p>

Farmer Beneficiaries (Activities under sub-component 2.3)	<p>Farmers who will directly benefit from project trainings/support ("Farmer Beneficiaries") under sub-component 2.3 (who collectively comprise a large proportion of the project's direct beneficiaries, as outlined in Section E.1 of the Funding Proposal) will be selected by the Extension Worker/trainer overseeing the training in question. Selection will be done according to standard principles of the Farmer Field School (FFS) approach:</p> <ul style="list-style-type: none"> - Farmers must be willing to participate in weekly sessions for the duration of one year (or the entire cropping season when training is limited to a single crop). - Farmers must be willing to work in a group, and share knowledge with their neighbours. - Farmers must be smallholders (less than 12 acres, as per provincial thresholds¹⁰) and be members of vulnerable and/or low-income households (note that this will be assessed by training facilitators based on guidance from FAO). <p>FAO will retain final control over Farmer Beneficiary selection, and ensure corrective actions are taken in the event that Extension Workers/trainers (selecting the Farmer Beneficiaries) do not adhere to the aforementioned selection criteria.</p> <p>In the case of Women Open Schools organized under Activity 2.3.2 (which will exclusively benefit women), the project will also prioritize the selection of women from women-headed households in addition to applying the above criteria.</p>	This will be conducted during the early stages of organizing each farmer training (e.g. CBFS, WOS).
Youth Beneficiaries (Activity 3.3.3)	<p>Youth (15-29 years old, in accordance with government definitions) who will directly benefit from project trainings/support under Activity 3.3.3 will be selected by FAO according to the following criteria ("Youth Beneficiaries"):</p> <ul style="list-style-type: none"> - The selection of youth to participate in this Activity will be based on an application process. - Youth candidates will be invited to apply for available spots for each training. - Project staff and training facilitators will select candidates based on the alignment between their profiles and the trainings to be provided (i.e. relevance of their past training (if any), skill-set and experience). 	This will be conducted during the early stages of organizing each training.

C.4. Background Information on Project Sponsor (Executing Entity)

45. FAO was created as a specialised UN agency in 1947, at which time Pakistan was a founding Member State. It currently has staff and offices worldwide. The FAO country office for Pakistan, established in 1978, is currently managing 20 projects throughout the country, with an annual budget of USD 20 million. In the more than 70 years since FAO was established, it has managed 573 projects in Pakistan, at a total actual cost of USD 314 million. The FAO country office has administrative staff including assistants in administration, office support, information resources and programmes who provide backstopping, support and supervision to the administrative staff of individual projects.

46. FAO will serve as both the Accredited Entity (AE) and Executing Entity (EE) for this project. These functions will be segregated internally to ensure built-in project oversight and supervision is maintained. In particular, the Executing Entity function will be fulfilled by a dedicated project delivery team anchored in the FAO country office in Pakistan. This

¹⁰ These thresholds are subject to change, and will be re-assessed/confirmed during project inception.

arrangement is described in more detail in Section C.7. With respect to the administration of the proposed project, as Executing Entity (EE), FAO will hold the project to its standards for project financial management, procurement, auditing and reporting. These standards have already been reviewed and approved by the GCF in the context of the Organization's application to become a GCF Accredited Entity in 2016.

47. The FAO country office in Pakistan is staffed with 116 technical officers in a wide range of fields. Subject matter specialists in country who can provide expertise and materials pertinent to this project include those in natural resource management, water, crop production, geographic information systems, nutrition, gender, and monitoring and evaluation. Furthermore, FAO has project offices and national staff currently located in Peshawar, Quetta, Karachi, Multan, Badin, Chagai, Hyderabad, Khara, Nushki and Panjgur. A map of all currently on-going FAO operations in Pakistan is included in Attachment 2. The relationships of the FAO Country Office with federal and provincial governments, development partners, and civil society organisations can be put to use in the implementation of this project and in securing continuity and sustainability in follow-up to project activities after project completion.

48. Standing behind the country level team, FAO has technical specialists based in its headquarters (HQ) in Rome and Regional Office for Asia and the Pacific (RAP). Technical staff members at HQ and RAP will be able to reinforce its country-level resources and contribute experience, knowledge and resources from other parts of Asia, in particular South Asia, where FAO is currently working with its Member States to deepen countries' understanding of the implications and options for adaptation to climate change in the agricultural sector. As Pakistan can capitalise on these regional resources that FAO can offer as EE, so too can the technology applied in the Pakistan Indus Basin under this project be available to other countries including India, China and Afghanistan. This project can also readily capitalise on on-going FAO regional initiatives operational in Pakistan on food security and nutrition, namely the Asia and the Pacific Zero Hunger Challenge and the Regional Rice Initiative with which there are direct synergies in the planned awareness raising and household-level food security activities.

49. Among FAO's many knowledge assets developed for applications in the context of adaptation to climate change that have already been incorporated in the design of this project in Pakistan are ASIS and MOSAICC. Planners at the Provincial Departments of Agriculture in Punjab and Sindh as well as professionals from other institutes such as PMD, PARC, NARC and PCRWR will be trained on these tools in the context of policy support activities. Other assets include, for example, the Collect Earth and Earth Map tools, developed together with Google in collaboration with the International Climate Initiative of the German Ministry for Environment, to combine very high spatial resolution with very high temporal resolution imagery for assessment of land use changes.

50. This project will also benefit from the Global Farmer Field School Platform launched by FAO in early 2018, in collaboration with 15 organisations to connect the global network of practitioners and organisations using Farmer Field Schools, an element proposed here to achieve the intended GCF outcome of 'Strengthened adaptive capacity and reduced exposure to climate threats'. The Farmer Field School approach, now implemented in over 90 countries, is a participatory approach pioneered by FAO in 1989 for integrated pest management in rice production in Asia, and is now recognised worldwide. Furthermore, FAO can draw on the many experienced national entities, NGOs, research institutions and private sector stakeholders in Pakistan that are connected with the Global Farmer Field School Platform, including the Pakistan Integrated Pest Management Program to further customise its application within the country in the service of climate change adaptation in the Indus Basin.

51. FAO has also closely engaged with development partner stakeholders in Pakistan working in agriculture and water management. The project will benefit from their insights and to determine how GCF financing for climate change adaptation could help increase the returns to investments. Amongst these partners, including ADB, CIAT, DFID, GiZ, IFPRI and the World Bank, FAO has conferred most closely with CIAT, IFPRI and the World Bank on this proposal in the context of its on-going collaborations, especially with the World Bank. FAO is currently providing technical assistance in connection with the design and implementation of World Bank projects under the Cooperative Programme between the World Bank and FAO, which has more than 50 years of history and more than USD 20 million annual budget. The Government and the World Bank are eager that the outputs of this project will be made available to them so that they may use their projects as vehicles for further upscaling and mainstreaming of successful outputs.

C.5. Market Overview (if applicable)

Not applicable

C.6. Regulation, Taxation and Insurance (if applicable)

Not applicable

C.7. Institutional / Implementation Arrangements

52. FAO will serve as both the Accredited Entity (AE) and Executing Entity (EE) for this project with a set-up that supports strong government ownership and implementation, and will serve the capacity development objectives of the project. The government and FAO will jointly form the project implementation units at three levels: (i) the Project Management Unit (PMU) at the national level; (ii) Provincial Project Implementation Units (PPIUs); and (iii) District Project Implementation Units (DPIUs). These implementation units will comprise both government staff members and project-recruited staff. FAO will also provide technical and administrative support to the government and these project implementation units. This arrangement will ensure:

- *High technical standards are adhered to throughout project implementation.* Due to the highly technical nature of the project activities, the project will need to avail itself of FAO's in-country technical expertise to underpin day-to-day project implementation. The project delivery team (including FAO Pakistan staff) will have the vital expertise needed to ensure that the project achieves its desired results, and that it effectively equips government and other stakeholders to sustain the process of sector transformation after project closure. Similarly, the project delivery team will draw directly on the wealth of technical expertise and experience elsewhere in FAO, something that would be limited under alternative implementation arrangements.
- *Project delivery can proceed efficiently despite the complex governance framework.* Under the post-devolution national governance structures in Pakistan, provincial governments are responsible for agricultural development in their respective provinces. The project will work with two provincial governments and the federal government, which means working with three separate governments. Each of these governments will also be represented by multiple ministries/departments. Implementation risks and associated inefficiencies will be mitigated by engaging a project delivery team that is anchored in FAO-Pakistan to lead project implementation – an arrangement that the Government of Pakistan has explicitly requested.
- *Government partners still play a leading role in project delivery and capacity development.* The PMU, PPIUs and DPIUs will work closely with a range of Responsible Entities and Implementation Partners to deliver project support, achieve results and ensure benefit streams are sustainable beyond project closure. In so doing, the project will build the capacity of key national entities, ensure government ownership of project support, and foster sustainability beyond project closure. More information on the roles of Responsible Entities and Implementation Partners is included below, while their roles in supporting/enabling delivery of individual activities is included in Section 5 of the Feasibility Study.

Accredited Entity Role

53. In its role as Accredited Entity, FAO will be responsible for the overall management of this project, including: (i) all aspects of project appraisal; (ii) administrative, financial and technical oversight and supervision throughout project implementation; (iii) ensuring funds are effectively managed to deliver results and achieve objectives; (iv) ensuring the quality of project monitoring, as well as the timeliness and quality of reporting to the GCF; and (v) project closure and evaluation. FAO will assume these responsibilities in accordance with the detailed provisions outlined in the Accreditation Master Agreement (AMA) between FAO and GCF.

54. To perform these Accredited Entity functions, FAO will set up a dedicated FAO-GCF project supervision team comprising relevant staff from the FAO Country Office in Pakistan, the FAO Regional Office for Asia and the Pacific in Bangkok, and FAO Headquarters in Rome. The project supervision team will remain independent of the Executing Entity functions also performed by FAO (see below). In line with the GCF policy on fees adopted through GCF Board Decision B.19/09, the above-mentioned segregation of responsibilities within FAO will ensure that the Organization can independently and effectively perform the types of Accredited Entity functions listed in the GCF *General principles and indicative list of eligible costs covered under GCF fees and project management costs*, also adopted through GCF Board decision B.19/09.

Executing Entity Role

55. FAO Pakistan will bear the overall responsibility for fulfilling the Executing Entity functions on this project. In this context, the FAO Pakistan office in Islamabad will host a PMU comprising project-recruited staff and government staff. This PMU will coordinate the work of two PPIUs and eight DPIUs, each of which will include a combination of project-recruited staff and government staff. Led by the PMU, these units will collectively perform all Executing Entity functions on this project, including (inter alia) preparation of annual work plans and budgets (AWPBs) in collaboration with key government counterparts, overall day-to-day project management, monitoring project progress, and reporting to the Project Oversight Committee (POC) and FAO-GCF project supervision team. These units will work with relevant Responsible Entities and Implementation Partners to deliver individual sub-components and activities, as outlined below and in Section 5 of the Feasibility Study. Along with specialised FAO technical experts who will directly backstop the project, the project-recruited staff and government staff in the PMU, PPIUs and DPIUs will collectively comprise a project delivery team. This project delivery team will lead the execution of all activities included in this project using the GCF grant financing and co-financing from the Governments of Punjab and Sindh – which will be transferred to FAO as grant/cash co-financing through a Unilateral Trust Fund (UTF) – to achieve the anticipated results. When doing so, the PMU, two PPIUs and eight DPIUs will adhere to FAO policies and procedures, and use FAO systems for (inter alia) financial management and procurement. FAO will ensure that there is no direct overlap between (i) the staff who comprise the project delivery team, and (ii) the staff who comprise the project supervision team and fulfill FAO's Accredited Entity functions. This will ensure built-in project oversight and supervision functions are fulfilled.

Project Governance Structure

56. The governance structure of the project includes a POC, which will be chaired by the Government of Pakistan through the Ministry of Climate Change (MoCC) and co-chaired by FAO. The Secretary MoCC will serve as the Chairperson of the Committee. The Committee will be accountable to the Government of Pakistan and the FAO project supervision team as AE. It will comprise representatives from: MoCC; Ministry of National Food Security and Research (MoFSR); Ministry of Water Resources (MoWR); Ministry of Planning and Development (MoPD); the Punjab Agriculture Department and Irrigation Department; the Sindh Agriculture Department and Irrigation Department; PMD; PCRWR; PARC; and FAO.

57. The primary functions of the POC will be: (i) aligning project activities with Government of Pakistan policies and priorities; (ii) ensuring coordination of the project amongst federal government partners and with provincial partners; (iii) providing oversight of project implementation; (iv) approving AWPBs and reviewing project progress; and (v) guiding the resolution of implementation challenges. The Committee will meet twice a year, however the Chairperson may also convene ad hoc meetings to discuss oversight or implementation issues. The Chair will also have the authority to invite other experts as the need arises. Minutes of POC meetings will be made publicly available and circulated to all Committee members and all other project stakeholders.

Provincial Level Governance Structure

58. Each provincial government will put in place a Provincial Project Technical Committee (PPTC) to oversee and monitor the implementation of the project activities in its province. The respective PPTC will be chaired by the Planning and Development Department of the province with co-chairs from the Provincial Agriculture and Irrigation Departments. The primary functions of the Provincial Project Technical Committees will be as follows: (i) ensuring coordination of the project with federal government partners and amongst provincial partners; (ii) monitoring of project implementation at the provincial level; and (iii) reviewing AWPB, and reviewing project progress at the provincial level. The Federal MoCC, MoFSR and MoWR as well as PMD and research institutions will also be represented on the PPTC. The Chair of the Committee will have the option of inviting other experts as the need arises and may invite representatives from other key projects funded by government or through development assistance to attend as observers, or for knowledge sharing and peer assistance. The PPTCs will maintain close liaison with the PPIUs to ensure effective and timely implementation and support them to overcome any challenges on the ground.

Project Implementation Arrangements

59. The PMU, PPIUs and DPIUs (described in more detail below) will ensure support is delivered in close collaboration with key federal, provincial and district entities, which are regarded as 'Responsible Entities' (i.e. government institutions) that are vital to the effective delivery and sustainability of this project. Each project activity is 'owned' by one (or more) of these Responsible Entities. Throughout project implementation, these Responsible Entities will work in a manner that is complementary to the project.

60. Responsible Entities will play a central role throughout project implementation to ensure that the project's AWPB activities are aligned with their priorities and plans, and will secure their commitment to take ownership of project-financed support and integrate it into their regular operations after project closure. More information about the role of Responsible Entities is included further below, while their role in individual activities is specified in Section 5 of the Feasibility Study.

Project Management Unit

61. A PMU will be established in Islamabad to be located at the FAO Country Office. The PMU will be headed by a full-time project-recruited Project Coordinator who will be responsible for project delivery and coordination with all stakeholders. The PMU will be responsible for providing support to the execution of day-to-day activities with participating federal and provincial governments and other stakeholders. The PMU will also execute activities at federal level (in particular under Component 1), and ensure these are aligned with the execution of activities in the two provinces. The government counterpart to the Project Coordinator will be the (part-time) Project Director, to be appointed by the MoCC and seconded to the project. The PMU will also include the following staff (inter alia): (i) Procurement Officer; (ii) Finance Officer; (iii) Monitoring Specialist; and (iv) Information Technology Specialist. The roles and responsibilities of PMU staff are described in more detail in Section 7 of the Feasibility Study.

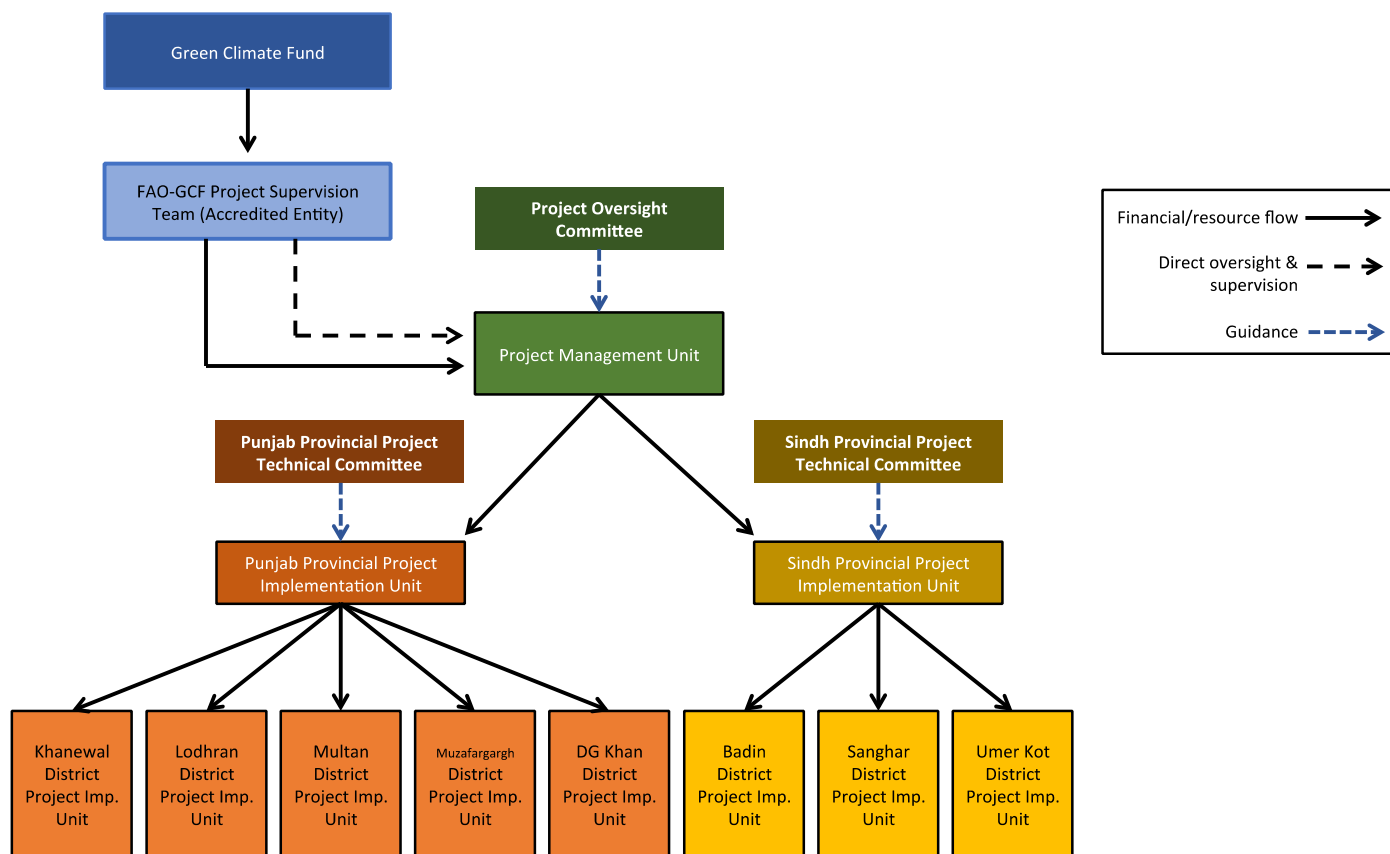
Provincial Project Implementation Unit

62. Under the PMU, there will be two PPIUs that will serve as operational arms of the PMU to be located in Multan for Punjab and in Hyderabad for Sindh. Each PPIU will be headed by a Provincial Project Director to be nominated by the Agriculture Department in each province. At the provincial level, the Irrigation Department will also appoint a Chief Engineer or equivalent as the Joint Project Director. Day-to-day project operations in each PPIU will be supported by a Provincial Project Coordinator who will be recruited by FAO to be responsible specifically for project implementation at the provincial level and implementation of Component 3. The Provincial Project Coordinator will ensure effective liaison and coordination with PMU and the other PPIU in implementation of the project activities. The PPIU offices will be jointly identified by the Agriculture and Irrigation departments (co-located in one of the two departments) to further augment liaison between Agriculture and Irrigation Departments, and staffed with government staff and FAO recruited subject matter specialists (local). They include (inter alia): (i) Water Management and Hydrology Specialist; (ii) Groundwater Specialist; (iii) Agronomist; (iv) Farmer Field School Specialist; (v) Information Technology Specialist; (vi) Knowledge and Communication Expert; (vii) Safeguard Specialist; (viii) Gender and Nutrition Specialist; and (ix) Monitoring Specialist.

District Project Implementation Unit

63. Under the PPIUs there will be a DPIU for each of the eight districts. These will be the operational arm of the project for district-level activities. The DPIUs will be located within the office of the district agriculture authorities. Each DPIU will consist of the district Head of Department of Agriculture, and the Assistant Executive Engineer (AXEN) / the Sub Divisional Officer (SDO) from the Department of Irrigation. The project will recruit six extension workers in each district who will carry out field extension activities as members of their respective DPIUs. In each district, one of these extension workers will be selected to serve as the District Project Coordinator tasked with leading field activities at district level.

Figure 1. Project Governance and Implementation Structure



Responsible Entities

64. Implementation of project activities at the field level will be largely undertaken by Responsible Entities that have been identified to implement specific project activities. Responsible Entities will work with project-financed staff, project-recruited subject-matter specialists, and contracted service providers to deliver support to targeted beneficiaries at field level. Responsible Entities will themselves benefit from project-financed support, including capacity building and access to knowledge and information, as for example under Component 1 in connection with water accounting or evapotranspiration monitoring. This approach to implementation has been taken to ensure sustainability as it directly contributes to strengthening systems, building capacity, and enhancing service delivery.

International Technical Assistant Specialists

65. The project will recruit the following long-term international technical assistance (TA) experts who will be based in either Multan or Hyderabad to carry out provincial level field activities. They will also be responsible for liaising with FAO technical departments and the capacity development of staff members from government and participating entities. They will include: (i) Chief Technical Advisor – who is also responsible for providing TA to Component 3; (ii) Hydrology and Water Management Specialist; and (iii) Agronomist.

C.8. Timetable of Project Implementation

The Timetable is included in Annex 6.

D.1. Value Added for GCF Involvement

66. The prospect of GCF financing has already been catalytic in stimulating the NDA and MoCC in Pakistan to work with FAO to look into how climate change scenarios are going to affect the agricultural sector and what the implications will be for the Pakistani economy. This in turn led to a joint effort to determine what kinds of interventions are needed and at what level. The prospect of GCF support has also led both FAO and MoCC to contribute more than USD 500 000 of financial and staff resources to the identification and planning of solutions for adaptation and building resilience in the design of this project. This has culminated in a commitment by the Provincial Governments of Punjab and Sindh to allocate USD 12.7 million in co-financing to this project. In the absence of prospects for GCF support, it would not have been possible to mobilise the resources from these stakeholders into a programme with the large outreach and potential impact offered by this project.

67. With the investment of a critical mass of resources coming from GCF, federal and provincial governments and FAO, this investment in public goods will further catalyse widespread household-level investments in adaptation across a large area of the Indus Basin. Results of the financial and economic analysis for this project show that the project investments in awareness raising, information services, increased knowledge, government capacity and skills at the grass roots level have the potential to mobilise investments in resilience building activities by households, Micro Finance Institutes (MFIs) and private sector firms in the Indus Basin of as much as USD 100 million.

68. It is important to note that GCF will add value to this project that would be difficult for the Government to match in its entirety for two main reasons. The first is because of the low level of human development in the Indus Basin and the attendant competition for the use of scarce provincial government resources. The second is because of the split in budgetary arrangements for public sector investment between the provincial and federal levels. Investments in the monitoring and dissemination of information about climate change that are needed by farmers, district and provincial officials will be most efficient if they are made at the national level. Individual provinces cannot afford to set up their own early warning systems based on remote sensing, nor should they, as there are economies of scale that can be achieved by investing in physical and human capital in one central location for information services that can serve the entire country. However, federal government budgetary processes are not structured to readily finance and provide centralised services to the provinces or to facilitate pooling of resources for joint activities. GCF financing in this project can work to turn this constraint into an opportunity to provide evidence of the usefulness of selected federal government initiatives that provide benefits at scale across more administrative units and to motivate increases in budgetary allocations for needed services in the future.

D.2. Exit Strategy

69. The exit strategy for this project consists of elements designed to result in the sustainability of selected outcomes and processes after project completion. These include:

Improving Knowledge Skills and Competencies on the Job: The project includes a series of training and capacity development activities for men and women who are government officials, professional staff, extension workers, private sector field workers and beneficiary farmers on climate resilient approaches and practices. It will also make explicit efforts to include people from a segment of society that is vulnerable to climate change such as the poor, women and minority groups, to build skills and knowledge that will continue to be applied after project closure.

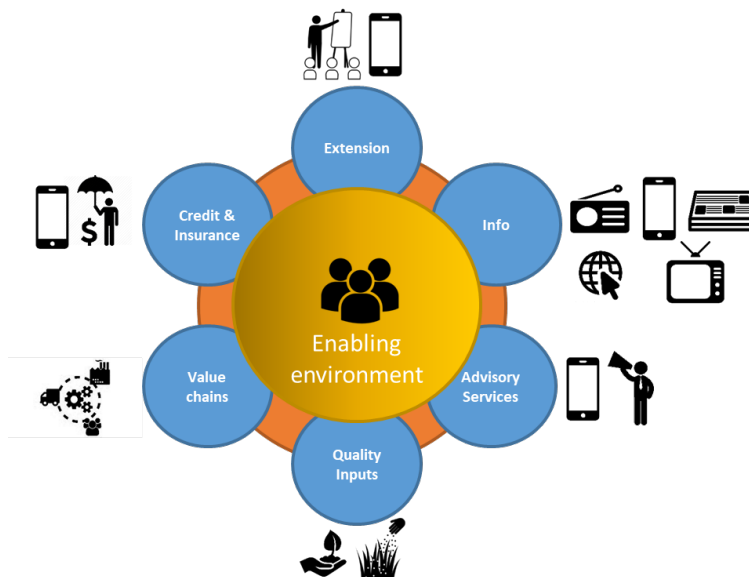
Capacity Development of Local Entities for Sustained Interactions with Target Farmers: The project has proposed the identification of suitable local agencies as implementing partners in introducing and applying climate-resilient technologies and approaches, and establishing and training their core teams. By developing the capacity of these local agencies, the project will enable them to continue supporting and interacting with target farmers in a manner that supports sustained and upscaled adoption of CRA and OFWM. This is key, as farmers need to continue to communicate about the climate resilient practices after the termination of the project. As an information gateway on CRA and OFWM, the ACWA Portal will be a key resource that enables people working with vulnerable farmers to sustain services and other forms of support after project closure.

Incremental Costs for New Services Assumed by Government during Implementation: As activities financed with GCF funds commence, new services will be set up together with staff in the institutions that will carry on their implementation after project closure. These will mostly revolve around services for measurement and analysis of ET, water accounting, agro-meteorology stations, and IT operations and maintenance. The provincial governments of both Punjab and Sindh have already indicated the availability of resources that can be programmed for such costs in the future. In addition, the World Bank, which supports both provinces, is keen to scale up the outputs of these new services. Therefore, the project will work to assist responsible institutions in determining the exact recurrent cost implications on an annual basis and in presenting revised budget requirements to provincial authorities to cover these costs after project completion.

Ensuring Good Financial Returns for Producers: Drawing from tested technologies that are being developed in Pakistan with technical assistance from FAO and others, this project will demonstrate CRA and OFWM practices that will be financially attractive to producers. Motivation to adopt these practices will stem in part from the prospects of increased income rather than avoiding losses in a without project scenario.

Sustainable Learning Impacts through the Creation of an Enabling Environment: Technology transfer is not enough to sustain the learning and transformation of agricultural practices. They need to be supported by other services, such as financial, value-chain and quality inputs service providers. The proposed project extension activities will not be a stand-alone component but be embedded in the total programme approach to create an enabling environment for farmers to adopt CRA and OFWM practices. As shown in Figure 2, the learning process of the face-to-face extension activities will be complemented by other supporting activities, which will become a part of the daily enabling environment.

Figure 2. Schematic Representation of the Enabling Environment



Directly involving the private sector: Collaboration with the private sector is part of this project's strategy to forge relationships with producers, who will continue to access inputs and services needed for improved practices, as well as buyers for their products. The project will be a catalyst to set in motion behaviour and foster relationships that will continue after project completion in as much as they effectively serve the interests of concerned partners. It will induce participating private sector companies to expand activities and to inform farmers of good farming practices for increased and higher quality outputs. On the farmer side of the partnership model, the project will provide training to build farmer bargaining power and organizational skills.

Information and Communication Technology (ICT) in Awareness Raising and Extension. One traditional mode of transferring knowledge to producers has been extension by field workers. However, the benefits of this approach are always limited in scale due to the limited number of available extension workers *vis-à-vis* the vast number of farmers. In order to overcome this physical limitation, “e-agriculture” or “ICT in agriculture,” will be promoted to supplement extension in order to reach as many farmers as possible. Such approaches have shown considerable potential in offering a wide range of solutions to agricultural challenges (World Bank, 2017; FAO, 2016). The approach used in this project will include the introduction of a number of innovations based on state-of-the-art digital technology. Several different types of ICTs will assist a wide range of stakeholders with sharing knowledge and information, building relationships and undertaking transactions (see Appendix 15 of the Feasibility Study), which will ensure sustainable communication after project closure.

E.1. Impact Potential

Potential of the project/programme to contribute to the achievement of the Fund's objectives and result areas

E.1.1. Mitigation / adaptation impact potential

70. The project impact at the household level will increase the resilience of men and women's livelihoods. At project completion over 1.3 million people (see a note below) living in some 200 000 households (77 600 households through the structured extension activities; 124 000 households from field visits) will have benefitted from the use of new adaptive technologies and practices through direct interaction with the project. This constitutes approximately 8 percent of the rural population of the eight project districts, including the most vulnerable producers to whom the majority of direct support and hands-on activities will have been targeted. These people are counted as direct beneficiaries. They belong to households that will participate in – and the others who will visit – project activities including field visits and demonstrations. An additional 10 million people living in rural households in the eight districts covered by the project will potentially benefit from exposure to intensive information dissemination through the 'e-agriculture' platform and mobile phone-based technologies. These beneficiaries of the information and awareness campaigns in Component 3 have not been counted as direct beneficiaries. However, it is foreseen that all of the 16 million rural people living in the eight project districts will benefit indirectly. Even if they do not participate directly in the project activities, they will benefit indirectly from the increased economic activity in the project area in relation to increased agricultural production, processing and input trade, from greater knowledge about weather and climate, and greater appreciation of gender issues. These are described below in Section E.3.1. Environmental, social and economic co-benefits. Furthermore, provincial government institutions that work with these rural people, and local businesses in the agricultural sector will all provide better services as a result of enhanced information and skills that they will have acquired through the project.

Note: It is estimated that a total of around 250 000 farmers will benefit directly from the project (201 600 male and 48 000 female farmers). As female farmers will most likely be in the same household as the male beneficiaries, the project will reach 200 000 households. With an average family size of 6.3, the number of total beneficiaries is around 1.3 million.

E.1.2. Key impact potential indicator

GCF core indicators	Expected tonnes of carbon dioxide equivalent (t CO ₂ eq) to be reduced or avoided (Mitigation only)*	Annual	na ¹¹
		Lifetime	na ¹²
	Expected total number of direct and indirect beneficiaries, disaggregated by gender (reduced <u>vulnerability</u> or increased <u>resilience</u>); Number of beneficiaries relative to total population, disaggregated by gender (adaptation only)	Total	Direct: 1 300 000 (636 000 women) Indirect: 16 000 000 (7.9 million women)
		Percentage (%)	Direct: 8% (of which 4% women) Indirect: 100% (of which 49% are women)

¹¹ The project is classified as an 'adaptation' only project for GCF and not as a 'mitigation' or as a 'cross-cutting project. This is due to the fact that mitigation is not an explicit project objective. Nevertheless, the project will have mitigation co-benefits for Pakistan. The expected annual reduction in emissions will be 0.9 tCO₂e per hectare per year, or a total of roughly **200 000tCO₂e per year** if the improved practices were applied on 40% of the project area.

¹² Over the 20 year lifetime of the project emissions would be reduced by **about 4 million tCO₂e** if practices were adopted on 40% of the project area.

<p><i>Other relevant indicators</i></p>	<ul style="list-style-type: none"> • Strengthened institutional and regulatory systems for climate-responsive planning development. • Increased generation and use of climate information in decision-making. • Strengthened adaptive capacity and reduced exposure to climate risks. • Strengthened awareness of climate change threats and risk reduction processes.
	<p>71. A baseline survey will be implemented under the supervision of the project monitoring specialists in project year 1 in order to quantify the actual levels of resilience, vulnerability, food security, awareness and adaptive capacity. This will allow project implementers to determine the baseline conditions against which the project impact will be measured on the following core impacts and outcomes expected from the use of GCF resources:</p> <p>A1.0 Increased resilience and enhanced livelihoods of the most vulnerable people, communities and regions. A2.0 Increased resilience of health and well-being and food and water security. A7.0 Strengthened adaptive capacity and reduced exposure to climate risks. A8.0 Strengthened awareness of climate change threats and risk reduction processes.</p> <p>72. The project monitoring specialists, together with subject matter specialists and the international TA team, will also implement a qualitative baseline study of institutions, specifically of PMD, IRSA, the Department of Irrigation Punjab, the Department of Irrigation Sindh, the Department of Agriculture Punjab, the Department of Agriculture Sindh, and selected Water User Associations in each of the project districts. It will allow the project to document the degree of achievement of the outcomes being sought by GCF in terms of:</p> <p>A5.0 Strengthened institutional and regulatory systems for climate-responsive planning development. A6.0 Increased generation and use of climate information in decision-making.</p>
<p>E.2. Paradigm Shift Potential Degree to which the proposed activity can catalyze impact beyond a one-off project/programme investment</p>	
<p>E.2.1. Potential for scaling up and replication</p>	
	<p>73. This project will shift Pakistan and Indus Basin agriculture from its current situation of high vulnerability toward an alternative paradigm wherein better information and farming practices will significantly increase resilience to climate change. The project constitutes an important step in a longer-term process of transforming agriculture in the Indus Basin. Changing climatic conditions will require changes in practices across the agricultural sector, which employs 25.8 million people. The sheer magnitude of the required behavioural change – among a large and poor population with limited educational background – is an enormous task that the Government cannot achieve on its own. External support is essential. At the same time, the strategic importance of Indus Basin agriculture – where 90 percent of the country's agricultural output is produced – and its vulnerability to climate change make this process of transformation an absolute necessity.</p> <p>74. Given the scale of this endeavour, the project alone cannot transform Indus Basin agriculture. It will rather set this transformational process in motion, and equip government, farmers and other stakeholders to continue driving this process – scaling up and out – to achieve impact beyond the project investments and project closure. There are four primary ways in which the project will do this.</p> <p>a. <i>The project will establish cutting-edge systems and build capacities to generate, disseminate and utilize vital data and information on climate change and its impacts on water resources and farming systems.</i> The project assigns particular importance to enabling accurate measurement, monitoring and modelling of hydrologic systems in the Indus Basin, taking into account the impacts of climate change. In so doing, the project will equip government and other stakeholders with the knowledge needed to inform policy, investment and farm management decisions well into the future. This is particularly important in the context of Indus Basin</p>

agriculture, where modelling suggests that stakeholders will have to contend with complex changes in rainfall patterns and shifts in the location and timing of water availability, as well as considerable variability in terms of the frequency and intensity of some climate change impacts. Investments in the proposed systems and capacities will enable Indus Basin stakeholders to continuously assess risks and vulnerabilities in agriculture, and mount appropriate responses. In addition, key International Financial Institutions (IFIs) and other partners have indicated a strong interest to invest in project-supported systems and capacities in other districts and provinces once they have been successfully applied under this project.

- b. *The project will strengthen the extension system in the Indus Basin to ensure it is better able to support adoption of locally appropriate Climate Resilient Agriculture (CRA) and On Farm Water Management (OFWM) practices at scale.* The project will work with extension workers from the public sector, private sector, NGOs, farmer organizations and partner projects, all of whom play a key role in delivering extension services in Punjab and Sindh. It will equip them with knowledge of locally appropriate CRA and OFWM practices, as well as relevant training modules, to enable them to promote adoption of CRA and OFWM practices at a considerable scale during the project (under Component 2), and continue doing so beyond project closure. The project will also ensure extension service providers have access to new information – including that which is generated under Component 1, as briefly described above – and can continuously update their services to cater to evolving climatic conditions and farmer needs. The project will not only strengthen these technical elements of the extension system, but also build extension workers' capacity to use new service delivery methods. Drawing on the e-agriculture tools established by this project, the extension system will be better equipped to reach remote areas and farmers that are not currently well served, including poorer farmers with limited education and literacy. The extension directorates within the Departments of Agriculture in Punjab and Sindh – key project partners and co-financiers – will be particularly well equipped to scale up more effective, inclusive and climate-informed extension services to reach additional districts beyond the eight targeted by this project.
- c. *The project will support adoption of CRA and OFWM practices among a critical mass of farmers, which will further increase local awareness of – and the demand for – these climate resilient approaches to farming.* The project initiates a paradigm shift among about 200 000 farming households (1.3 million rural people) in the eight districts, while collaborating with public and private sector actors who work directly with those producers. In so doing, the project will demonstrate the adaptation benefits and financial viability of these practices at scale within local communities. These positive results and benefits will be further promoted through word of mouth within farming communities (Component 2), and multi-media information and awareness raising campaigns organized as part of the project's e-agriculture strategy (Component 3). The project will thereby stimulate broader interest in these types of CRA and OFWM practices among farmers who live in the target districts (which are home to 16 million rural people) but did not directly benefit from the project. This in turn will increase the demand for relevant (climate-informed) services and support – including from extension service providers (as described above), as well as advisory and financial service providers (as described below) – within and beyond the targeted districts in Punjab and Sindh.
- d. *The project will strengthen the enabling environment to ensure state and non-state actors are better able to support adoption of CRA and OFWM at scale, and contribute to the process of transforming Indus Basin agriculture beyond project closure.* The project will work with government stakeholders to promote greater use of newly available knowledge (as generated under Component 1) in policymaking and service provision. In an effort to improve vulnerable farmers' access to credit and insurance products that would enable adoption (and continued use) of locally appropriate CRA and OFWM practices, the project will help connect farmers to locally-active financial service providers throughout the eight targeted districts. It will also support these service providers to better understand climate risks and the benefits of project-promoted practices, and factor this enhanced understanding into their products and pricing – support that directly responds to these entities' needs and demands (as articulated during project design consultations). In addition, the project will work with other local agricultural service providers (e.g. input providers, processors and young agro-technicians) to understand and respond to the changing market dynamics involved in the climate-resilient transformation of Indus Basin agriculture. In addition to being better capacitated to provide support for locally appropriate CRA and OFWM practices as a result of the project, local service providers will be incentivized to provide such services to respond to increasing demand from farmers (as outlined above).

75. The success of this project will provide a possibility of scaling up the benefits by the Government, International Financial Institutions (especially the World Bank), and the private sector to all 16 million rural people living in the targeted districts, and to the 90 million rural people in Pakistan's Sindh and Punjab Provinces. This project is also instrumental as it complements the new Government investment plan in agriculture in small machinery such as laser-levellers, seed drills, fertilizer drills, chisel ploughs and cultivators, and it attends to the 'soft' side of the needed transformation, while addressing agriculture and water issues. Ultimately, there is also potential for replication of climate change monitoring and farm level practices to be scaled up and have an impact in neighbouring countries – Afghanistan and India. Pakistan participates in a number of multilateral regional efforts such as the Indus Basin Initiative being implemented with support from the International Centre for Integrated Mountain Development (ICIMOD) and the Indus Basin Knowledge Platform supported by the International Water Management Institute (IWMI), which offer excellent vehicles for Pakistan to share knowledge and experiences in this project that will help to extend the reach of possible benefits beyond national boundaries.

76. The combined effect of institution building activities and the availability of accurate real time information will transform decision making in participating institutions, which has the potential to spill over to other provinces in the Indus Basin and the country at large where they work.

77. In providing this support, the project would catalyse a shift – in terms of the prevailing sectoral paradigm, the ways in which information and data are disseminated and used, and how sectoral support services are structured and provided – that would fundamentally change how Indus Basin agriculture and water would be managed in a changing climate. The proposed GCF project would therefore also constitute a marked departure from previous projects and (ongoing/planned) baseline projects, and address crucial gaps in the support provided for Indus Basin agriculture. For example, the proposed project places a strong emphasis on strengthening capacity to provide climate-informed extension and advisory services in collaboration with public and private service providers – support that has not yet been provided. This is part of the project's broader approach to emphasising farmer learning and face-to-face interaction between farmers and sectoral service providers in catalysing behavioural change for increased resilience at farm level. This too represents a departure from other approaches that focus more on providing farming inputs and other subsidies, which can create dependencies and fail to create sustainable behavioural change in the medium term. Furthermore, the proposed project will establish new and innovative extension and information dissemination tools – those that are part of the project's e-agriculture strategy – that have not previously been harnessed in Punjab and Sindh, and offer considerable potential to expand the reach of climate-informed extension and advisory services. Finally, the project will establish cutting-edge systems that are new to the Indus Basin, and will use satellite imagery and other data to enable more holistic monitoring of cropping patterns, water use and climate change impacts.

E.2.2. Potential for knowledge and learning

78. At present there is not enough knowledge of how the climate is changing in the Indus River Basin, how the changes that are occurring are affecting agriculture, what changes are expected in the future and how they are likely to affect agriculture, and what can be done to best respond to those changes so as to create the conditions for sustainable agriculture in the future. Moreover, an understanding of the knowledge that does exist is not widespread. Therefore, the investments in this project focus on acquiring and disseminating knowledge on how the climate is changing in the Indus River Basin, and what can be done to respond or adapt to those changes.

79. In Component 1, the project puts in place equipment and procedures to acquire data and information, transform that data and information into knowledge through routine posts through the ACWA about topics such as temperature and rainfall probability, timing, and intensity. In Component 2, vulnerable agricultural producers will learn skills to access weather-related knowledge that is being acquired and shared by public sector institutions like PMD or the provincial Departments of Agriculture and Irrigation. The information made available through Component 1 about water and weather will be put into user-friendly formats and combined with knowledge about the implications for farmers and their crops in Component 2 activities under the project's *e-agriculture* approach. In Component 3, the project activities on modelling of weather data collected by the project will allow financial institutions providing credit and crop insurance to acquire knowledge that they can use to reduce risk and lower their costs, thus enabling them to provide financial services that are better suited to changing local conditions.

80. The knowledge and learning that will take place across different groups during the project will be the force that underlies the shift in paradigm for Pakistan in its approach to the Indus River Basin. The knowledge of how the climate is changing in the Indus Basin will have applications, for example, in work to reform water distribution policies by provincial irrigation authorities, in decisions to create or upgrade water delivery mechanisms, in choices in seed breeding and selection by the Pakistan Agricultural Research Centre or by seed suppliers like SANIFA Agri Services. Knowledge internalised by the staff of the national and provincial government stakeholders included in the project will change their way of working as the project promotes the sharing of skills and resources amongst staff and counterparts across components.

81. Key knowledge outputs generated by this project – in the form of training materials, including videos, and online services for farmers – will be available to other provinces through the ACWA portal. Knowledge from the project will reach a more general, wider audience in the public awareness raising campaigns foreseen on radio and mobile phone messages. They will also reach the scientific community through participation of project staff and government stakeholders in regional events like the Indus River Basin Forum sponsored by IWMI in 2017.

E.2.3. Contribution to the creation of an enabling environment

82. The process of transforming Indus Basin agriculture that is set in motion by this project can only be sustained if agriculture sector policy and support services enable and actively contribute to this process. In response to this need, proposed measures are conducive to effective and sustained participation of both public and private sector actors to continue supporting climate resilient development beyond the project. These measures are also, to a large extent, the ones that are described in section D.2 Exit Strategy.

83. Component 3 aims to create an enabling environment in part by equipping relevant stakeholders to address issues that may otherwise impede a sector-wide transformation (e.g. water efficiency, rural credits, value-chains, and lack of access to information). Rather than set up new systems and services, the project will work with the numerous relevant initiatives being implemented by other organisations including private sector companies that – with the right information and support – can play a key role in supporting the uptake of climate-resilient agriculture among vulnerable farmers throughout the Indus Basin. The key is networking and exchanging ideas and experiences.

84. The project will enhance the Government's capacity to put into action its NCCP and NDC, as well as the Pakistan Climate Change Council through the MoCC as the base to create an enabling environment. It will do so by facilitating both Federal and Provincial Governments to use project results and data contained in the ACWA portal (Component 1) for evidence-based decision-making. Furthermore, the project will line up necessary budgetary allocations with federal and provincial governments to ensure continued delivery of much-needed support and enabling conditions required to continue driving the process of transforming Indus Basin agriculture from a climate-vulnerable to a climate-resilient development pathway.

85. Given the efficiency of the private sector generally, especially with respect to technological development and service delivery, the project design has been developed to build partnerships in the agricultural sector whenever possible. It also favours arrangements whereby private sector partners will have incentives to work with government like having developed a larger customer base or increased demand for a type of product. In addition, the project supports public and private sector actors to use ICT for data collection, web portal management, demonstration plot management, crop insurance risk analysis and direct seeding of rice. The project also includes provisions to make the necessary financial resources available to producers and other private sector operators on a sustained basis, including by ensuring that their activities are profitable. These activities will create a wider enabling environment where different actors complement each other to meet the demands of farmers.

86. The project aims to build the capacity not only of men who are farming but also of women so that communities as a whole may adopt climate resilient practices, as will be required given the interrelated nature of farm activities and farming systems. Government officials, technicians and practitioners from NGOs will also be guided, with due involvement of women and minorities, so that they can continue to guide farmers where necessary and integrate farmers' feedback in their work upstream.

87. There are a wide range of other project activities that will improve the enabling environment for supporting agricultural producers to transition to climate resilient agriculture. This includes public education that will create a broad, common understanding of what climate change is going to mean in rural Pakistan and what people need to do about it. It also includes technical assistance for provincial authorities to set water allocation policies that respond to changing climatic conditions. Other important measures include helping banks make crop insurance and credit available to finance climate friendly on-farm works, as well as putting in place free phone-based services for timely weather forecasts needed around planting and harvesting.

E.2.4. Contribution to regulatory framework and policies

88. This project will make important contributions to the regulatory framework and policies to improve climate-responsive planning and development. Under Component 3, it will contribute by: (i) increasing collaboration between institutions; (ii) supporting knowledge sharing for evidence-based policy making; and (iii) mainstreaming climate policy across all policy areas. In addition to these activities, the project will also: (iv) make data and data analysis available; (v) raise public awareness and understanding to garner popular support for inclusive climate change adaptation; and (vi) provide hands-on assistance to the drafting and formulation of standards and regulations for field level implementation of higher level policies in Punjab and Sindh. It will focus on provincial level policies and regulations for the use of water in agriculture in the face of climate change. These project activities should provide the two provinces with the means to help move forward the agenda for the finalisation and approval of the National Water Policy that has been on-going for an extended period. In this process, it will also help responsible provincial government offices to achieve coherence between the implementation of the eventual National Water Policy and the existing National Climate Change Policies.

89. The project activities under Component 1 with PMD and the PCRWR will collect and analyse data in water accounting and high-resolution ET data in Punjab and Sindh. The data gathered through water accounting and ET data will also serve to monitor water use and availability in agriculture. These functions and the outputs that they provide will permit provincial authorities to achieve greater transparency, reliability and equity in water allocation and in the application of future regulations for both surface and groundwater.

E.3. Sustainable Development Potential

Wider benefits and priorities

E.3.1. Environmental, social and economic co-benefits, including gender-sensitive development impact

90. As the overall objective of the project will be to increase the resilience to climate change of the most vulnerable households in the Indus River Basin, calculation of the economic impact of the project has been made based on the financial benefits that will accrue to the participating vulnerable households from incremental increases in income after adopting project-recommended agricultural practices. These are detailed in Section F.1 Economic and Financial Analysis. Beyond these, there will be further impact from significant environmental and social benefits as well as economic benefits that have also been partly quantifiable. The most important benefits along these lines will be in growth for the local economy, reduction in greenhouse gases (GHGs), increased empowerment of women and minority groups, and improvement of nutrition and food security.

91. Additional expenditure in the project area as a result of project spending will have a multiplier effect on growth in the local economy. There will be a higher turnover for related agricultural sector businesses including input suppliers, traders and processing facilities. Further economic growth will be generated from spending on production costs and consumption spending as a result of increased returns to labour.

92. The project will deliver environmental co-benefits in the form of climate change mitigation. Using its Ex-Ante Carbon Balance Tool (EX-ACT), FAO has estimated that reduced residue burn, reduced pumping, better land use practices, improved soil quality and higher productivity of water in groundwater ecosystems will lower greenhouse gas emissions by approximately 0.9 tons per hectare per year in the project area. This will have a climate change mitigation impact of at least 4 million tonnes of Carbon Dioxide equivalent (tCO₂e) reduced emissions over a 20 year period, if improved practices were adopted on 40 percent of the surface area to be covered by the project.

93. The project will generate social benefits from the explicit inclusion in technical training in field schools and demonstration plots of at least 48 000 women who are working as agricultural producers. This will raise the development impact on the women included in training in terms of the empowerment they are expected to experience as a result of increased knowledge and income. It is also expected to result in benefits in terms of increased food consumption for the 72 percent of households in Sindh and 60 percent in Punjab that currently fall short of reaching food security. The increased income that women participating in the project will have, combined with better knowledge on nutrition as a result of project outreach to them, offers potential to reduce the prevalence of childhood undernutrition that currently affects the majority of children in the project area districts.

E.4. Needs of the Recipient

Vulnerability and financing needs of the beneficiary country and population

E.4.1. Vulnerability of country and beneficiary groups (Adaptation only)

94. Pakistan's total population is now reported at 207 million people, with 132 million in rural areas, according to the 2017 government census. About 90 million rural people live in the provinces of Punjab and Sindh. To put this in perspective, this is well over the combined total of 65 million people who are exposed to climate change risks and living in all 52 of the world's Small Island Developing States.

95. As noted above, Pakistan is highly vulnerable to climate change. According to the UNDP Multidimensional Poverty Index, 44 percent of Pakistan's total population and 68 percent of the rural population lives in poverty. The country is the lowest of all lower-middle-income countries in terms of human development, ranking 147 out of the world's 188 countries. That is lower than both India and Bangladesh. The low status in terms of human development for the country as a whole makes vulnerability to climate change particularly acute and generally constrains people's adaptive capacity and ability to be resilient.

96. The intended beneficiaries of this project, within Punjab and Sindh Provinces in the Indus River Basin, are small farmers. They live in eight selected districts with a total of 16 million people. Most of the households in the selected districts do not have a secure food supply. About 60 percent of people in Punjab districts and 72 percent in Sindh districts experience food insecurity. The majority of the rural population in these districts are illiterate with approximately 67 percent of the rural women in Punjab districts and 84 percent of women in Sindh districts unable to read or write.

97. Most agricultural producers are landless, largely tenant farmers. Only 22 percent of households in the project area in Sindh and 36 percent in Punjab own the agricultural land that they farm. The extent of bonded labour and child labour in the area led the Government of Pakistan and the International Labour Organisation (ILO) to initiate a joint project in 2016 to reduce child and bonded labour in the Punjab districts of Khanewal, Multan, and Dera Ghazi Khan. All three districts are part of this project's target area.

98. In such conditions, the resilience of rural households is limited and their vulnerability to changing climatic conditions – like extreme temperatures and changing rainfall patterns – is acute. The vulnerability of this large proportion of the population in these two quite large provinces makes the nation itself quite vulnerable overall.

E.4.2. Financial, economic, social and institutional needs

99. Pakistan's financial needs with respect to adaptation are very high. The Government of Pakistan's first Nationally Determined Contribution (NDC) estimated that it will require between USD 7-14 billion per annum to meet its adaptation needs. These would be required to protect public and private resources that are the source of economic growth in the country. Much of the expenditure to protect private assets and income streams will be made by the private sector. However, resources to provide public goods and services such as technology, knowledge and information needed by vulnerable farmers will have to be provided by the Government.

100. **In 2016, in spite of Pakistan's financial constraints, estimated federal climate-related expenditure was between 5.8-7.6 percent of the total expenditures in the federal budget.** Pakistan is committed to increasing that amount, but competition is high for federal budgetary resources, in particular due to the current high levels of debt servicing and security-related defence costs of the federal government. At the same time provincial governments have very limited funds available for investment as they struggle to find resources to cover expanding recurrent cost expenditures in health, education and communications due to urbanisation and demographic changes.

101. **At present, the federal government is not in a position to raise additional resources domestically through taxation or domestic government borrowing due to possible negative impacts on the economy at large.** It has sought access to low interest-rate concessional financing from other multilateral financing institutions to address agriculture and water issues in the Indus Basin. However, increasing future debt servicing obligations remains

an issue. The government debt-to-GDP ratio has been increasing over the past decade. Concerns about taking on additional debt – particularly to finance the types of public goods and capacity development activities supported through this project – are pronounced. If debt servicing costs continue to increase, this will further reduce fiscal capacity to finance public investments that are essential to long-term economic growth, as well as cover the rising costs of climate change adaptation. It is important to note that funds borrowed from development partners such as the World Bank and the Asian Development Bank are generally allocated for investments in infrastructure, other forms of public works and hardware, while the Government is advised to avoid using borrowed resources for training and technical assistance.

102. **There is a critical need in Pakistan for grant funding to finance technical assistance, training and other softer investments needed to change skills, knowledge, mind-sets, relationships and ways of working and managing natural resources and production in the face of climate change.** Yet neither the domestic private sector, government nor multilateral financial institutions are currently in a position to provide grant resources for these kinds of public goods. This makes the value-added of the scarce grant funds from the GCF especially high. At the same time this puts the GCF in a position to heighten the impact of its funds by directing them to investments on agreed climate change adaptation priorities for which no other source of funds is available, but which are essential for inclusive climate resilient agriculture.

103. **The grant financing requested from the GCF is the minimum level of concessionality needed to make this project viable.** The project includes considerable support for public goods, as well as technical assistance and capacity building geared toward unlocking investment in climate-resilient agriculture during and beyond the project implementation period. Although the project generates important economic benefits through this support, this does not constitute the type of government investment that would directly generate financial returns and thus enable repayment of (even a concessional) loan. In addition, the support the project provides to farmers is largely geared toward improving their capacity to adopt CRA and OFWM practices, while also strengthening the extension, advisory and financial services that enable farmers to adopt and sustain climate-resilient approaches to farming. Project activities will not crowd-out private investment by beneficiary farmers, but rather act as a catalyst to unlock additional investment in climate resilient agriculture (for more information see Section F.1 of the Funding Proposal and Section 9 of the Feasibility Study). Given this, as well as the poverty and vulnerability status of the farmers targeted by the project, grant financing is considered to be the appropriate level of concessionality.

104. Pakistan's governance arrangements – whereby resources, policies, operations and expenditures are decentralised to the four provinces at the sub-national level – imply that the capacity to meet the needs of the people of Pakistan to adapt to climate change must be developed at the provincial level. In recognition of this, the project includes some basic investments under Component 1 in coordination and acquisition of systems and knowledge that are more effective at the national level, for economies of scale and holistic ecosystem planning. However, the project allocates more than 70 percent of project resources to directly strengthening institutions and implementation capacity of the affected population through skill-building and technology transfer to farmers and the private sector institutions working with them such as input suppliers, traders, and banks. The economic, social and institutional needs that they respond to are described above in terms of vulnerability.

E.5. Country Ownership

Beneficiary country (ies) ownership of, and capacity to implement, a funded project or programme

E.5.1. Existence of a national climate strategy and coherence with existing plans and policies, including NAMAs, NAPAs and NAPs

105. The Ministry of Planning, Development and Reforms developed the Pakistan Framework for Economic Growth in 2011 to address the impact of climate change in the country. It proposes to 'climate-proof economic growth from the impacts of climate change, paying particular attention to the agricultural, water and energy sectors'. Furthermore, Pakistan's National Climate Change Policy (NCCP), adopted in 2012, and the associated framework for implementing that policy both place an emphasis on agricultural development.

106. At the 22nd Session of the Conference of the Parties (COP22) to the UN Framework Convention on Climate Change (UNFCCC), Pakistan highlighted its National Climate Change Policy, its National Disaster Risk Reduction

Policy, and its commitment to the Sustainable Development Goals (SDGs) as part of its own development agenda. In its Nationally Determined Contribution (NDC) Pakistan indicates its commitment to achieve: (i) behavioural changes in consumption patterns; (ii) application of scientific and technological knowledge in adaptations at the national, provincial and sectoral levels; (iii) integration of climate change concerns in economic planning and decision making; (iv) building up necessary institutions at all levels; and (v) development of low carbon emission scenarios with all possible options for implementation.

107. As discussed below in section E.5.3 Engagement with NDAs, civil society organizations and other relevant stakeholders, the NDA has been involved throughout the project preparation process to ensure that the project will make the maximum possible contribution to the country's NCCP objectives. This proposal was jointly crafted with them to respond to several NCCP objectives, including:

- 4.1.0 Objective 1: To conserve water by adopting appropriate techniques and measures.
- 4.1.2 Objective 2: To increase awareness to adapt to changing water resource situation to climate change.
- 4.1.3 Objective 3: To develop and implement integrated water resource management.
- 4.1.4 Objective 4: To develop and enforce required legislative and regulatory framework to protect water resources from climate change related vulnerabilities.
- 4.1.5 Objective 5: To enhance capacity to manage the country's hydrological system.
- 5.3.0 Objective 1: To build climate change resilience into Pakistan's agricultural system.
- 5.3.1 Objective 2: To enhance crop productivity through irrigation and land management techniques.
- 5.3.2 Objective 3: To enhance institutional capacities to undertake research & development on agriculture.
- 5.3.3 Objective 4: To enhance the understanding of CC issues by farmers, agricultural industries, and policy makers to enable them to make informed decisions.

108. Furthermore, beyond the federal government and the NDA, the provincial governments of Punjab and Sindh have both shown a strong sense of ownership of the project to date. This has been manifested through their commitment of co-financing resources of USD 8.0 million and USD 4.7 million, respectively. They will channel these resources through FAO for expenditure by FAO on their behalf together with GCF resources in the project area.

109. The proposed project, with its focus on the middle and lower parts of the Indus Basin, will work downstream of the on-going work on glacial lake outburst floods under the Scaling-up of Glacial Lake Outburst Flood risk reduction Project in Northern Pakistan (GLOF) being financed by GCF and implemented by UNDP.

E.5.2. Capacity of accredited entities and executing entities to deliver

110. FAO will function as the Accredited Entity and the Executing Entity. Its capacity to fulfil these functions is described in Section C.4. Background Information on Project Sponsor, Executing Entity.

E.5.3. Engagement with NDAs, civil society organizations and other relevant stakeholders

111. This proposal was prepared in response to the expression of interest by Pakistan's NDA at the MoCC for assistance in adaptation work in water management and the agricultural sector. Meetings began with the NDA in April 2017, when FAO and the NDA staff identified a comprehensive set of institutional and interest groups that comprise the stakeholders who will be concerned by investments in this area. Key stakeholders were identified within MoCC, in the Ministry of Planning, Development and Reform, the MoFSR, GCISC, NARC, CAEWRI, PARC, and PCRWR, and PMD. FAO gathered technical inputs and institutional background on the mandate, role, capacity and work plans of these institutions and how the NDA proposed coordinating work amongst them. Once the targeting and scope of the proposed project were outlined in meetings with those agencies, individual interviews took place with officials in the Punjab and Sindh Provincial Departments of Irrigation and Departments of Agriculture.

112. Following initial information gathering and scoping for the project on behalf of the NDA from April 2017 through July 2017, FAO provided its preliminary findings and suggestions to leadership within the NDA. Based on feedback from the NDA, an expanded FAO team was composed, drawing on in-country and international technical expertise to explore selected issues in-depth. This team carried out a field mission in July 2017, and its in-depth engagement has been on-going since April 2017, in the form of data collection and analysis as well as through on-site visits, focus group meetings and field level consultations with agricultural labourers (with special attention to women and minorities), NGOs, producers, producer groups, input suppliers, financial services suppliers, output traders, processors, and others in the proposed project area.

113. A high-level stakeholder consultation for the Punjab was held at the Arid Agriculture University in December 2017 to review the project Concept Note in-depth with prominent Punjabi experts working in the field of water management and climate resilient agriculture. A comparable event was held in Hyderabad in January 2018. The Concept Note was drafted drawing upon the preliminary findings from engagement with stakeholders through January 2018. It was cleared by the NDA and submitted by the FAO to GCF for comment in February 2018.

114. During the formulation of the full Funding Proposal, in-depth consultations with stakeholders in the eight project districts took place over a period of 10 days in February–March 2018 in connection with the field work done in order to assess possible environmental and social safeguard issues related to proposed project activities. The key results of those consultations related to safeguards are summarised below in Section F.3 and the details of the consultations and their findings and outcome are shown in the Environmental and Social Management Framework (Annex 4), while the consultations themselves are briefly summarized in Attachment 6 of this funding proposal. Special attention was given during those consultations to gender issues and the identification of activities for the inclusion in project components to address the issues raised. The project Gender Action Plan (Annex 5) was an outcome of this fieldwork. A summary of stakeholder consultations that have informed the design and development of this project (from February 2017 – June 2018) is included in Attachment 5 of this funding proposal.

115. The provincial and federal government contributed to the formulation of the project by allocating experts at the federal, provincial and district levels to provide country specific technical information as well as data necessary for formulation of the project. During formulation, the provincial government stakeholders of Punjab and Sindh have made commitments to co-finance the project implementation through cash contributions, of USD 8.0 million from Punjab and USD 4.7 million from Sindh. Provincial counterparts have also committed in-kind resources in the form of office space and staff time. They have committed to appointing staff to function as the provincial Project Directors and Joint Directors, and the federal government has committed to appointing a Project Director at the national level.

116. FAO also closely engaged with development partner stakeholders in Pakistan working in agriculture and water management in order to benefit from their insights and to determine how GCF financing for climate change adaptation could help increase the returns to investments that the country is making with the external financing they are providing. Amongst these partners, including CIAT, DfID, GiZ and the World Bank, FAO has conferred most closely with CIAT, IFPRI, UNDP on GLOF and the World Bank on this proposal in the context of its on-going collaboration. In the Cooperative Programme between the World Bank and FAO, FAO has a 50-year history of providing technical assistance in the design and implementation of World Bank investments. Government officials that will be responsible for this project, in particular the officials of concerned Provincial Departments in Punjab and Sindh, are also responsible for the World Bank-financed initiatives in agriculture and irrigation in the two provinces. They have conferred with the World Bank and FAO about programming the inclusion of activities in this project – like water accounting and ET monitoring and management – so that technology, skills and knowledge acquired with GCF financing can be transferred into their planned work under larger projects like the SMART project in Punjab and the follow-on project to the SWISP in Sindh. In this way, the GCF-financed inputs will have the effect of shifting the focus of World Bank-financed activities, to make them more responsive to climate change considerations. At the same time the World Bank financed projects will serve as vehicles for extending the results of GCF financing.

E.6. Efficiency and Effectiveness

Economic and, if appropriate, financial soundness of the project/programme

E.6.1. Cost-effectiveness and efficiency

117. Available climate change simulation information for project design was used for the calculations in the economic and financial analysis of the planned investment for this project. A likely 4 percent decline in yields of wheat, rice, cotton and sugarcane due to climate change would be expected to decrease net profits of targeted farmers in the project area by around USD 66 million over the next 20 years in a 'without project' situation. With the project these losses would be avoided. New practices adopted on 5 percent of agricultural land would eventually increase to up to 40 percent of the land in the project area. This is due to the assumption that during the project implementation period only the 'early adopters' would take up the new practices and after initial positive results more and more farmers will adopt those new practices, and practices initially promoted through extension efforts will further spread through word-of-mouth recommendations among farmers and villages. This would generate an additional net cash flow to producers of USD 91 million over a twenty-year period. At the household level this would bring 30–80 percent increases in the returns to family labour as the result of increased yields and lower production costs. The return on the investment of the estimated total project costs that this would bring is detailed below in section E.6.3.

118. Additional financial and economic growth will be generated by the project as the turnover of agricultural sector businesses including input suppliers, traders and processing facilities will increase due to increased output volumes, and additional cash in the local economy will stimulate increased consumption of goods and services by rural households. This would build the strength and resilience of the local economy to cope with incremental changes due to factors like increased temperatures, and to cope with extreme weather like droughts and floods.

119. The cost of the overall investment for this project would be about USD 37 per beneficiary, counting 1.3 million direct beneficiaries that will be reached, which represents 8 percent of the rural population in the project area. The reach of this project coverage is comparable to GCF-financed projects for adaptation at a comparable level of investment, such as the recently approved Responding to the Increasing Risk of Drought: Building Gender-responsive Resilience of the Most Vulnerable Communities in Ethiopia project, reaching an estimated 1.3 million beneficiaries at a total cost of USD 50 million. In contrast, the GCF-financed project in Colombia entitled Scaling Up Climate Resilient Water Management Practices for Vulnerable Communities in La Mojana at a total cost of USD 117 million is expected to reach 405 000 beneficiaries.

120. In terms of efficiency, this project would compare very favourably with on-going investments being made in the Indus Basin by other development assistance agencies with estimated costs per beneficiary ranging from USD 26 for the Sindh Resilience Project to USD 120 in SMART. Cost per beneficiary is considerably lower than for the recently approved GCF-financed Saiss Water Conservation Project for Morocco estimated at a total cost of USD 206.67 million or about USD 96 per beneficiary for the planned 2 150 000 direct and indirect beneficiaries. It also compares quite favourably to the Bhutan for Life project at a total cost of USD 118 million or about USD 422 per beneficiary for the total planned 145 000 direct and indirect beneficiaries.

121. The return on GCF resources will be enhanced by the mobilisation of USD 12.7 million in Government co-financing that will cover about one quarter of the total project costs.

122. Project efficiency would be further enhanced by the positive externalities that it would bring in terms of climate change mitigation through reduced GHG emissions. As mentioned above in section E.3.1. *Environmental, social and economic co-benefits*, if project-recommended practices for adaptation are adopted as expected in the project area, the resultant GHG reductions could be in the order of 0.9 tonnes per hectare per year on some 225 000 ha. This is expected to have a mitigation impact of about 4 million tCO₂e reduced emissions over a 20-year period.

E.6.2. Co-financing, leveraging and mobilized long-term investments (mitigation only)

Not Applicable.

E.6.3. Financial viability

123. Overall, the Net Present Values (NPV) and Internal Rates of Return (IRR) for the project are positive, reflecting the incremental net profits benefiting farming households. This is reflected in the Economic NPV and Economic IRR

(EIRR), calculated for a 20-year period and presented below in Section F.1. The analysis underlying these is presented in full in Annex 3.1, and described in detail in Section 9 of the Feasibility Study.

124. GCF resources will be used, in combination with grant resources from Government, to produce public goods and services, such as developed capacity of both Government and farmers, as well as better information, better government policies, and knowledge of climate change issues. Although these will generate benefits to the Pakistani economy, they will not directly generate financial returns to the Government. Therefore, no financial rate of return has been calculated to determine the financial viability of the project overall.

125. Nonetheless, as indicated, the quantification of the benefits used to calculate the EIRR to the investment of resources has been derived from the stream of benefits that will be generated at the farm level to individual agricultural producers reached through project activities. The analysis estimates the changes in costs and benefits to producers of adopting practices that will be recommended by the project in the improved environment, resulting from project investments. In this connection, the changes to be made by individual producers will each be fully viable from a financial perspective.

126. The future project viability is assured through a combination of elements that build the technical, financial, operational and institutional capacities of national and sub-national governments and local communities that will be self-sustainable in the post-project period.

E.6.4. Application of best practices

127. Best practices have been applied to the design of this project, and will be applied in its implementation, in all facets where there are technologies and practices that have proven to be successful elsewhere and that also fit the given context of this project.

128. One of the most innovative and valuable technologies to be put in place under the project will be the ET monitoring system that will provide Pakistani experts with one of the most advanced cutting-edge approaches to determining real use and needs of plants for water in agriculture. The technology is recognised for its accuracy and the detailed knowledge that can be used by farmers and water allocation officials to lower costs, minimise waste and achieve the highest possible productivity of water based on actual plant physiological requirements. It has been successfully used in China for precision monitoring and water allocation on large areas.

129. The project will also bring a set of FAO-developed technologies that are very relevant to climate change analysis, including ASIS, Collect Earth, Earth Map, and MOSAICC. The project will develop the national capacity to use these technologies.

130. The proposed CRA and OFWM practices (see sub-component 2.1) are all tested in Pakistan. As demonstrated in the financial analysis of this proposal, they have shown substantial benefits to participating farmers in the area of yield increase. These practices will be disseminated using FAO's FFS extension platform, which is widely recognised as one of the best practices in influencing farmers' cropping practices.

131. The project will also put the best practices of Pakistan's own communications industry leaders who distribute content over several formats including its print, radio, mobile phone messages and online platforms in the service of climate change. It will build partnerships with them for the project's awareness raising campaigns. The project will also partner with Pakistan's own successful mobile money service providers to extend their reach into the country's most vulnerable rural areas where high costs can make other kinds of financial service providers non-viable. This will also provide opportunities for synergy with the on-going collaboration in Sindh for simple means of electronic registration of children born in the province that will help address the difficult social conditions of women and children in the project area, described in the Environmental and Social Management Framework (Annex 4).

132. Building on the best practices from elsewhere in South Asia and in East Africa, distance learning for illiterate agricultural producers will be organised through interactive delivery of selected technical messages through videos

and gamification or interactive learning via mobile phones including the possibility to access technical advisors that respond to local problems using photos taken by farmers and sent by messages to technical specialists. Some such practices have already been introduced in the project provinces and the Government of Punjab has expressly conveyed to FAO, in writing, its interest, and the farmers' interest in seeing services along these lines increase.

133. Other best practices – no less important – range to the opposite end of the spectrum. The project design incorporates a seemingly obvious, but often-overlooked best practice when it comes to reaching women farmers: using women extension agents for WOSs. The project will also provide transport for women and day care for children while women attend training events.

134. Another best practice that will be applied in the project relates to training certificates as means to validate skills acquired, and which will be used to market those skills acquired. The project will adopt this practice in the training of agrotechnicians who will provide some services to water user associations and farmers that will enable them to maintain and repair equipment and small-scale machines, like pumps.

135. On still another level the project incorporates best practices with respect to the delivery of development assistance by making explicit arrangements with government agencies to gradually assume any recurrent costs that they may incur as the result of new equipment, staff or activities introduced by the project that will be sustained after project completion. In this case, for example, PMD agreed to secure the budgetary resources that will be required in project year 4, project year 5 and project year 6 to cover the costs of running the ET monitoring systems.

F.1. Economic and Financial Analysis

136. A financial and economic cost benefit analysis was conducted to evaluate the financial viability of the investment. A twenty-year period has been assumed for the economic analysis, which includes the six-year project implementation period.

137. The main purpose of the project is to build farmers' capacity to withstand the adverse effects of climate change. The target group will be poorer farmers with no or limited capacity and knowledge to adapt their current agriculture practices to climate change. They will benefit from specific advice on agriculture techniques and more efficient use of inputs under Component 2, in conjunction with the other two components.

138. The analysis identifies quantifiable benefits both directly and indirectly related to the project activities based on crop production models of representative farms in the southern region of Pakistan. Benefits contributing to an increase of household income are: (i) adoption of improved agricultural technology and practices; (ii) increased production of selected crops; and (iii) adoption of improved water saving practices. Incremental net profits for the farmers were calculated by comparing the traditional agriculture practice (without the project) to the improved agriculture practice (with project). It is worth noting that incremental benefits can already occur by keeping the farmers' profits on the same level as today compared to a net profit decline under climate change.

139. The main benefit streams are occurring in Component 2. However, information systems financed by GCF in Component 1 would not be set up under normal market conditions as they represent a public good, rather than generating profits. Yet, information and data produced under Component 1 will be used in Component 2 to further strengthen the knowledge base of farmers and therefore indirectly contribute to the adoption of new agriculture practices that can better withstand climate change induced events. Similarly, one of the main tools to give farmers an understanding of the new practices will be demonstration plots. Such plots are for educational purposes and do not yield the necessary profit for the private sector to invest. Hence, GCF funding is also crucial under Component 2. Component 3 will create an enabling environment where farmers and private sector companies will be able to continue driving the process of sector transformation toward a climate resilient development pathway. Outputs of Component 1 will also contribute to the process.

140. On a per acre basis, net profits were calculated for each crop and each new practice. Five main practices are included in the analysis: (i) wheat – zero tillage; (ii) rice – alternate wet and dry with direct seeding; (iii) cotton – ridge sowing; (iv) sugarcane intercropping; and, (v) homestead gardening. In addition, this project will also promote multiple cropping systems and the use of temperature tolerant varieties of the target crops. Total input costs (including costs for seeds, fertilizer, machinery, hired labour and other fixed costs) were subtracted from the total revenues to calculate the net profit per acre. For the 20-year analysis (under climate change assumptions), constant input prices are assumed, with declining yields. Further, it is assumed that the average yield increases in the second period after adopting the new practice. The prompted practices are not depended on an increased use of fertiliser, pesticides and herbicides. Therefore, no projects funds will be allocated for these agriculture inputs.

141. Additional net cash flow to households would also reduce the financial gap; as farmers are up to 40 percent better off when comparing the with and without project scenarios. In turn, this would put households in a stronger bargaining position with private sector operators, including input suppliers, traders and financial service providers.

142. In order to adequately reflect changes on the ground, the influence of climate change on crop yields has been built into the economic and financial analysis. Drawing on the analysis summarised in the Feasibility Study, an annual yield decline is assumed in both the with and without project scenarios. Farmers, for example, would face a loss of around 4 percent of their annual net profit of wheat per acre, if left alone. In addition to the yearly yield decline, the occurrence of extreme weather events (e.g. flood or drought) in the Indus Basin have also been considered. Every fifth year, such an event would occur and reduce the yield output by 50 percent. The year following this event is a recuperation period until yields bounce back to the base case in the third year after the extreme weather event. The same event is taking place in the with project scenario. It is, however, assumed that households will slowly build up some resilience due to the project activities. Stronger and more stable livelihoods mean that households will be better

equipped to cope with the adverse effects of climate change and yields will not drop that drastically as compared to the without project scenario.

Economic Analysis

143. The economic analysis not only includes benefits directly related to the on-farm activities, but also environmental co-benefits benefiting the society as a whole. Therefore, the analysis focuses on a main case A that includes environmental co-benefits. A sensitivity analysis was also conducted for a secondary case B that excludes environmental co-benefits.

144. The environmental co-benefits are quantified through the FAO's EX-ACT tool that estimates the impact of the agriculture practices on the carbon-balance. The carbon-balance is defined as the net balance from all GHGs expressed in CO₂e that were emitted or sequestered due to project implementation as compared to a without project scenario. In the project, balance is due first to: (i) reduced CH₄ emissions from the shift to continuously flooded to intermittently flooded soil; and, (ii) increased soil carbon sequestration from management options adopted for wheat–cotton cropping systems and sugarcane. This translates into -0.15 tCO₂-e for wheat/cotton, -0.16 t CO₂-e for sugarcane and -1.29 t CO₂-e for rice per year, per acre. The economic analysis uses a price of USD 40 per tonne of CO₂eq, in line with the report of the High-Level Commission on Carbon Prices¹³ and other guidelines on the social cost of carbon (SCC)¹⁴, but a sensitivity analysis shows that the project remains profitable with a carbon price of USD 5 per tCO₂eq (as outlined in Table 4).

145. The analysis uses the economic NPV, the benefit-cost ratio and EIRR as a measurement for success. Economic values (costs and benefits) are all measured in real terms of 2017. The financial prices for traded agricultural inputs and commodities were converted to economic prices at import and export parity prices. The prices of non-traded goods and commodities were converted to economic prices using a standard conversion factor of 0.83. Economic costs of the project are net of taxes, duties, subsidies and price contingencies. In addition, it is assumed that benefits would be realised gradually, starting in year 2 and continue occurring until year 20. Project costs are also net of taxes and occur during the project implementation period in the first 6 years.

146. It is estimated that a total of around 250 000 farmers will benefit directly from the project (about 201 600 male and 48 000 female farmers). As female farmers will most likely be in the same household as the male beneficiaries, the project will reach 200 000 households. The average family size is 6.3 people per household, thus, the number of total beneficiaries is estimated around 1.3 million. With an average of 1.93 acres per small-holder farmer, the project is expected to influence around 385 000 acres in the two target provinces of Sindh and Punjab.¹⁵ The analysis uses a bell-curve shaped adoption rate with increasing rates of adoption to a maximum of 40 percent in year 10. The project consulted local experts and on-going projects to arrive at a realistic adoption rate. In the early stages of the project only so-called “early adopters” will take up the proposed new practices. After some initial positive results in combination with increasing extension work, more and more farmers will adopt those new practices. Diminishing rates of adoption are applied at the tail end of the bell curve.

147. The deposit interest rate in Pakistan in 2018 is 5.75 percent and the discount rate at which it lends to commercial banks is 15 percent. Hence, the project is using a computed social discount rate of 10 percent for the analysis.

¹³ The report was led by Joseph Stiglitz and Nicholas Stern, and concluded based on an extensive review that a range of USD 40–80 per tonne of CO₂e in 2020, rising to USD 50–100 per tonne of CO₂e by 2030, is consistent with achieving the core objective of the Paris Agreement of keeping temperature rise below 2 degrees.

¹⁴ This includes the Asian Development Bank's 2017 *Guidelines for the Economic Analysis of Projects* ([available here](#)), as well as 2017 guidance published by the World Bank ([available here](#)) that recommended using a low and high cost of USD 40 and USD 80 per tCO₂eq (respectively).

¹⁵ The EFA assumes a more conservative area under the project than the calculation in the EX-ACT tool. Further, slight differences in acreage also stem from the assumption in increasing adoption rate (EFA) vs. constant adoption rate (EX-ACT).

148. The economic analysis shows a very satisfactory EIRR for the project. The EIRR for the project (with environmental co-benefits) is 18.8 percent, the NPV is USD 15 783 573 and the Cost-Benefit ratio is at 1.51 points. A total of USD 4.5 million (10.5%) come solely from the environmental co-benefits (see Table 3).

149. Furthermore, the project is also financially viable with a 10-year period of analysis. The EIRR for 10 years (including environmental co-benefits) is 12.6 percent and the NPV is USD 3 178 731.

Table 3. Economic Analysis results

	<i>With Environmental co-benefits</i>	<i>Without Environmental co-benefits</i>
NPV (@10%)	USD 15,783,573	USD 11,298,114
Benefit Cost ratio	1.51	1.36
EIRR for 20 years	18.8%	16.5%

150. A sensitivity analysis was also conducted to test the robustness of the project; including project cost escalation, reduction of benefits, delays of incremental benefits to take place, exclusion of environmental benefits and different social costs of carbon (SCC). Unexpected increases in investment costs were estimated at 110 percent, 120 percent and 150 percent of the base scenario.

151. The project maintains above 10 percent returns even when the investment cost increases by 50 percent. Compared to the cost increase scenario, the decrease in benefits is relatively more sensitive, and the economic return is more affected by a reduction of benefits. The project could handle the reduction of benefits of 10 percent and 20 percent. With a 50 percent decrease in benefits, the project could no longer maintain above 10 percent of economic returns. Moreover, the project is economically robust even with delays in flow of benefits by 1 or 2 years. The project maintains an EIRR of 15.5 percent and 13.2 percent respectively.

152. One of the parameters that was tested in the sensitivity analysis was the exclusion of the environmental co-benefits. Excluding those benefits, the EIRR is 16.5 percent, the NPV and the Cost-Benefit ratio is 1.36 points, all at a social discount rate of 10 percent (see Table 4).

Table 4. Sensitivity analysis WITH Environmental Co-benefits (@ USD 40 per tonne CO₂)

	Base Case (@10%)	Costs Increased			Decrease in benefits			Delay of benefits	
		10%	20%	50%	-10%	-20%	-50%	1 year	2 years
EIRR	18.8%	16.6%	14.7%	10.1%	16.4%	13.8%	4.7%	15.5%	13.2%
NPV ('000 USD)	\$15,784	\$12,666	\$9,549	\$198	\$11,088	\$6,393	(\$7,694)	\$11,451	\$7,511

Additionally, the project's sensitivity to changes in the price per tonne of carbon was also tested. The analysis (with environmental co-benefits) assumes a price per tonne CO₂ of USD 40 in line with the findings of the High-Level Commission on Carbon Prices (as noted above), as well as SCC guidelines published by the World Bank and Asian Development Bank. A reduction of the SCC to USD 5 per tonne still produces relatively favourable results, while an increase in the price to USD 70 significantly improves the overall standing of the project, as shown in Tables 5 and 6 below. Additional information on this analysis is included in Annex 3.1 – *Economic and Financial Analysis*.

Table 5. Sensitivity analysis WITH Environmental Co-benefits (@ USD 5 per tonne CO₂)

	Base Case (@10%)	Costs Increased			Decrease in Benefits			Delay of benefits	
		10%	20%	50%	-10%	-20%	-50%	1 year	2 years
EIRR	16.8%	14.7%	12.8%	8.4%	14.5%	12.0%	3.2%	13.9%	11.9%
NPV ('000 USD)	\$11,859	\$8,742	\$5,625	(\$3,727)	\$7,556	\$3,253	(\$9,656)	\$7,890	\$4,281

Table 6. Sensitivity analysis WITH Environmental Co-benefits (@ USD 70 per tonne CO₂)

	Base Case (@10%)	Costs Increased			Decrease in benefits			Delay of benefits	
		10%	20%	50%	-10%	-20%	-50%	1 year	2 years
EIRR	20.5%	18.2%	16.2%	11.5%	18.0%	15.3%	5.9%	16.8%	14.3%
NPV ('000 USD)	\$19,148	\$16,031	\$12,913	\$3,562	\$14,116	\$9,084	(\$6,012)	\$14,503	\$10,280

F.2. Technical Evaluation

Option Considered but Rejected

153. **Selection of Rainfed Area:** The Government and FAO examined a wide range of options for supporting Pakistan to effectively transform the agricultural sector and water management in the Indus Basin to become climate resilient. One option considered was to work outside irrigated areas with producers practicing rain-fed agriculture, who are often more vulnerable to climate change impacts. However, the option to address the impact of climate change on irrigated agriculture was retained, given the importance of the irrigated agriculture sector in the Indus Basin in terms of food security of the country, the contributions to its economy, the absolute numbers of hectares and people working in irrigated agriculture as well as their relative importance over rainfed areas.

154. **Investments in Irrigation Infrastructure:** The focus on irrigated agriculture, i.e. efforts to improve the Basin's irrigation system as such, were ruled out in the design of this project. While farmers in the Indus River Irrigation System (IRIS) suffer with respect to access and availability of irrigation water from the canal system, these current limitations in access and availability are not a result of climate change. Therefore, while improvements to irrigation structures and water delivery functions need to be made and would help farmers adapt to climate change, investments in the irrigation system as such do not directly fall within the mandate of the GCF. Other international financial institutions and multilateral banks already working in the Basin are better positioned to finance them.

155. Nevertheless, increased temperatures leading to increased evapotranspiration will increase crop water requirements and necessitate improved efficiency in water delivery and use. Planned project activities to establish a water accounting system and ET Monitoring and Management are extremely important to achieve this, and will become absolutely necessary for Pakistan as a result of climate change. Based on meetings held with Government and World Bank staff, World Bank financing will be used to scale up outcomes of this GCF-financed project.

156. **Dissipation of resources over large area coverage:** The Government and FAO rejected proposals to cover all of the districts in the Basin due to the administrative challenges of working with four different provinces and the lower numbers of irrigated hectares in Balochistan and Khyber Pakhtunkhwa. Equally important was the need to limit the area where the project would work in order to provide intensive support to a critical mass of farmers, and service providers who work with them, needed to achieve a real transformation in production practices in a given area.

Technical Evaluation

157. **Selection of Crops and Production System:** The rice–wheat, cotton–wheat and sugarcane cropping systems were selected as the most widely grown crops and for their economic importance. In addition, multiple cropping of fruits and vegetables was included as a climate resilient practice. Proposed inclusion of monocrop potato and chili was rejected as these crops are confined to a more limited growing area, and because including them would reduce the intensity of resources applied to achieving solid results for given crops. However, the option was kept open as a part of the high-value multiple cropping system. The design team recognised the important role of livestock in the Indus Basin economy, the likely impact of climate change on livestock productivity, and even the challenges of mitigating their impact on greenhouse gas emissions. Again, it rejected the feasibility of including the commercial livestock systems in the proposal. However, gender considerations led to the inclusion of animal husbandry and poultry in the planned

WOSs. This was in recognition of the important role that women have in carrying out tasks related to livestock – as assets and food sources – in the need to build the resilience of women and their households.

158. Although the team recognised that in the long term shifting to different crops may be necessary – especially for sugarcane – this would require major additional efforts in developing new value chains and may bring major risks for farmers. By contrast, the selected climate resilient practices can be more easily adopted by smallholder farmers, because they require relatively limited investments and improve profitability, even under current conditions. This last point is important, because the top priority of smallholder farmers, particularly tenants, is to solve their current economic problems, and any practice that would only pay off in the future would not be adopted.

159. The project will **use the FFS approach**, which promotes farm-based experimentation, group organisation and decision-making, thereby increasing the likelihood that farmers will eventually “own” and adopt improved practices, and increasing farmers’ analytical capacities which will also improve their capacity to respond to future – as yet unknown – climate change impacts.

160. **An initial compendium of practices that have been evaluated** as suitable for providing benefits that will increase resilience to climate change conditions such as those that are forecast for the project area includes the following:

Table 7. Summary of Assessment on Proposed Practices

No	Cropping System	Temperature Stress	Moisture Stress/Water Savings	Weather Variability	Supportive Practices
1	Rice and Wheat Cropping System				
a	Direct seeding rice		X	X	
b	Zero-tillage wheat		X	X	
c	Alternative wet dry rice production		X		
2	Cotton and Wheat Cropping System				
a	Ridge sowing cotton		X		
b	Raised bed planting wheat		X		
3	Sugarcane Intercropping System				
a	Intercropping		X	X	
b	Mulching Sugarcane		X	X	
4	Multiple Vegetable Cropping System				
a	Multiple crop veg. and fruits				
b	Green manuring			X	X
5	Homestead Gardening			X	
a	Vegetable, fruits gardening				
B	Backyard poultry			X	
c	Backyard small animal production			X	
6	Cross cutting – best practices				
a	Laser leveling		X		X
B	Composting			X	X
c	Integrated pest management				X
d	Heat tolerant varieties	X	X	X	X

161. These practices are discussed in detail Appendix 13 of the Feasibility Study.

F.3. Environmental, Social Assessment, including Gender Considerations

162. An Environmental and Social Assessment was undertaken during project preparation according to the International Finance Corporation (IFC) Performance Standards and FAO Environmental and Social Management Guidelines. The key findings on potential positive and negative impacts of the project are as follows.

163. **Assessment Findings. Overall, the environmental and social impacts of the Project will be positive.** The project is expected to improve the natural resources and agricultural land upon which farmers work, based on improved, climate-resilient agricultural practices and natural resources management, specifically water management across the basin. Better functioning ecosystems will positively affect human health and well-being in the long run. Socially, the project will engage women through a Gender Action Plan that ensures proactive mainstreaming of women into all activities, empowering women with agricultural skills and knowledge. Livelihoods are expected to improve, based on increased adaptive capacities within the target communities. Investments in machinery and equipment, technology, and high quality agricultural inputs used on-farm and off-farm are expected to reduce impacts of climate change on agricultural productivity and production. The establishment of the ACWA portal is expected to positively impact government ministries and departments, facilitating improved coordination and planning of natural resources and agricultural extension services with a climate focus. In addition to these positive impacts, the project incorporates special participatory training sessions and activities in farmer field school and similar formats under Component 2 to ensure that farmers are able to proactively enhance their livelihoods in ways that would not have occurred in a 'without project' scenario. For example, Integrated Pest Management (IPM) practices will be used under the project in order to promote sustainable pest management that reduces reliance on and overall use of pesticides.

164. Given that the water management techniques promoted through the project under Component 1 will be based on rigorous water accounting and ET monitoring, conflict pertaining to water is not foreseen as a result of the project. On-farm water management under Component 2 is not envisaged to create conflict between upstream and downstream users based on increased withdrawals or sequestration of water. The project's inclusion of landless farmers and tenants means there is a potential risk of changes in tenant relationships with landlords due to increased land value resulting from increased agricultural productivity. This type of risk will be mitigated with application of the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests. Sensitisation will also be offered on safe, decent rural employment and age-appropriate work, given that youth often assist with the farming work of their respective families. Increased production may result in the generation of new environmental waste for example from slow-release fertilizers that do not fully decompose. Last of all, increased production is often a trigger for increased pesticide use, even if the pesticide use is indirect and not promoted under the project. As mentioned under the positive impacts of the project, indirect, increased use of pesticides will be mitigated by training on IPM. In instances where pesticide use is unavoidable, training on the safe handling of pesticides will be provided and bio-pesticides will be promoted over other varieties. There will be no pesticide procurement under the project, and highly-hazardous pesticides will not be used in the project areas. The project is not focused on construction activities, though minor construction activities may be pursued for the sake of establishing new agro-met systems. Due to the small size of such stations, potential negative impacts are expected to be minor and can be mitigated. For example, noise pollution during installation, air pollution due to dust, and health/safety risks during installation of agro-met stations, are envisaged to be low-to-moderate, localised and temporary.

165. According to FAO and IFC Guidelines followed in this assessment, the project has been categorised as a Category B medium risk project. The main reason for this is the inequality in the labour market and presence of landless farmers in the project area who will be included in project activities. Results of the assessment in terms of safeguards triggered, as a result of both existing conditions in the project area and of the planned project activities are shown here.

Safeguard Policies	Triggered	Safeguard Instruments & Mitigation Measures
ESS 1 – Natural Resources Management	NO	Non-Eligible activities
ESS2 – Biodiversity, Ecosystems, and Natural Habitats	NO	Non-Eligible activities
ESS3 – Plant Genetic Resources for Food and Agriculture	YES	ESMF/ESMP, ensuring that seeds used are registered.
ESS4 – Animal – Livestock and Aquatic Genetic Resources for Food and Agriculture	YES	ESMF/ESMP
ESS5 – Pest and Pesticide Management	YES	ESMF/ESMP with Integrated Pest Management (IPM) used in activities, training on the safe handling and use of pesticides in instances where avoidance is not possible, and a negative list (exclusion of all highly hazardous pesticides (HHPs)).
ESS6 – Involuntary Resettlement and Displacement	NO	Non-Eligible activities
ESS7 – Decent Work	YES	ESMF/ESMP; Training for farmers and sensitisation sessions for government will be held on decent rural employment, age-appropriate works, and Occupational Health and Safety, and the project will utilise the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries, and Forests
ESS8 – Gender Equality	NO	The Project incorporates a Gender Analysis and Action Plan, with specific gender-targeted activities built into the project design
ESS9 – Indigenous Peoples and Cultural Heritage	YES	ESMF, FPIC, and a chance-finds mechanism

166. **Environmental and Social Safeguard Management Framework (ESMF) Approach.** As called for by the FAO and IFC guidelines, the project will be using an ESMF approach, as the exact beneficiaries can only be known at the time of implementation. The ESMF is attached as a part of the ESMF document. A summary of safeguard-related consultations undertaken to date is included in Attachment 6 of this funding proposal.

167. **Gender Analysis.** An analysis of the gender-related aspects of the situation in the project area was also undertaken at the time of the Environmental and Social Assessment (see the Gender Assessment and Action Plan, Annex 5). The analysis showed that equality is provided for in various forms in legal documents, including the Constitution and international treaties signed by the country. The recent Vision 2025 puts gender equality among one of the first goals, but women have generally not benefitted from these declarations. *De facto*, an inferior status is accorded to women before or at birth and leads to their lower human development and more unfavourable socioeconomic circumstances, especially in rural areas. Segregation of men and women is a dominant factor of both private and public life that accentuates differences in gender-based tasks, roles and responsibilities. In terms of literacy rate, rural-urban and male-female divides appear to be widening in Pakistan. In the project area female literacy is very low with only 33 percent of women in Punjab and 16 percent in Sindh able to read. Women's standard of health is low by national standards and very low by international ones. In Sindh, for example, the poorest women are more than twice as likely to be malnourished compared to their counterparts in rural Nigeria. In agriculture, women are fully

responsible for small-scale livestock including goats and chickens and are reported to fulfil 60–90 percent of all tasks in the management of cattle and buffalo. Women grow food for their families and have a role in some part of all of the work 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 crops, large livestock and associated household income.

168. **Gender Action Plan.** A detailed Gender Action Plan has been prepared for the project (see Gender Assessment and Action Plan, Annex 5). It is characterised by four strategic approaches to addressing the constraints and opportunities observed in the project area that will affect the project. Firstly, it focuses on strengthening the presence and influence women in the transfer and use of technology. To do this, quotas are established for the appointment of women staff in technical positions, and quotas for women's participation in project training activities and special funds for women in formal training to increase the pool of available applicants for training and staff positions. Secondly, the Gender Action Plan builds on existing differentiation of tasks and interests, implementing training by women and for women at separate locations for women that focus on subjects that are specifically tailored to women's interests and responsibilities, such as raising and caring for livestock and growing vegetables. Thirdly, the Action Plan works with men and existing power structures to work towards institutionalising support to the inclusion of women through awareness raising on constraints and issues with policy makers, land-owners, project staff and local government officers responsible for project implementation. Fourthly it includes measures to address practical problems that women face in engaging in activities like the project and in assimilating the knowledge they need. In this spirit for example, it uses visual and audio-visual learning tools and provides for the project to schedule and locate training at times and places where women can attend or to cover transportation costs for male relatives to accompany them to activities if necessary. As the Gender Action Plan provides for many specific efforts to make the project gender-sensitive, its provisions will need to be taken into consideration during the planning and implementation of most components, sub-components and activities.

F.4. Financial Management and Procurement

169. Financial management and procurement under this project will be guided by relevant FAO rules and regulations, as well as relevant provisions in the Accreditation Master Agreement (AMA) signed by FAO and the GCF. These rules and regulations were reviewed and deemed satisfactory by the GCF Secretariat and Accreditation Panel as part of FAO's accreditation to the GCF.

170. The project will be executed directly by FAO in accordance with its rules, regulations, policies and procedures.

171. FAO has deployed an Oracle based Enterprise Resource Planning (ERP) system the 'Global Resources Management System' (GRMS). This system provides all FAO employees around the world with travel, human resources, procurement and finance functionalities. Using GRMS improves the flow of financial information, supports financial monitoring and reporting, increases transparency and visibility, and strengthens internal control. FAO maintains a Chart of Accounts which is used by the whole Organization and that allows for a separation of income and expenditure by donor and project and it provides a standardised coding structure that enables data to be recorded, classified and summarised to facilitate internal management and external reporting requirements.

172. Direct procurement by FAO is done in accordance with the FAO Manual Section 502, "Procurement of Goods, Works and Services". To sub-contract the delivery of specific activities using Letters of Agreement, FAO operates in accordance with its Manual Section 507, "Letters of Agreement". Such services are managed under the FAO Procurement Service, which provides policy and operational support to FAO offices and staff undertaking these activities to ensure the Organization procures goods, works and services based on "Best Value for Money" principles. To sub-contract delivery for agreed results, FAO operates in accordance with its Manual Section 701, "Operational Partners Implementation Modality".

173. The project will be subject to FAO's audit regime, including the external audit and internal audit function.

G.1. Risk Assessment Summary

174. Several financial and operational risk factors have been identified which may negatively affect project implementation and the achievement of desired results. The security situation in the target area is found to be the highest risk. In response, field operations will be closely coordinated with, and follow advice from, the United Nations Department of Safety and Security (UNDSS).

175. The second highest risk is flooding. The prevention of severe floods is highly dependent upon existing irrigation infrastructure such as dams and drainage canals, both of which fall outside the scope of the project. In order to minimise risks of damage to crops and agricultural land from potential flooding, the project will introduce crop varieties that require shorter cropping periods and promote the diversification of crops.

176. Other types of risks are related to the land tenure system. The majority of target farmers are poor, and they are typically tenants. Their land use decisions are heavily influenced by their land-owners. The project will involve land-owners in promoting CRA and OFWM practices, to develop a broad base in understanding that the practices are financially viable and economically beneficial for both land-owners and tenants under any revenue sharing regime.

177. Another risk that the project will need to address is the traditional relationship that farmers have with middlemen. The existing exploitive relationship between middlemen and the target farmers may potentially undermine the project's incentives for farmers to adopt CRA and OFWM practices. As such, the project needs to address this issue, even though it can be considered a fundamental development issue as opposed to a climate change issue. The project will address this risk by introducing – through the implementation of CBFs and WOSs – MFIs and buyers for farmers so that farmers have other money lending options and alternative opportunities to sell their produce.

G.2. Risk Factors and Mitigation Measures

There are eight selected risk factors identified.

Selected Risk Factor 1

Description	Risk category	Level of impact	Probability of risk occurring
Security. Operations in the field are disrupted due to the deterioration of political and social stability jeopardising the safety of field staff and making it difficult to implement planned activities.	Technical and operational	High (>20% of project value)	Medium

Mitigation Measure(s)

Work programming at the level of field activities will be undertaken with guidance from the country level authorities of the United Nations Department of Safety and Security. Every year, in collaboration with local authorities, the project management will review specific steps to address any local security issues in the project area that are likely to affect staff or producers at the time of the preparation of the project annual work plans and budget.

Selected Risk Factor 2

Description	Risk category	Level of impact	Probability of risk occurring
Government implementing partners, conditioned by past practices of working independently, each in their own domain, will find it cumbersome to establish working relationships and collaborate closely.	Technical and operational	Medium (5.1-20% of project value)	Medium

Mitigation Measure(s)			
Implementation arrangements will explicitly provide for fully shared responsibilities regarding access to project resources and accountability for achievement of project outcomes between the two key implementing partners in water and agriculture in each province. Provincial governments have fully reviewed and provided explicit support for the roles and responsibilities of the project management unit, the private sector and non-governmental organisations in implementation.			
Selected Risk Factor 3			
Description	Risk category	Level of impact	Probability of risk occurring
Land users may return to unsustainable practices after project has ended.	Social and environmental	Medium (5.1-20% of project value)	Low
Mitigation Measure(s)			
The proposed project will promote only economically viable agriculture practices that have been developed and tested with farmers in the provinces of Sindh and Punjab, and for which they will have access to any necessary inputs and services needed after project completion as the result of project activities and investments.			
Selected Risk Factor 4			
Description	Risk category	Level of impact	Probability of risk occurring
Traditional relationships with landlords and middlemen undermine incentives for small-holders to adopt climate resilient agriculture practices and on-farm water management.	Social and environmental	Low (<5% of project value)	Low
Mitigation Measure(s)			
The proposed project will ensure economic benefits and lower the labour-intensity of climate resilient agriculture practices and on-farm water management and demonstrate the financial profitability of their adoption. It will also assist farmers to know about and use alternatives to middlemen in the form of micro-finance, insurance and other production financing that is available to them in the project area.			
Selected Risk Factor 5			
Description	Risk category	Level of impact	Probability of risk occurring
Limited awareness and preparation of communities/government staff can impede adoption of the technologies, practices, and information advanced through the project.	Technical and operational	Low (<5% of project value)	Low
Mitigation Measure(s)			
As part of the project design, there are different capacity development and training initiatives for community members, community leaders and government authorities to impede adoption. FAO Pakistan has a proven record of social mobilisation in the project areas.			
Selected Risk Factor 6			
Description	Risk category	Level of impact	Probability of risk occurring
Climate shocks especially floods can lead to a risk of damages to the project investments affecting implementation.	Social and environmental	High (>20% of project value)	Low

Mitigation Measure(s)			
Special mitigation measures to cope with shocks such as droughts and floods will be part of the project proposal so as to minimise the impact on project implementation.			
Selected Risk Factor 7			
Description	Risk category	Level of impact	Probability of risk occurring
Private sector may not have the same goals or interests (driven by profit making) as other stakeholders, leading to misalignment in priorities to address resilience objective of the project.	Social and environmental	Low (<5% of project value)	Medium
Mitigation Measure(s)			
The proposed project will conduct due diligence of potential private sector partners; establish concrete and clear roles and responsibilities for each partner and ensure strict adherence to role and responsibilities.			
Selected Risk Factor 8			
Description	Risk category	Level of impact	Probability of risk occurring
Changes in Pakistan's status vis-à-vis the Financial Action Task Force (FATF) may pose financial risks, including possible impacts on local prices.	Financial	Medium (5.1-20% of project value)	Low
Mitigation measure(s)			
FAO considers that the probably that Pakistan's position vis-à-vis the FATF will worsen during project implementation is low, in part because the current government has reinforced the country's commitment to uphold the integrity of the international financial system – a commitment that the FATF has recognized. In addition, the potential impacts of this risk are mitigated by the fact that: (i) the proposed project will involve minimal procurement of farming inputs and very (if any) little international procurement, thus reducing the extent to which price changes may affect project delivery; and (ii) due to its legal status and associated privileges and immunities, FAO is able to operate in contexts even if sanctions have been imposed (though this is not anticipated, as outlined above).			
Other Potential Risks in the Horizon			
178. Project Starting Months: The proposed five cropping systems are all based on the cropping calendar, with April 2019 set as the starting month. Delays in approval and/or project start date would mean that the project implementation team would need to revisit the cropping calendar and make necessary adjustments for the cropping practices. Similarly, depending on the extent of the delays, the project implementation team may be required to perform a second analysis of the project areas in order to determine any changes in climate-change needs and/or institutional arrangements.			

H.1. Logic Framework.

Please specify the logic framework in accordance with the GCF's [Performance Measurement Framework](#) under the [Results Management Framework](#).

H.1.1. Paradigm Shift Objectives and Impacts at the Fund level

Paradigm shift objectives

Increased climate-resilient sustainable development	Men and women farmers across the Indus River Basin can sustain income and food security levels because they have the information, services and skills they need to successfully adapt water management and agricultural practices to changes in temperatures and rainfall.					
Expected Result	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term (if applicable)	Final	
Fund-level impacts						
GCF core indicator	Number of direct and indirect beneficiaries	Baseline and Completion Surveys ¹⁶ 2017 Pakistan Population & Housing Census Multiple Indicator Cluster Surveys (MICS) for Punjab and Sindh Training Report	<u>Direct:</u> 0 (incl. 0 women) <u>Indirect:</u> 0 (incl. 0 women)	<u>Direct:</u> 0.4 million (incl. 196,000 women) <u>Indirect:</u> 0 ¹⁷ (incl. 0 women)	<u>Direct:</u> 1.3 million (incl. 636,000 women) <u>Indirect:</u> 16 million (incl. 7.9 million women)	Surveys to be implemented at start-up and completion. Surveys will collect data to (inter alia) assess household resilience at baseline and completion using proven approaches such as the <i>FAO Self-evaluation and Holistic Assessment of climate Resilience of farmers and Pastoralists</i> (SHARP) and <i>FAO Resilience Index Measurement and Analysis</i> (RIMA), as well as insight from the UK-supported Building Resilience and Adaptation to Climate Extremes and Disasters (BRACED) programme.
	Number of beneficiaries relative to total population	Baseline and Completion Surveys 2017 Pakistan Population & Housing Census Multiple Indicator Cluster Surveys (MICS) for Punjab and Sindh Training Report	<u>Direct:</u> 0 (equivalent to 0% of total rural population in targeted districts) (incl. 0 women, equivalent to 0% of total rural population in targeted districts) <u>Indirect:</u> 0 (equivalent to 0% of total rural population in targeted districts) (incl. 0 women, equivalent to 0%	<u>Direct:</u> 0.4 million (equivalent to 3% of total rural population in targeted districts) (incl. 196,000 women, equivalent to 1.5% of total rural population in targeted districts) <u>Indirect:</u> 0 ¹⁸ (equivalent to 0% of total districts rural population) (incl. 0 women, equivalent to 0%	<u>Direct:</u> 1.3 million (equivalent to 8% of total rural population in targeted districts) (incl. 636,000 women, equivalent to 4% of total rural population in targeted districts)	The mid-term target for direct beneficiaries is an estimate based on the number of agricultural households that are expected to be reached through project trainings by the end of PY3, multiplied by the average number of people (6.3)

¹⁶ Baseline and completion surveys will be conducted in Years 1 and 6 by an independent firm contracted by FAO.

¹⁷ The project expects to have supported some beneficiaries to benefit from the adoption of climate-resilient livelihood options by mid-term, but this will not be measured. This is because the number of people benefiting from the adoption of practices is considered to be meaningfully measured through a household survey – which in the interest of efficient use of resources will not be commissioned as direct and indirect beneficiaries of the project will start to reach scale in year 3/4, and thus a mid-term household survey would not provide an accurate indication of project progress.

¹⁸ Footnote 2 *ibid*.

			of total districts rural population) <u>Total Rural Population in targeted districts:</u> 16 million	of total rural population in targeted districts) <u>Total Rural Population in targeted districts:</u> 16 million	<u>Indirect:</u> 16 million (equivalent to 100% of total districts rural population) (incl. 7.9 million women, equivalent to 49% of total rural population in targeted districts) <u>Total Rural Population in targeted districts:</u> 16 million	living in each household in the eight districts targeted by the project. The total combined urban and rural population in the eight districts targeted by the project is about 21.5 million people. The total population used to calculate the proportion of beneficiaries refers to the total <i>rural</i> population of the eight districts targeted by the project, which is about 16 million people.
<i>A1.0 Increased resilience and enhanced livelihoods of the most vulnerable people, communities and regions</i>	A1.2 Number of males and females benefiting from the adoption of climate-resilient livelihood options (including agriculture, fisheries, tourism, etc.)	Baseline and Completion Surveys Agricultural Census ¹⁹	Males = 0 ²⁰ Females = 0 Total = 0	Males = 0 ²¹ Females = 0 Total = 0	Males = 664,000 Females = 636,000 Total = 1.3 million people in targeted districts benefiting from the adoption and use of CRA and OFWM	Surveys to be implemented at start-up and completion. Surveys will collect data to (inter alia) assess household resilience at baseline and completion using proven approaches such as FAO SHARP and FAO RIMA, as well as insight from the UK-supported BRACED programme.
<i>A2.0 Increased resilience of health and well-being, and food and water security</i>	A2.2 Number of food secure households (in areas/periods at risk of climate change impacts)	Baseline and Completion Surveys National Nutrition Survey ²²	TBD ²³	0 households ²⁴	200,000 households	All 1.3 million direct beneficiaries (who live in an estimated 200,000 households) reached by the project will be food secure by project completion. About 40%

¹⁹ The most recent Agricultural Census was published in 2010. A follow-up Agricultural Census is expected to be prepared during the implementation period of this project, though the timeline is not yet known.

²⁰ These baseline figures are estimates. FAO will verify these baseline figures using data from the baseline survey to be administered in PY 1, which itself will be triangulated using data from (inter alia) the Agricultural Census.

²¹ The project expects to have supported some beneficiaries to benefit from the adoption of climate-resilient livelihood options by mid-term, but this will not be measured. This is because the number of people benefiting from the adoption of practices is considered to be meaningfully measured through a household survey – which in the interest of efficient use of resources will not be commissioned as direct and indirect beneficiaries of the project will start to reach scale in year 3/4, and thus a mid-term household survey would not provide an accurate indication of project progress

²² The most recent National Nutrition Survey is from 2011. A follow-up National Nutrition Survey is currently underway, and is collecting and analysing data at district level. The expected publication date for this new National Nutrition Survey is not yet confirmed, but is expected sometime in 2020-21.

²³ A formal baseline value for the targeted districts will be set through the baseline survey, to be administered during PY 1.

²⁴ The project expects to have supported some households to become food secure by mid-term, but this will not be measured. This is because the number of food secure households at mid-term is considered to be meaningfully measured through a household survey – which in the interest of

						in Punjab and 28% in Sindh may be food secure at time of project start up. These possible baseline values will be verified through the baseline survey administered during project inception.
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H.1.2. Outcomes, Outputs, Activities and Inputs at Project/Programme level

Expected Result	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term (if applicable)	Final	
Project outcomes	Outcomes that contribute to Fund-level impacts					
A5.0 Strengthened institutional and regulatory systems for climate-responsive planning and development	A5.2 Number and level ²⁵ of effective coordination mechanisms	Institutions Studies (incl. as part of Baseline and Completion Surveys) Reports and minutes from coordination mechanism meetings	Mechanism to facilitate coordination between federal and provincial authorities: Level 1 Mechanism to facilitate coordination between Dept. of Agriculture and Irrigation in Punjab: Level 1 Mechanism to facilitate coordination between Dept. of Agriculture and Irrigation in Sindh: Level 1	Mechanism to facilitate coordination between federal and provincial authorities: Level 2 Mechanism to facilitate coordination between Dept. of Agriculture and Irrigation in Punjab: Level 2 Mechanism to facilitate coordination between Dept. of Agriculture and Irrigation in Sindh: Level 2	Mechanism to facilitate coordination between federal and provincial authorities: Level 4 Mechanism to facilitate coordination between Dept. of Agriculture and Irrigation in Punjab: Level 4 Mechanism to facilitate coordination between Dept. of Agriculture and Irrigation in Sindh: Level 4	Mechanisms at MoCC, PMD, Ag Punjab, Irrigation Punjab, Ag Sindh, Irrigation Sindh made effective.
A6.0 Increased generation and use of climate information in decision making	A6.2.Use of climate information products/services in decision-making in	Monitoring of canal flows. ET-based water accounts.	Baseline level of <i>reliability</i> of water distribution (measured by average	<i>Reliability</i> of water distribution improved by 5% relative to baseline (i.e.	<i>Reliability</i> of water distribution improved by 10% relative to baseline (i.e.	One of the most important effects/results arising from the use of project-generated

efficient use of resources will not be commissioned as the direct and indirect benefits of the project will only begin to reach scale in year 3/4, and thus a mid-term household survey would not provide an accurate indication of project progress.

²⁵ Level for each coordination mechanism is expressed on a scale of 1-4. Each 'level' refers to a different degree of effectiveness (1 = no coordination mechanism; 2 = coordination mechanism in place; 3 = coordination mechanism in place, meeting regularly with appropriate representation (gender and decision-making authorities); 4 = coordination mechanism in place, meeting regularly, with appropriate representation, with appropriate information flows and monitoring of action items/issues raised).

	climate-sensitive sectors	Soil moisture balance.	fluctuations in soil moisture over time in the selected canal command area of the selected canal) to be established during project inception.	reduced average fluctuations in soil moisture over time of 5%) within the selected canal command area of the selected canal.	reduced average fluctuations of soil moisture over time of 10%) within the selected canal command area of the selected canal.	<p>climate information (e.g. Component 1 outputs) will be changes in water distribution to ensure it is more responsive to the evolving climate-related needs and conditions experienced by farmers.</p> <p>Monitoring the 'reliability' of water distribution (as measured by changes in soil moisture over time and space) is among the best ways of assessing whether water distribution is adequately responding to farmers' evolving water needs in a changing climate.</p> <p>Commitments from the provincial irrigation/water management departments will not change.</p> <p>Change in water distribution can be attributable to the ET monitoring and management system and are not excessively influenced by other factors (such as changes in river flow volumes).</p>
A7.0 Strengthened Adaptive Capacity and reduced exposure to climate threats	A7.2 Total geographic coverage of climate-related early warning systems and other risk reduction measures established/ strengthened	<p>Project progress reports</p> <p>Pakistan Meteorological Department (PMD) reports</p>	1.2 million ha	5 million ha	5 million ha	<p>The target for geographic coverage constitutes the total area in the 8 project districts.</p> <p>The agro-meteorological network managed by PMD is strengthened and provides adequate coverage in the 8 targeted</p>

						districts by the end of PY6.
A8.0 Strengthened awareness of climate change threats and risk reduction processes	A8.1 Number of males and females made aware of climate threats and related appropriate responses.	Media/outreach Marketing survey Mobile phone-based feedback system. Baseline and completion surveys (including KAP survey).	Males = 0 Females = 0 Total = 0 residents in targeted districts	Males = 0 ²⁶ Females = 0 Total = 0 residents in targeted districts	Males = 5.1 million Female = 4.9 million Total = 10 million residents in target districts	The targeted population has access to the communication channels/tools used by the project. Assessment of how many made aware as result of project.
Project/programme outputs	Outputs that contribute to outcomes					
Component 1. Enhancing information services for climate change adaptation in the water and agriculture sectors						
Irrigation/water management departments use a functional evapo-transpiration-based water monitoring and management system to rationalise the distribution of water resources according to actual crop water requirements and government priorities.	Change in awareness, knowledge and understanding of irrigation/water management department staff (in Punjab and Sindh) in relation to current water resources, water-use patterns and water needs in the agriculture sectors in their respective provinces.	Institutions studies (incl. as part of Baseline and Completion Surveys). Assessments by project staff of irrigation/water management department staff's awareness, knowledge and understanding of water resources, water-use patterns and water needs in their respective provinces.	0	75% of surveyed staff in the departments of irrigation/water management in Punjab and Sindh improve their assessment scores when surveyed at mid-term relative to their baseline assessments.	100% of surveyed staff in the departments of irrigation/water management in Punjab and Sindh improve their assessment scores when surveyed at end-term relative to their baseline assessments.	Commitments from the irrigation/water management departments will not change. Awareness, knowledge and understanding of current water resources, water-use patterns and water needs is currently low, which is a major barrier to more evidence-based and climate-responsive water planning and management. Demonstrable increases in awareness, knowledge and understanding among government staff are pre-requisites to improving water planning, management and distribution.
Agri-Climate Water Portal accessed	Share of portal return visits by users in Indus Basin	Site user statistics	0	20% per month	50% per month	Procurement of service provider will be carried out without any major problem.

²⁶ The project expects to have supported some individuals to increase awareness of climate threats and related appropriate responses by mid-term, but this will not be measured. This is because the number of individuals made aware of such threats and responses is considered to be meaningfully measured through a household survey – which in the interest of efficient use of resources will not be commissioned as direct and indirect benefits of the project will only begin to reach scale in year 3/4, and thus a mid-term household survey would not provide an accurate indication of project progress.

	in proportion to unique visitors					
Component 2. Building on-farm resilience to climate change						
Extension workers, partner field staff and farmer facilitators are skilled in promoting climate resilient agriculture (CRA) and on-farm water management (OFWM) practices	Change in farmer understanding of CRA and OFWM practices as a result of trainings provided by extension workers, partner field staff and farmer facilitators.	Pre- and post-training assessments by farmers participating in project trainings.	0	80% of farmers trained by project-supported extension workers, partner field staff and farmer facilitators (1,064 by end of PY3) score better on post-training assessments than on pre-training assessments.	100% of farmers trained by project-supported extension workers, partner field staff and farmer facilitators (1,562 by end of PY6) score better on post-training assessments than on pre-training assessments.	Government makes field staff available to work on the project. Correct estimate of interested partners' field capacity in target districts. Trained staff do not transfer to other jobs.
Farmers are skilled in using climate resilient agricultural practices	Proportion of farmers trained by the project who begin to apply CRA and OFWM practices on their fields before the completion of their respective project trainings.	Assessments by trainers of farmers' actions during (and at completion of) project trainings. Randomized site visits to farmers' fields by project monitoring specialists.	0	At least 70% of the targeted 35,200 farmers involved in trainings report that they have begun to apply project-promoted CRA and OFWM practices before the completion of their trainings	At least 90% of the targeted 101,600 farmers involved in trainings report that they have begun to apply project-promoted CRA and OFWM practices before the completion of their trainings	The final selection of project-promoted CRA and OFWM practices are highly relevant to the cropping systems and conditions of targeted farmers. Targeted farmers continue to engage in project trainings for the full duration of these trainings (i.e. weekly sessions for the entire year or entire cropping season). Trainings are delivered in a form and manner that is accessible to, and relevant for, targeted farmers.
Component 3. Creating and enabling environment for continued transformation						
Heightened awareness, understanding and action by farmers throughout the Project Area with regards to climate change issues.	Number of farmers reached through awareness-raising campaigns who have begun to apply at least one project-promoted CRA and OFWM practice.	Baseline and completion surveys (including KAP survey). Mobile phone-based feedback system.	0	0	1 million	By completion, the project expects to reach about 10 million farmers through awareness-raising campaigns. The project assumes that about 10 percent of these farmers will begin/try to adopt at least one project-promoted CRA and OFWM practice.

						Adoption will be monitored using the mobile phone-based feedback system, through which farmer recipients will be asked to reply to messages and indicate their responses/actions by pushing numbers on their mobile phones. This system will also be used to refine/improve messaging.
Relevant Federal and Provincial Government staff capacity in place for use of climate information in policy making	Change in trained staff's capacity to utilize project-supported information systems, which will be measured by assessing their: (i) understanding of relevant climate information; (ii) knowledge of where to find this information; and (iii) knowledge of how to use this information in their work	Pre-training and post-training assessments	0	70% of trained staff score better on post-training assessments than pre-training assessments with respect to all three criteria (i.e. understanding, finding and using information).	100% of trained staff score better on post-training assessments than pre-training assessments with respect to all three criteria (i.e. understanding, finding and using information)	Staff are willing and available to engage in learning events and to undergo pre- and post-training assessments.
Farmers have access to and use services that enable them to adopt climate resilient practices	Percent of targeted farmers to be reached through the structured extension activities (Component 2) who have diversified their use of financial services and/or value-chain	Baseline and completion survey. Project progress and training reports. Pre- and post-training assessments.	0	At least 30% of farmers trained under component 2 by the end of PY 3 (around 10,000) have used at least one new financial or value chain service before the completion of their training.	At least 30% of farmers trained under component 2 by the end of PY 6 (around 30,000) have used at least one new financial or value chain service before the completion of their training.	Financial service providers are willing to adapt their financial products to make them more relevant for farmers investing in climate change adaptation, and to consider training by project as a risk mitigating factor.
	Proportion of Union Councils in which private service providers (input dealers, agrotechnicians, farm management consultants) provide specialized services to growing clientele	Product catalogues of input dealers. Specialized agro-technician and consultant database.	0	At least 60% of Union Councils in which the project has provided farmer trainings (under Component 2) by the end of PY 3 contain at least one service provider (e.g.	At least 90% of Union Councils in which the project has provided farmer trainings (under Component 2) by the end of PY 6 contain at least one service provider (e.g.	Input dealers are willing to stock climate change tolerant varieties even if there is initially low demand.

	of farmers adapting to climate change	Annual telephone survey among trained agro-technicians and consultants on number of clients. Project completion survey.		input dealer, agrotechnician, farm management consultant) delivering relevant climate change adaptation support services to farmers.	input dealer, agrotechnician, farm management consultant) delivering relevant climate change adaptation support services to farmers.	
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Activities	Description	Inputs (USD)	Description (Financiers)
Sub-Component 1.1			
Activity 1.1.1: Develop and establish a water accounting system, including the equipment needed to operate this system in two canals.	Agreeing on and implementing standard water accounting system, including materials, training.	3,586,120	GCF 87% Punjab 7% Sindh 6%
Activity 1.1.2: Conduct risk-based assessments of aquifer vulnerability, and procure and install automatic groundwater level sensors to enable continued monitoring.	Installation of sensors, connection with telemetry system, mapping, training.	1,847,929	
Activity 1.1.3: Support the development of local aquifer management plans and participatory aquifer management at field level.	Management plan, practice modules, implementation of participatory management by farmers.	863,021	
Sub-Component 1.2			
Activity 1.2.1: Develop and deploy an ET monitoring system.	Deployment of ET software, calibration, data collection, data production.	3,120,000	GCF 94% Punjab 4% Sindh 2%
Activity 1.2.2: Design, develop and build capacity to use ET-based water management software applications/tools to guide planning at policy and field levels.	Water allocation management using ET monitoring in selected areas.	3,769,000	
Activity 1.2.3: Strengthen the network of agrometeorological stations in the Project Area by installing and upgrading stations.	Installation of six agro-met stations, connection to existing network.	347,249	
Sub-Component 1.3			
Activity 1.3.1: Train Professional Beneficiaries in the water and agriculture sectors to use IT tools to inform planning and decision-making related to climate change, agriculture and water.	Training professionals in water and agriculture sector to use IT tools and data for better planning and response to climate change.	448,000	GCF 96% Punjab 2% Sindh 2%
Activity 1.3.2: Development of the Agri-Climate-Water (ACWA) Information Portal.	Design and development of portal for sharing data, information, and tools.	380,594	
Activity 1.3.3: Develop a consortium for information management and the ACWA Portal.	Networking and knowledge sharing amongst professionals in agriculture and water, around portal and tools.	408,450	
Sub-Component 2.1			

Activity 2.1.1: Develop and improve training materials to support adoption of CRA and OFWM practices.	Preparing and updating training materials manuals, and videos.	8,690,312	GCF 64% Punjab 26% Sindh 10%
Activity 2.1.2: Set up project demonstration plots and support adaptive research to underpin delivery of climate-informed extension services.	Selecting, setting up, and expanding demonstration plots and conducting adaptive research.	513,600	
Activity 2.1.3: Develop a CRA and OFWM practice repository – the Pakistan Climate Agriculture Information System (PCAIS).	Development of online agricultural information system.	32,000	
Sub-Component 2.2			
Activity 2.2.1: Train the core facilitators/staff who will lead climate-informed extension service delivery in each of the eight project districts.	Training extension workers and facilitators.	60,000	GCF 21% Punjab 55% Sindh 24%
Activity 2.2.2: Training of Trainers (ToT) on CRA and OFWM Practices.	Training of farmer facilitators and partner field staff.	259,601	
Sub-Component 2.3			
Activity 2.3.1: Train and support Farmer Beneficiaries to adopt CRA and OFWM through Climate and Business Field Schools (CBFS).	Direct training of farmers at field school sites.	7,387,814	GCF 57% Punjab 27% Sindh 16%
Activity 2.3.2: Train and support Women Farmer Beneficiaries to adopt CRA and OFWM through Women Open Schools (WOS).	Direct training of women farmers at field school sites.	5,630,400	
Activity 2.3.3: Training of Farmer Beneficiaries on CRA and OFWM organized by partners on their demonstration plots.	Training of farmers by partners at demonstration plots run by partners.	2,352,000	
Activity 2.3.4: Organize field days for additional farmers to visit CBFSS, WOSs and demonstration plots to gain exposure to CRA and OFWM practices.	Field days organized and farmers invited to visit to learn about CC responsive practices.	69,888	
Sub-Component 3.1			
Activity 3.1.1: Organize and launch a multimedia information and awareness raising campaign on climate change, CRA and OFWM.	Mass media, mobile phone and radio campaigns.	3,560,172	GCF 90% Punjab 3% Sindh 7%
Sub-Component 3.2			
Activity 3.2.1: Increasing Collaboration between Institutions through Knowledge Sharing for Evidence-based Policymaking.	Assessments, workshops and meetings, seminars.	1,149,055	GCF 86% Punjab 7% Sindh 7%
Activity 3.2.2: Mainstreaming Climate Resilient Agriculture and Water Management across All Policy Areas.	Annual climate policy forum and in-depth study.	102,602	
Sub-Component 3.3			
Activity 3.3.1: Develop a searchable online database (and associated application and map) of locally available financial and value chain services to support adoption and sustained use of CRA and OFWM practices.	Mapping value chains and financial services, providing direct assistance to access better services, markets.	97,932	GCF 95% Punjab 2% Sindh 3%

Activity 3.3.2: Support financial service providers to access and apply climate information and knowledge of CRA and OFWM to inform credit and insurance products.	Technical assistance to financial institutions in using CC data for improved products.	216,056	
Activity 3.3.3: Train and support local companies, young people and women to deliver services to farmers to facilitate adaptation to climate change.	Training young people and women to serve as agro-technicians, Farmer Experts, Farm management consultants, ICT access facilitators.	641,590	

H.2. Arrangements for Monitoring, Reporting and Evaluation

179. In its role as Accredited Entity, FAO (specifically the FAO-GCF project supervision team) will oversee and supervise the implementation of this project in accordance with the Accreditation Master Agreement (AMA) signed between FAO and the GCF. As per the GCF Monitoring and Accountability Framework, and in accordance with the AMA, FAO will provide the GCF with an Inception Report, Annual Performance Reports, an independent Mid-term Evaluation report, a Project Closure Report and an independent Final Evaluation report. FAO will also provide semi-annual and annual Financial Reports throughout project implementation.

180. In accordance with the AMA between FAO and GCF, the FAO Office of Evaluation will be responsible for the independent interim and final evaluations. The evaluations will be conducted using a question-driven approach, and may include assessments against the criteria of relevance, effectiveness and sustainability, among others. The interim evaluation will be instrumental in contributing – through operational and strategic recommendations – to improve implementation, setting out any necessary corrective measures for the remaining period of the project. The final evaluation will assess the relevance of the intervention, its overall performance, as well as sustainability and scalability of results, differential impacts and lessons learned. The evaluation should also assess the extent to which the intervention has contributed to the Fund's higher-level goal of achieving a paradigm shift in adaptation to climate change in Pakistan. To measure attributable changes, the evaluation will draw on mixed-methods, using qualitative methods (e.g. participatory rural appraisal) in combination with counterfactual analysis (e.g. quasi-experimental methods, depending on the existence of reliable control group data from the project's baseline and completion surveys, which will be confirmed during project inception). In addition to primary data collected by the evaluators and secondary national data, both interim and final evaluations will draw on the monitoring reports and activities prepared by project staff. Careful attention will be paid to the disaggregation of data, results and outcomes by gender.

181. Responsibility for project-level monitoring will rest with the PMU. The PMU will set up a monitoring system to be staffed by responsible project officers in connection with the three core project components. The monitoring system will serve to track and report on the project implementation overall, including the implementation of the AWPB as well as those outputs, outcomes and impacts detailed in the results framework, shown above in Section H.1. Logic Framework. It will also track implementation of the project's Gender Action Plan. Monitoring data will be stored, compiled and displayed in a dedicated module of the project MIS to be developed and deployed by the PMU. The monitoring team will work with technical advisors from FAO to elaborate the project processes for data collection with mobile telephones with Collect Mobile, an innovative tool developed by FAO.

182. Before other project activities start, the project will launch a baseline survey, as already noted above in Section E.1. Impact Potential. This work will draw on the Self-evaluation and Holistic Assessment of climate Resilience of farmers and Pastoralists (SHARP) indicator framework developed by FAO in collaboration with the University of Leeds for participatory assessments of agro-ecosystem resilience, and on the work of the programme entitled Building Resilience and Adaptation to Climate Extremes and Disasters (BRACED) in connection with reporting to the UK International Climate Fund on 'number of people whose resilience has been improved as a result of support from the project'. Using relevant data from the (baseline and completion) household surveys, the aforementioned approaches will enable the project to

effectively monitor household resilience at the start and end of the project, and the improvements therein. This in turn will enable more robust monitoring and reporting against key indicators included in the logical framework (as outlined in Section H.1). FAO has considerable experience using such approaches, which have proven to be an effective and efficient way of monitoring resilience at household level. In the implementation of the baseline and subsequent monitoring of the project, special attention will be given to the gender-disaggregation of data and findings on results and outcomes. Using these tools, the project monitoring staff will set a baseline for project progress and for subsequent evaluation. In addition, a baseline study of the key institutions and regulatory systems will be done at project start-up with selected counterpart institutions in order to be able to monitor and evaluate achievement of key GCF Outcome indicators. The baseline household survey and institutions study will take place at the start of the project. All household-level indicators and institutional indicators will be re-assessed at the end of the project through a completion survey and associated institutions study. Other indicators stipulated in Section H.1 will be assessed at regular intervals throughout the project – most notably at the mid-term stage – using other means of verification to ensure the project is proceeding as anticipated and achieving the necessary results. The costs for all surveys and other means of data collection and analysis have been duly integrated into the project budget.

183. Project monitoring officers will monitor AWPB implementation and the outputs that result from it, including those that are detailed in the results framework, on an on-going basis. They will use the data and information from this monitoring reported to them by project staff, project partners and beneficiaries to prepare the draft performance reports, which will in turn be sent to the POC and the FAO–GCF project supervision team (in its role as Accredited Entity). Using these inputs, the FAO–GCF project supervision team will bear overall responsibility for ensuring that all relevant reporting is provided to the GCF in a timely manner and in accordance with the formats and standards agreed by the two organisations. The monitoring team will also share monitoring findings with the project management staff so that they may discuss implementation issues as they arise. This will take place in the form of knowledge sharing events and briefings within the PMU, PPIU and DPIU management teams.

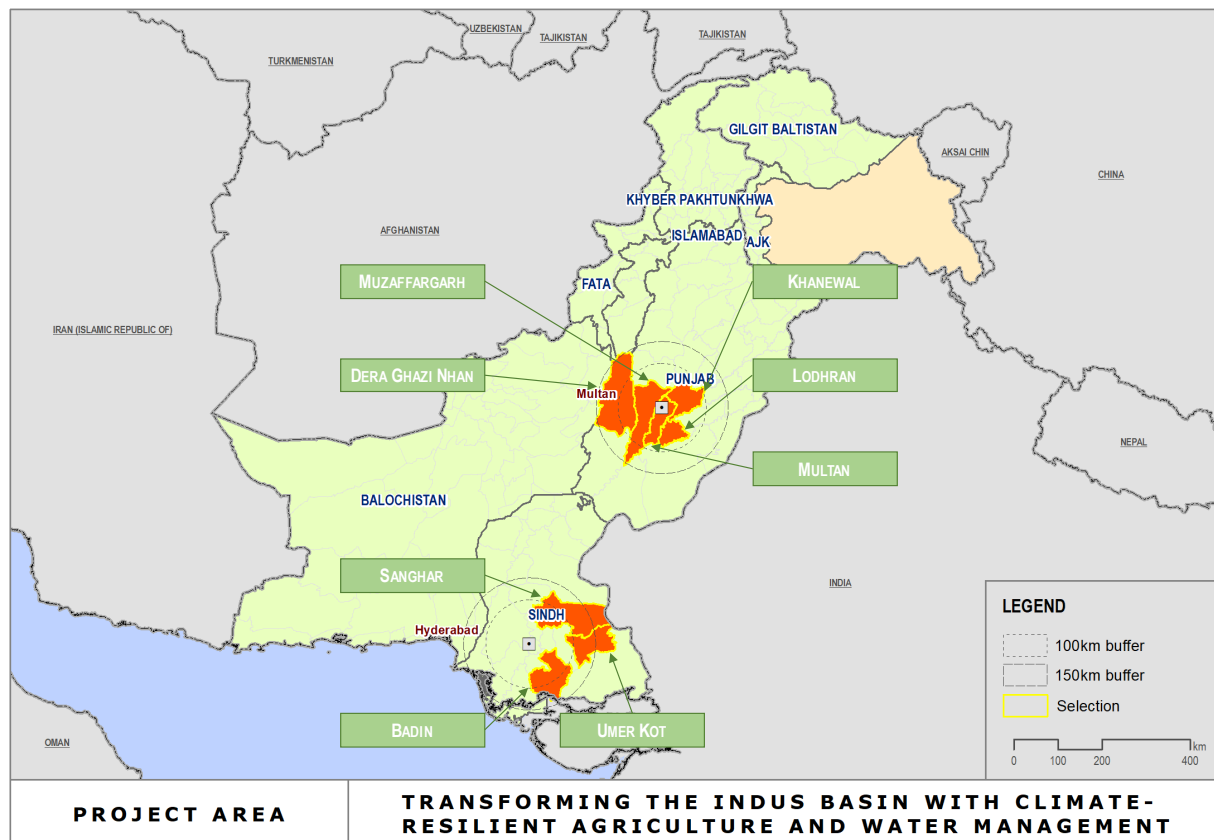
I. Supporting Documents for Funding Proposal

- ☒ NDA No-objection Letter
- ☒ Feasibility Study
- ☒ Integrated Financial Model that provides sensitivity analysis of critical elements (xls format, if applicable)
- ☒ Confirmation letter or letter of commitment for co-financing commitment (If applicable)
- ☒ Project/Programme Confirmation/Term Sheet (including cost/budget breakdown, disbursement schedule, etc.) – *see the Accreditation Master Agreement, Annex I*
- ☒ Environmental and Social Impact Assessment (ESIA) or Environmental and Social Management Plan (If applicable)
- ☐ Appraisal Report or Due Diligence Report with recommendations (If applicable)
- ☐ Evaluation Report of the baseline project (If applicable)
- ☒ Map indicating the location of the project/programme
- ☒ Timetable of project/programme implementation

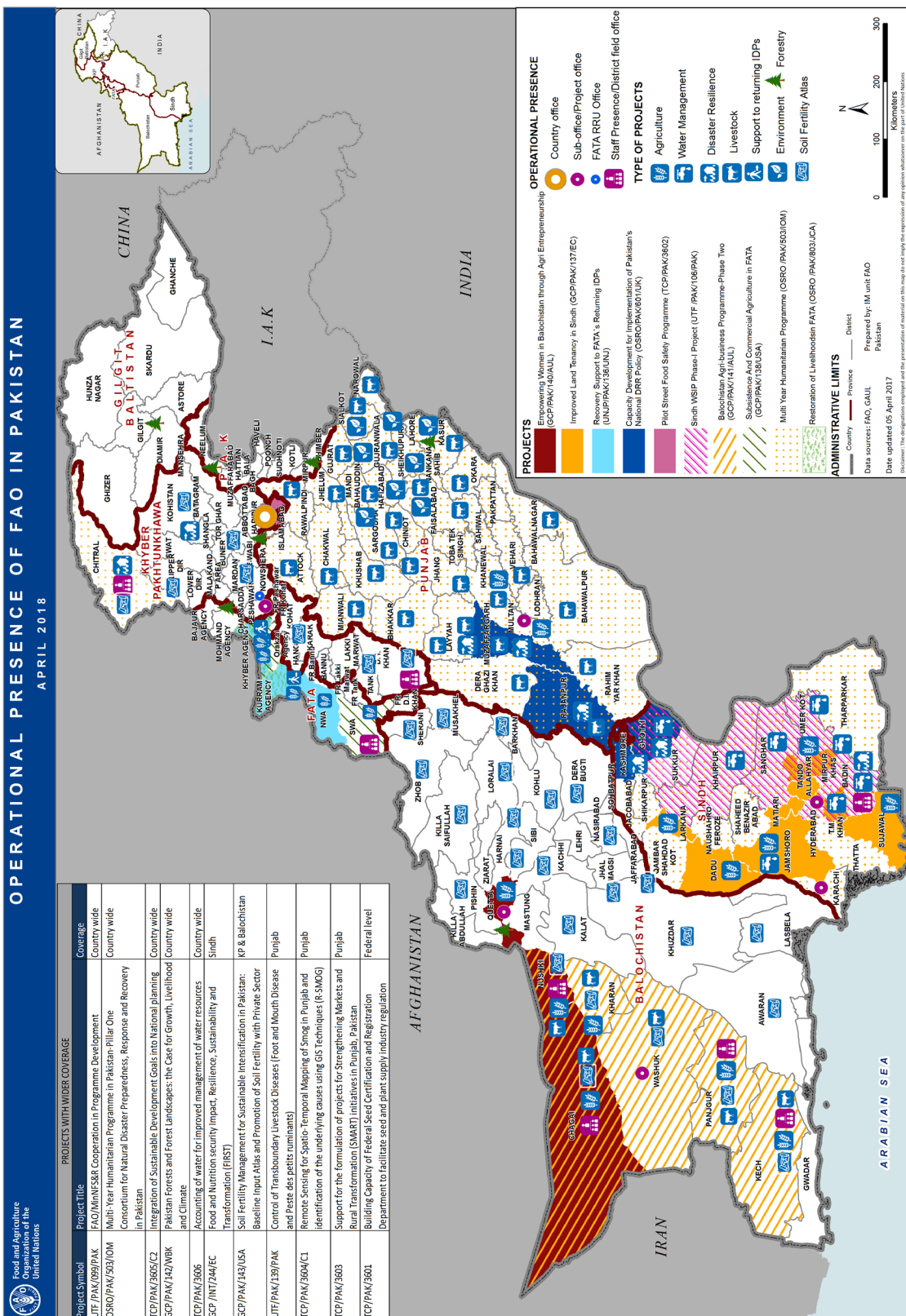
** Please note that a funding proposal will be considered complete only upon receipt of all the applicable supporting documents.*

Adaptation: Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities (IPCC)

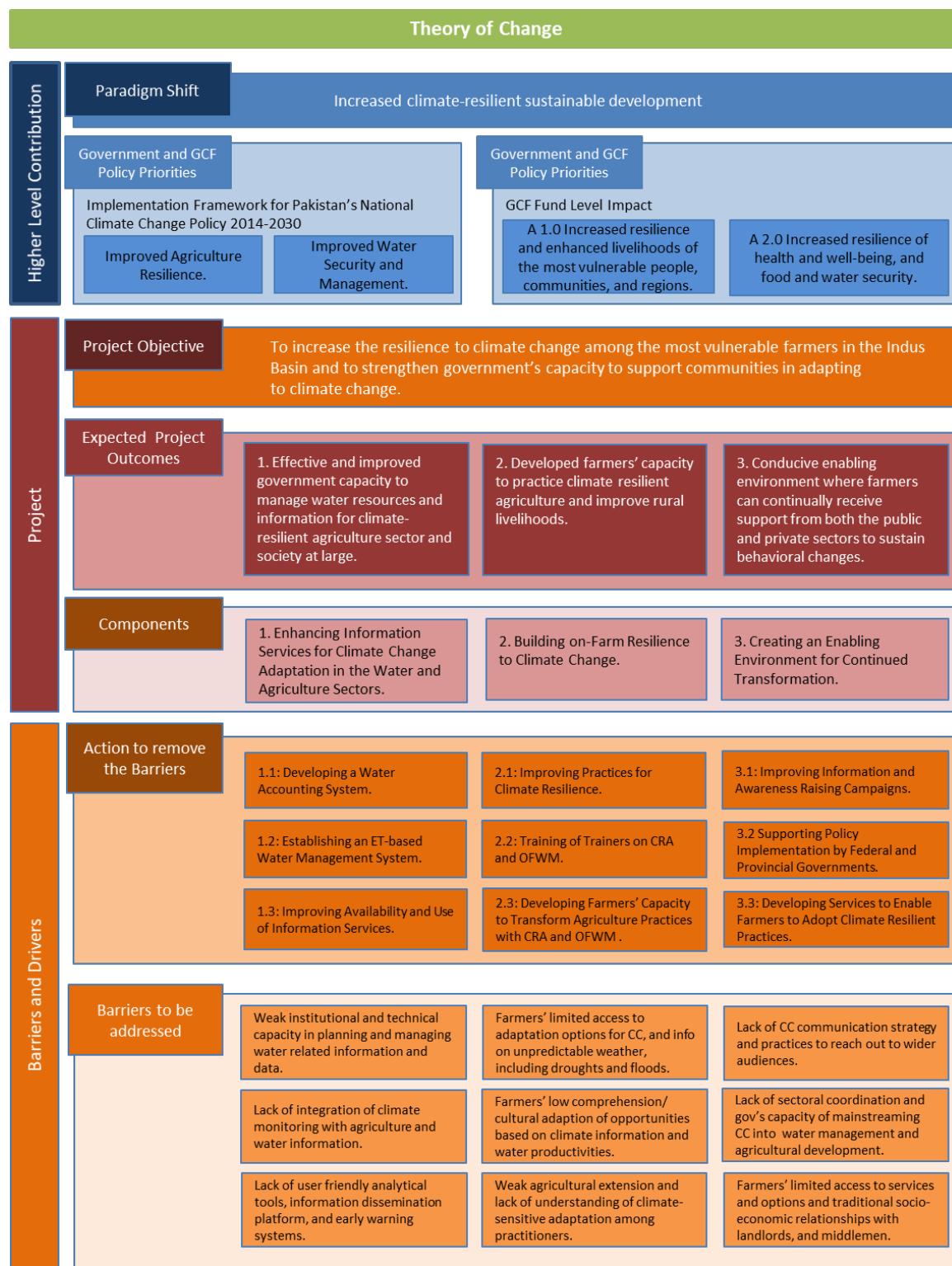
Attachment 1: Target Area Map



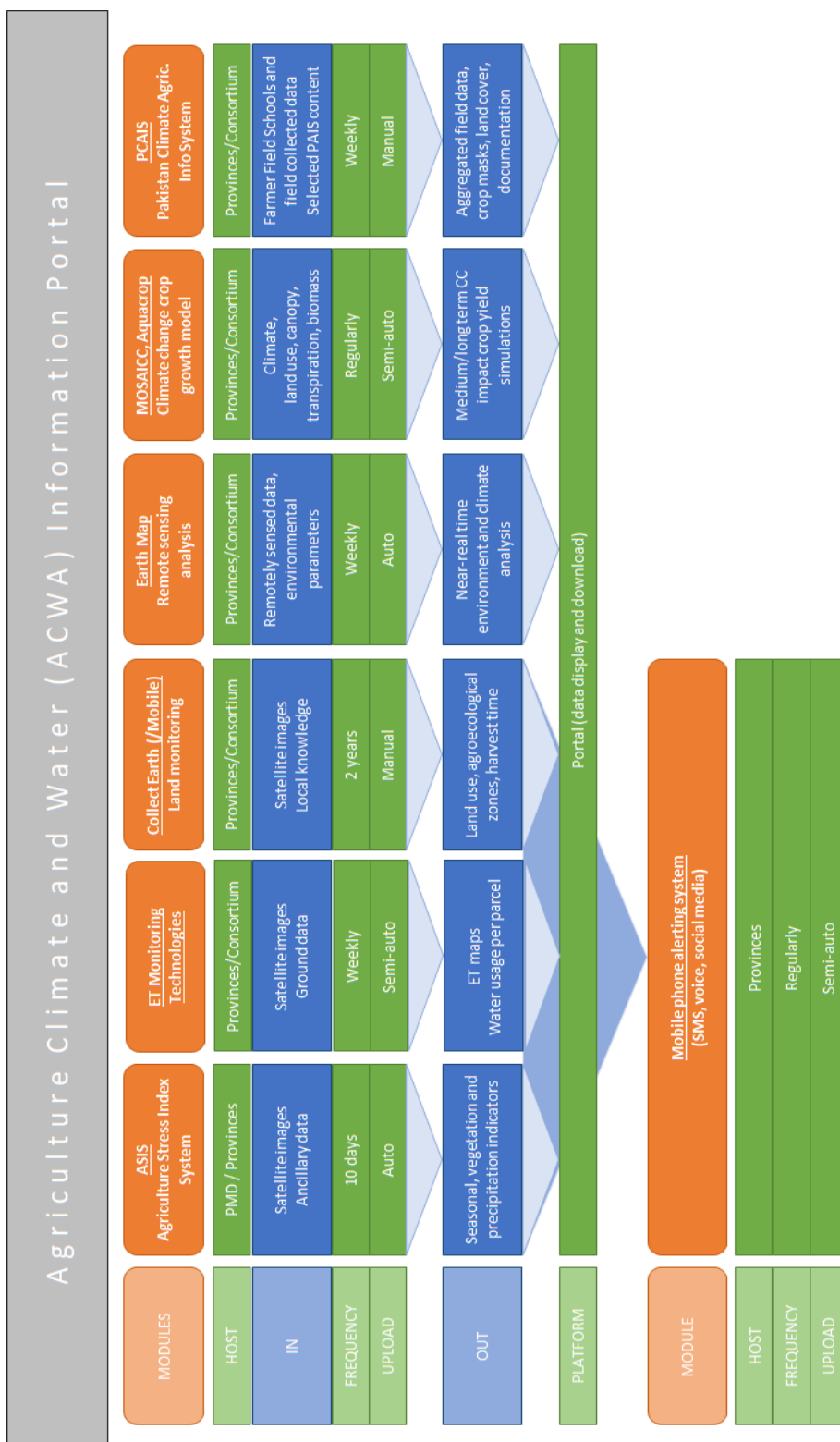
Attachment 2: FAO's Presence and On-Going Activities in Pakistan



Attachment 3: Theory of Change Diagram



Attachment 4: ACWA Portal Structure and Module Characteristics



Attachment 5. Summary Table showing the Consultation Process for the Formulation of GCF Project from February 2017 to June 2018

Timings/Duration	Type of Consultation	Departments and Institutions involved	No of participants	Locations
February 4, 2017	Approval of the Concept by the Local GCF Board Meeting	Members of the Board including Ministry of Climate Change(MOCC), Ministry of National Food Security and Research (MoFSR), Ministry of Planning, Development and Reform, Economic Affairs Division, Secretaries of all provincial departments related to Agriculture, Forestry, Livestock, Rural and development, Local and International NGOs , ADB, WB, and EU	45	Bhurban
May 1-5, 2017	Initial Mission from FAO Regional Office for Asia and Pacific (RAP) for consultation with the Federal and Provincial Stakeholders to prepare Draft Aide-Memoire	Ministry of Climate Change, Ministry of National Food security, Ministry of Planning, Development and Reform , Provincial Planning and Development ,Agriculture and Irrigation Departments, and Research institutions(GCISC, NARC, CAEWRI, PARC, and PCRWR, and PMD)	40	Islamabad, Lahore, Multan, Karachi and Hyderabad
July 24-31, 2017	TCI, RAP, and FAO Pakistan Preliminary mission for detailed consultation with key stakeholders for the preparation of project Concept Note	Ministry of Climate Change, Ministry of National Food security, Ministry of Planning, Development and Reform , Provincial Planning and Development, Agriculture and Irrigation Departments, and Research institutions (GCISC, NARC, CAEWRI, PARC, and PCRWR, and PMD), Local farming communities both men and women	65	Islamabad, Lahore, Multan, Karachi, Hyderabad
September 26, 2017	FAO Pakistan consultation meeting with the Secretary Ministry of Climate Change to discuss the criteria and the district selection	Ministry of Climate Change, Climate Finance Unit of MoCC, Department of Agriculture Extension Punjab, Department of On Farm Water Management Punjab, Department of Agriculture Research Punjab, Chief Planning Punjab Ag Department, Department of Agriculture Sindh, Punjab Irrigation Department Planning and Development Punjab	10	Lahore
September 27, 2017	FAO Pakistan consultation meeting with the Secretary Agriculture Punjab to discuss the criteria and the district selection (He could not attend the meeting in Lahore)	Secretary Agriculture Punjab	1	Islamabad

Timings/Duration	Type of Consultation	Departments and Institutions involved	No of participants	Locations
September 28, 2017	FAO Pakistan consultation meeting with the Minister of MNFSR to discuss the criteria and the district selection	Ministry of National Food Security and Research, Pakistan Agriculture Research Council, Pakistan Agriculture Research Centre, Federal Water Management Cell, Climate Change, Alternate Energy and Water Resources Institute, Institute of Agri-Biotechnology & Genetic Resources.	20	Islamabad
October 5-6, 2017	FAO Pakistan meetings with senior officials on the zero draft of the GCF Concept Note, in particular the selection of the Districts in anticipation of the first Project Formulation Mission.	Planning and Development Department Agriculture Department Agriculture Extension Department On-Farm Water Management Department Irrigation Department Environment Department	35	Karachi
October 8-24, 2017	Project Formulation Mission	Ministry of Climate Change, Ministry of National Food security, Ministry of Planning, Development and Reform , Provincial Planning and Development, Agriculture and Irrigation Departments, and Research institutions(GCISC, NARC, CAEWRI, PARC, and PCRWR, and PMD), Local farming communities both men and women, ADB, WB, EU	80	Islamabad, Lahore, Multan, Karachi, Hyderabad
December 2017, and January 2018	Two separate consultative workshops with the key stakeholders from Punjab and Sindh Agriculture Departments	Agriculture Extension Departments of Punjab and Sindh Provinces to review the second draft of the Concept Note in depth.	70	Islamabad, and Hyderabad
February 12, 2018	Consultative workshop about the institutional anchorage of climate-Agri and water portal	Ministry of Climate Change, National Food Security and Research, National Flood Commission, Ministry of Planning, Development and Reform , Pakistan Metrological Department(PMD), Pakistan Council For Water Research (PCRWR), NARC, CAVERI	30	Islamabad
February 26-March 8, 2018	Farmer/Village-Level Consultations by the Environmental and Social Safeguards Mission from FAO HQ (TCI)	Farmers (both men and women) and farming associations, various ethnic groups, women and women's organizations *further details (sex disaggregation, etc.) can be found by consulting Annex 1 on Safeguards Consultations	696	All eight targeted districts (five in Punjab, three in Sindh)

Timings/Duration	Type of Consultation	Departments and Institutions involved	No of participants	Locations
February 26-March 8, 2018	Key Informant Consultations by the Environmental and Social Safeguards Mission from FAO HQ (TCI)	Director General of Agriculture, On-Farm Water Management, Chief Engineer Irrigation, International NGOs, Local community organizations *further details can be found by consulting Annex 1 on Safeguards Consultations	25	All eight targeted districts (five in Punjab, three in Sindh)
March 7,8 2018	Consultative national workshop on Agriculture Extension strategy	Ministry of Climate Change, Ministry of National Food Security, Ministry of Planning, Development and Reform , Provincial agriculture, irrigation, departments and research institutions, IFPRI, WB, ADB. All provinces contributed and exchanged good practices.	40	Islamabad (all Provinces represented)
March 12, 2018	Consultative workshop on Social and Environmental Safeguards	MOCC, ILO, IUCN, WWF, PODA, NARC, International NGOs, NRSP, SRSP, Local NGOs, Women Organization and Representative	20	Islamabad
April 15-27, 2018	Appraisal Mission from TCI, RAP and FAO Pakistan <ul style="list-style-type: none"> - Meetings - Provincial Validation Workshop at Lahore - Provincial Validation Workshop at Karachi - National Validation workshop at Islamabad 	Ministry of Climate Change, Ministry of National Food Security and Research, Ministry of Irrigation, Ministry of Planning, Development and Reform, Provincial Agriculture and Irrigation Departments, International and Local NGOs),Financial Institutions (State Bank of Pakistan, Akhwat Bank, Khushali Bank, Bank Alfalah, and Zari Taraqati Bank, Telenor, insurance companies and private sector organizations, ADB, WB, PMD, PRWR, PARC, NRSP	150	Islamabad, Karachi, Lahore
April 24, 2018	Consultative Workshop on micro-credit to small farmers	State Bank of Pakistan, Akwat Bank, Zari Taraqiati Bank, NRSP Bank, Bank Alfalfa, Cooperative department KP, SRSP, Telenor Bank, representative of insurance companies	15	Islamabad
May 3, 2018	Meeting with Agriculture Department for preparation of PC1 under UTF arrangement	DG Agriculture Extension, DG on Farm Water Management and their field level staff	10	Lahore
May 2018	Meetings on the Draft Funding Proposal	Meetings with Ministry of Climate Change, Ministry of National Food Security, Provincial agriculture, irrigation, departments and research institutions, On the draft funding proposal	25	Islamabad, Karachi and Lahore
June 6, 2018	Meeting with DG on Farm Water Management for the finalization of the PC1	DG on Farm water Management and his staff	08	Lahore
TOTAL:			1 385	

Attachment 6. Consultations for Safeguards

Farmer Consultations

Date	Province	District	Union Council	Village	Consultation Type	Participants	
						Female	Male
12 October 2017	Punjab	Multan	Band Bosan	Sanbhal	Villagers, <i>not</i> segregated by gender	30	35
13 October 2017		Vehari	No. 10	Chak-206/E-B	Male members of Farmers' Integrated Development Association (local CBO)	0	32
					Female members of Farmers' Integrated Development Association	27	0
18 October 2017	Sindh	Hyderabad	Choudry Nizam Udin	Choudry Nizam Udin	Male villagers	30	0
					Female villagers	0	25
27 February 2018	Punjab	Lodran	49M	17MPR Tarbela Chak	Male villagers	0	40
				46M	Female villagers	30	0
			35M	26M	Villagers of a Christian minority village, <i>not</i> segregated by gender	26	32
28 February 2018		Muzaffargarh	Chak Farazi	Azizabad	Male villagers of Christian minority village	0	10
					Female villagers of Christian minority village	10	0
				Maqsoodpur	Male villagers of Shia minority village	12	0
					Female villagers of Shia minority village	0	12
1 March 2018		Dera Ghazi Khan	Peagah	Balouch Wala	Male villagers	0	20
				Basti Changwani	Female villagers	15	0
2 March 2018		Khanewal	98/10R	Chak 167/10R	Male villagers	0	42
					Female villagers	6	0
					Christian minority villagers	3	2
6 March 2018	Sindh	Sanghar	Pir Fakeer	Daim Thahim	Male villagers	0	18
					Female villagers	15	0
					Hindu minority female villagers with a male representative	20	1
7 March 2018		Umerkot	Walidad Pali	Walidad Pali	Male villagers	0	31
					Female villagers	48	0
					Hindu minority female villagers	24	0

Date	Province	District	Union Council	Village	Consultation Type	Participants	
						Female	Male
8 March 2018		Badin	Qaziah Wah	Ibrahim Junego	Male villagers	0	24
					Female villagers	24	0
			Ado Kohli	Quazia Wah	Hindu minority male villagers	0	24
					Hindu minority female villagers	28	0
Total:						348	348

Consultations with Organizations, CSOs, and Government (Key Informants)

Date	Province	Institution		Persons Consulted (TOTAL: 52)
		Name	Description	
9 October 2017	Islamabad	International Food Policy Research Institute	International agricultural research center	Stephen Davies (Senior Research Fellow) , Abdul Wajid Rana (Program Leader)
		Pakistan Agricultural Research Council (PARC) and National Agricultural Research Council (NARC)	PARC – apex agriculture research organization at the national level. NARC – a research center under PARC	Muhammad Azeem Khan (Director General, NARC), Anjum Ali Butt (Member, Crop Sciences, PARC)
11 October 2017	Punjab	Agriculture Extension Wing	Part of Government of the Punjab, Department of Agriculture	Zafaryab Haider (Director General)
		Department of On Farm Water Management	Part of Government of the Punjab	Malik Muhammad Akram (Director General)
		Irrigation Research Institute	Part of Government of the Punjab, Department of Irrigation	Ghulam Zakir Hassan Sial (Director)
		Classic Agro Farm	Private farm aiming for climate resilience	Muhammad Fiaz (Farmer)
		Chatta Farm	Private Farm experimenting on direct planting of rice	Amjad Hussain Chattah (Farmer)
13 October 2017		Haveli Canal System, District of Multan	Part of Government of the Punjab, Department of Irrigation	Tahir Anjum Qureshi (Superintendent Engineer)
		Agriculture Extension Wing, District of Multan	Part of Government of the Punjab, Department of Agriculture	Rana Munir Ahmad (Director, Agriculture Extension)
17 October 2017	Sindh	Agriculture Extension Services	Part of Government of Sindh, Department of Agriculture	Hidyatullah Chajro (Director General) Ghulam Mustafa Nangraj (Senior Communication Specialist) Touqeer Ahmad Sheikh (Senior Extension Specialist,)

		Department of Irrigation	Part of Government of Sindh	Dhanomal (Chief Engineer)
27 February 2018		Lodhran Pilot Project	Local NGO for poverty reduction in Lodhran District	Nadeem Abbas (Senior Manager), Nayab Gill (Communication Officer), Sadja Perveen (Social Organizer), Baqir Ali (Social Organizer), Ijaz Ul Haq (Social Organizer)
1 March 2018	Punjab	Department of On Farm Water Management, District of Dera Ghazi Khan	Part of Government of the Punjab	Anwar-ul-Haq Shahzad (Director Agriculture, On Farm Water Management), Khadim Hussain (Deputy Director, On Farm Water Management), Saifur Rehamn (former Director, On Farm Water Management)
		Department of Livestock and Dairy Development, District of Dera Ghazi Khan	Part of Government of the Punjab	Nadeem Arshad (Assistant Director-HQ), Mohammad Arif Rizwan (Veterinary Officer), Amir Mehmood (Assistant Director, Technical).
		Agriculture Extension Wing, District of Dera Ghazi Khan	Part of Government of the Punjab, Department of Agriculture	Abid Hussain (Deputy Director, Agriculture Extension), Shahid Muneer (Agriculture Officer)
		Department of On Farm Water Management, District of Multan	Part of Government of the Punjab	Zaffar Ullah Sindhu (Director, Agriculture On-Farm Water Management)
		Agriculture Extension Wing, District of Multan	Part of Government of the Punjab, Department of Agriculture	Chodrey Niaz Ahmad (Deputy Director, Agriculture Extension)
		Environmental Protection Agency, District of Multan	Part of Government of the Punjab, Department of Environment Protection	Ishaq Ahmed (Inspector)
3 March 2018		World Wildlife Fund Lodhran Pilot Project, Farmers' Development Organization, Al-Mustafa Development Organization, Concern Worldwide	International and local NGOs	Muhammad Ifran (CRCP Project Coordinator, WWF), Habib Ahmed (Director of Implementation, Lodhran Pilot Project), Ali Azhar (M&E Coordinator, Farmers' Development Organization), Gurtiaz Naqni (President, Al-Mustafa Development Organization), Khan Zada (Livelihood Consultant, Concern Worldwide)
5 March 2018	Sindh	Sindh Forest Department	Part of Government of Sindh	Abdul Sattar Kahtri (Conservator), Abid Hussain Rind (Divisional Forest Officer)

7 March 2018		UNDP Small Grants Programme		Masood Ahmed Lohar (National Programme Manager), Sajida Sultana (PhD Candidate & Research Assistant, University of Waterloo)
12 March 2018	Islamabad	Stakeholder meeting with Potohar Organization for Development Advocacy (PODA), National Agriculture Research Council (NARC), Ministry of Climate Change (MOCC), International Union for Conservation of Nature (IUCN), National Rural Support Program (NRSP), International Labor Organization (ILO), Hashoo Foundation Pakistan Poverty Alleviation Fund (PPAF)	Ministries, international NGOs, national NGOs for poverty reduction, UN agencies	Aftab Alam (Board Member, PODA), Noshaba Arif (PODA), Beenish Ibrahim (PODA), Yousuf Riaz (Principal Scientific Officer, NARC), Ghuulam Akbar (NARC) Mohammad Ibrahim Khan (REDD+ Officer, MOCC) Rizwan Arshad (Deputy Director, MOCC), Fauzia Malik (Manager of Islamabad Office, IUCN), Salma Khalid (Project Manager – Gender, NRSP), Naseem Khalid (Project Officer, ILO), Umama Binte Azhar (Deputy Manager-Environment & Climate Change, Hashoo Foundation), Sania Liaquat (PPAF)

Attachment 7. Overview of Potential for Collaboration between the GCF Project and Selected Other Projects

Punjab

Project title	Implementation period	Potential to collaborate / complementarity at provincial level re GCF components 1 & 3	Potential to collaborate / complementarity at district level re GCF component 2
1. Strengthening Markets for Agriculture and Rural Transformation (SMART), WB	Final pipeline	High for collaboration on evidence-based policy and insurance and complementarity	High
2. Kissan package, interest free loans provided by NRSP, Akhuwat, ZTBL, Telenor bank &?, with Government of Punjab covering interest costs	2016/2017 – 2021/2022	Medium for collaboration: introducing climate smart criteria/ incentives in loan product, and adjust standard input package covered by the loan	Medium for collaboration: Through FFS programme can assist farmers with the paperwork, & convince banks that trained farmers are less risky
3. Punjab Irrigated Agriculture Productivity Improvement Project (PIPIP), WB	2012/13 – 2020/21	Low	High on complementarity, GCF providing capacity building to make best use of PIPIP investments
4. Establishment of High-Tech Mechanization Service centers (HMSCs), Gov of Punjab, DGA Field	2016/17 – 2020/21	Medium for collaboration: introducing climate smart criteria in HMSC matching grant programme	Medium on complementarity with regards agrotechnician
5. Better Cotton Initiative, GIZ & WWF	2017 - 2021	Medium on complementarity: the BCI may benefit from component 1 generated data and knowledge	Only for cotton: High on complementarity. <u>Need</u> to coordinate to avoid duplication of training
6. Rainwater Management in Cotton Fields to Minimize Impacts of Climate Change (pilot), Gov of Punjab, DGA OFWM	2016/17 – 2018/19	Low	Only for cotton: High on complementarity (GCF can use the pilot fields with rainwater harvesting ponds & sunken fields as examples)
7. Development of Hybrids and Varieties in Vegetable Resilient to Climate Change, Gov of Punjab, Research	2017/18 – 2021/22	Medium on complementarity: the BCI may benefit from component 1 generated data and knowledge	Only for vegetables: High on complementarity
8. Extension service 2.0 (focused on soil fertility mapping and advisory services for balanced fertilizer use), Gov of Punjab, DGA Extension	2015 - 2020	Medium on complementarity (may integrate soil fertility maps into crop Information portal?)	Low

Sindh

Project title	Implementation period	Potential to collaborate / complementarity at provincial level re GCF components 1 & 3	Potential to collaborate / complementarity at district level re GCF component 2
1. Sindh Agricultural Growth Project (SAGP) assisted by the WB 1226 M	2014-2018 period most likely to be further extended	Medium on market access, value addition and transfer of technology	Medium , extension services, ,Public private partnership , community mobilization ,capacity development
2 Sindh Irrigated Agriculture Productivity Enhancement Project assisted by WB cost 6120 Million Pak rupee	2016-2020	High, transfer of technology, Flood and drought strategy, Crop diversification, gender mainstreaming	High, Conservation,, technology transfer, local capacity building , social mobilization
3.Sindh Water Sector Improvement Project WB assisted cost 138 million Dollars	2016-2018 period most likely to be extended	High, capacity building, water conservation, community mobilization, Sensitization on Climate change	Medium improving Extension services, capacity building, PPP, creating awareness on climate change
4.Dissemination of Agricultural Information among the Farming Community through demonstration plots, and farmers field day through Electronic & Print Media Cost 150 M	2016-19	High for collaboration creating awareness on climate change and water conservation	High on reaching out growers and creating awareness on project and climate related issues.
5. Construction of Mirch (Chili) Market in Kunri Umer Kot District Cost 200 M (un approved)	2018-20	Medium for purpose of market access.	Medium for Chili crop which is major crop of the Umer Kot area. Project may help in designing of efficient market for all stakeholders
6. Capacity Building of Field Extension Staff by providing training and refresher courses Cost 80 M (unapproved)	2018-20	High. Capacity building including improving training Modules and syllabus	Medium field based training, gender sensitization, community participation
7. Revamping of Seed Development and Production facilities Cost 180 M (unapproved)	2018-20	Medium , capacity development of breeders and others	Low capacity development of stakeholders
8. Provision of Assistance to Farmers on purchase of Wheel Type Tractors, Phase-IV Cost 2000 M (unapproved)	2018-19-	Medium, technology transfer, improving criteria to help small growers and farmers	Medium by helping small farmers to buy tractors through forming groups

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No-objection letter issued by the national designated authority(ies) or focal point(s)

Tel: 051-9245626
Fax: 051-9245627



(F.No.CFU/GCF/004/2015)
Government of Pakistan
Ministry of Climate Change
LG & RD Complex, Sector G-5/2, Islamabad

ADDITIONAL SECRETARY

Islamabad, the 19th April 2019

To: **Green Climate Fund (GCF) Secretariat**
Song Do,
South Korea

Subject: **Funding proposal for the GCF by FAO regarding "Transforming the Indus Basin with Climate Resilient Agriculture and Water Management".**

We refer to the project "Transforming the Indus Basin with Climate Resilient Agriculture and Water Management" as included in the funding proposal submitted by FAO to us on 6th December 2017.

2. The undersigned is the duly authorized representative of the Ministry of Climate Change, the National Designated Authority/Focal Point of Pakistan. Pursuant to GCF decision B.08/10, the content of which we acknowledge to have reviewed, we hereby communicate our No-Objection to the project as included in the funding proposal.

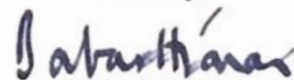
3. By communicating our No-Objection, it is implied that:

- a) The Government of Pakistan has no-objection to the project as included in the funding proposal;
- b) The project as included in the funding proposal is in conformity with Pakistan's national priorities, strategies and plans;
- c) In accordance with the GCF's environmental and social safeguards, the project as included in the funding proposal is in conformity with relevant national laws and regulations.

4. We also confirm that our national process for ascertaining no-objection to the project as included in the funding proposal has been duly followed.

5. We acknowledge that this letter will be made publicly available on the GCF website.

Yours sincerely,


(Babar Hayat Tarar)

Copy to:

1. FAO Country Office, Islamabad.

Environmental and social safeguards report form pursuant to para. 17 of the IDP

Basic project or programme information	
Project or programme title	Transforming the Indus Basin with Climate Resilient Agriculture and Water Management
Existence of subproject(s) to be identified after GCF Board approval	No
Sector (public or private)	Public
Accredited entity	Food and Agriculture Organization of the United Nations (FAO)
Environmental and social safeguards (ESS) category	Category B
Location – specific location(s) of project or target country or location(s) of programme	Pakistan <ul style="list-style-type: none"> Punjab Province: Dera Ghazi Khan, Khanewal, Lodhran, Multan and Muzzafargar Sindh Province: Badin, Sanghar and Umer Kot
Environmental and Social Impact Assessment (ESIA) (if applicable)	
Date of disclosure on accredited entity's website	Monday, June 3, 2019
Language(s) of disclosure	English, Urdu, and Sindhi
Explanation on language	The above-mentioned languages are most commonly spoken in the districts targeted by this project.
Link to disclosure	English: http://www.fao.org/3/CA2888EN/ca2888en.pdf Urdu: http://www.fao.org/3/CA2888UR/ca2888ur.pdf Sindhi: http://www.fao.org/3/CA2888SD/ca2888sd.pdf
Other link(s)	FAO disclosure portal: http://www.fao.org/environmental-social-standards/disclosure-portal/en/ FAO Pakistan (country office) website: http://www.fao.org/pakistan/resources/publications/en/
Remarks	An environmental and social assessment consistent with the requirements for category B projects is contained in the Environmental and Social Management Framework (ESMF) that is available at the above-mentioned links.
Environmental and Social Management Plan (ESMP) (if applicable)	
Date of disclosure on accredited entity's website	Monday, June 3, 2019
Language(s) of disclosure	English, Urdu, and Sindhi
Explanation on language	The above-mentioned languages are most commonly spoken in the districts targeted by this project.
Link to disclosure	English: http://www.fao.org/3/CA2888EN/ca2888en.pdf Urdu: http://www.fao.org/3/CA2888UR/ca2888ur.pdf

	Sindhi: http://www.fao.org/3/CA2888SD/ca2888sd.pdf
Other link(s)	FAO disclosure portal: http://www.fao.org/environmental-social-standards/disclosure-portal/en/ FAO Pakistan (country office) website: http://www.fao.org/pakistan/resources/publications/en/
Remarks	Preliminary environmental and social management planning consistent with the requirements for category B projects is contained in the ESMF that is available at the above-mentioned links.
Any other relevant ESS reports, e.g. Resettlement Action Plan (RAP), Resettlement Policy Framework (RPF), Indigenous Peoples Plan (IPP), IPP Framework (if applicable)	
Description of report/disclosure on accredited entity's website	Monday, June 3, 2019
Language(s) of disclosure	English, Urdu, and Sindhi
Explanation on language	The above-mentioned languages are most commonly spoken in the districts targeted by this project.
Link to disclosure	English: http://www.fao.org/3/CA2888EN/ca2888en.pdf Urdu: http://www.fao.org/3/CA2888UR/ca2888ur.pdf Sindhi: http://www.fao.org/3/CA2888SD/ca2888sd.pdf
Other link(s)	FAO disclosure portal: http://www.fao.org/environmental-social-standards/disclosure-portal/en/ FAO Pakistan (country office) website: http://www.fao.org/pakistan/resources/publications/en/
Remarks	The document available at the above-mentioned links includes a social inclusion planning framework (SIPF) consistent with the requirements for a category B project.
Disclosure in locations convenient to affected peoples (stakeholders)	
Date	Monday, June 3, 2019
Place	FAO Pakistan (country office) website: http://www.fao.org/pakistan/resources/publications/en/
Date of Board meeting in which the FP is intended to be considered	
Date of accredited entity's Board meeting	N/A
Date of GCF's Board meeting	Saturday, July 6, 2019

Note: This form was prepared by the accredited entity stated above.

Secretariat's assessment of FP108

Proposal name:	Transforming the Indus Basin with Climate Resilient Agriculture and Water Management
Accredited entity:	Food and Agriculture Organization of the United Nations (FAO)
Country:	Pakistan
Project/programme size:	Small

I. Overall assessment of the Secretariat

1. The funding proposal is presented to the Board for consideration with the following remarks:

Strengths	Points of caution
This project focuses on agriculture, which is the primary source of income and livelihoods for rural populations, and helps vulnerable farmers, who are the most impacted by climate change.	Monsoon rains cause flash flooding in the target provinces, which could impact the project activities. However, crop varieties with shorter cropping periods will be promoted to mitigate this risk.
In addressing climate change impacts on yields, the project demonstrates strong climate rationale for GCF-funded activities supported by robust climate data and economic analysis.	Policy level uptake of assessment results cannot be guarantee. However, the project will set up a steering committee for decision-making, which will ensure accountability.
The project demonstrates high country ownership. It is well aligned with national priorities and key policy frameworks, including Pakistan's nationally determined contributions. The selected provinces of Sindh and Punjab provide co-financing in cash.	
Key barriers (institutional, financial, data, capacity, and behavioural) affecting the agriculture sector are being addressed in synergy and in coordination with relevant stakeholders.	

2. The Board may wish to consider approving this funding proposal with the terms and conditions listed in the respective term sheet and addendum XIII titled "List of proposed conditions and recommendations".

II. Summary of the Secretariat's assessment

2.1 Project background

3. Pakistan's vulnerability is linked to its dominant arid to semi-arid climate, as well as its high dependency on a single river system and snow/glacial meltwater for its agricultural water supply. Agriculture consumes roughly 90 per cent of all available fresh water supplies. It employs more than 40 per cent of the labour force, produces more than 90 per cent of the country's food supply, and generates 75 per cent of the country's export revenues. For rural areas, agriculture is the main source of income and livelihoods.
4. Analysis of available climate data indicates that climate change, manifested through significant temperature increases and more variable changes in precipitation, will impact the Indus Basin hydrology and agriculture in significant ways.
5. The project is aimed at (i) increasing the resilience of poor small-scale farmers to climate change in eight vulnerable districts in the Sindh and Punjab provinces based on the climate vulnerability and poverty profile of these areas; and (ii) strengthening local governments' capacity to support communities in adapting to climate change through improved climate information services and better on-farm management practices.
6. The project will achieve this through the implementation of three main technical components in the targeted agricultural districts of Pakistan:
 - (a) Enhancing information services for climate change adaptation in the water and agriculture sectors;
 - (b) Building on-farm resilience to climate change; and
 - (c) Creating an enabling environment for continued transformation.

2.1.1. Climate objective

7. Modelling of climate change scenarios for Pakistan shows that if agriculture and water management in the Indus Basin continue in a "business-as-usual" mode, increasing temperatures and changes in precipitation will pose serious threats to the future livelihoods of farmers and to the Pakistani agricultural sector. This project was designed to change that by moving away from "business-as-usual" in the Basin, causing a paradigm shift in agriculture and water management whereby producers can successfully adapt to climate change and sustain their livelihoods. The project objective is to transform agriculture in the Basin by increasing resilience among the most vulnerable farmers and strengthening the capacity of the Government of Pakistan to support communities to adapt to climate change.

2.1.2. Financing information and environmental and social safeguards category

8. The accredited entity (AE) has requested USD 34.99 million in grant financing from GCF to finance project activities, and USD 12.68 million in co-financing will be provided by the Government of Pakistan, including a grant from the Government of Punjab of USD 7.99 million (22.8 per cent) and one from the Government of Sindh for USD 4.69 million (13.4 per cent). The co-financing from the two provinces is channelled to the Food and Agriculture Organization of the United Nations (FAO) under a Unilateral Trust Fund arrangement between the governments and FAO.
9. The project management cost (PMC) is USD 2.15 million, which is under 5 per cent of the total project amount. This includes GCF grant financing of USD 1.29 million, with additional co-financing provided by governments of Sindh and the Punjab amounting to USD 429,892 each, to support PMC in the project.
10. The project has been categorized by the AE as a category B – medium risk project. This is because of the inequalities in the labour market and presence of landless farmers in project sites who will be included in project activities. An environmental and social management framework (ESMF) is presented with the funding proposal, which includes information on

safeguards that the project will put in place to address environmental and social issues triggered during project implementation.

2.2 Component-by-component analysis

Component 1: Enhancing information services for climate change adaptation in the water and agriculture sectors (total cost: USD 14,770,363; GCF cost: USD 13,523,363, or 91.5%)

11. The component will conduct a series of capacity development activities for the government staff to enable them to use key technologies for better monitoring climate change impacts on water and agriculture sectors. Under the first sub-component, the project will support the development of a water accounting system for the Indus Basin through conducting four water accounting assessments with the help of acoustic water level sensors in two canal commands to assess discharges entering canals. In addition, a set of risk-based assessment for aquifer vulnerability to depletion and salinization will be conducted and training will be provided to planners to undertake such assessment after project closure. This will help to develop local aquifer management plans in selected areas. The regulatory and policy institutions mandated to govern water resources in Pakistan often lack resources and capacities to make informed decisions based on such analysis. Hence, the component will address this by training planners and local farmers in important aspects of hydrology monitoring and management.

12. The second sub-component under component 1 of the project is strengthening evapotranspiration-based systems for monitoring actual water consumption in agriculture. The agriculture system in Pakistan is dependent on rain-fed water systems and often reliant on seasonal variation. Extreme temperatures have implications for water supply in the target areas, and, in the absence of a robust monitoring system, farmers are exposed to climate risks that limit their ability to make informed choices related to water resource management for agricultural. This subcomponent will therefore allow for the development of monitoring systems that are useful to planners and farmers in decision-making related to water allocations and better agriculture management.

13. The analysis produced through the assessments will be widely disseminated through online and offline media, including through the Agri-Climate-Water Information Portal (ACWA Portal), which will provide public access to decision-making tools and data for various stakeholders.

Component 2: Building on-farm resilience to climate change (total cost: USD 24,995,615; GCF cost: USD 14,948,872, or 59.8 per cent)

14. This component will use a range of experience-based, face-to-face approaches, including demonstration plots, climate field schools, and field days, allowing farmers to learn and enhance their adaptive capacity with climate-resilient farming methods in the light of frequent and intense climate impacts that affect agricultural productivity. The component will be implemented in collaboration with a number of public sector organizations, non-governmental organizations and private sector stakeholders. These will enter into results-oriented agreements to implement extension activities using a climate-focused curriculum. This type of learning by doing will allow farmers to adopt best practices in climate-resilient farming and encourage them to implement sustainable farming practices that reduce pressure on soils and water. Experience has shown that climate field schools and demonstration activities are pivotal in shaping farmers' attitudes towards sustainable farming practices and highlighted the potential of such activities by enhancing farmers' yields and incomes.

15. The sustainability of the interventions under this component is well presented. It is expected that the training materials developed under the project can be used to scale up

demonstration activities in other similar areas of the country. The component also uses a training-of-trainers model to train 1,600 extension workers, who would then train around 102,000 low-income and vulnerable farmers through demonstration plots and field days. This facilitates peer-to-peer learning and ensures that local capacities are enhanced.

Component 3: Creating an enabling environment for continued transformation (total cost: USD 5,767,407; GCF cost: USD 5,221,003, or 90.5 per cent)

16. This component is aimed at strengthening and sustaining capacity-building by increasing information and awareness levels among key stakeholders. The project will develop services for and partnerships among public institutions, farming communities, and insurance companies to boost the understanding of climate risks and ways to better manage them. The component will also work towards mainstreaming climate-resilient agriculture and water management in development planning at local level so as to facilitate long-term changes in policy and regulatory frameworks. An important activity under the component relates to developing the capacities of insurance providers who will be trained in understanding climate risks. This will help them develop better credit products for farmers in the future.

III. Assessment of performance against investment criteria

3.1 Impact potential

Scale: High

17. The project aims to increase the resilience of 1.3 million people (including 636,000 women) in eight very poor farming districts in the Punjab and Sindh provinces. This will directly benefit around 250,000 poor farming households through structured agricultural extension activities and climate-adaptive farming practices.

18. It is expected that an additional 16 million beneficiaries (including 7.9 million women) will indirectly benefit from the project through information dissemination activities and awareness-raising campaigns, and from the increased agricultural productivity in the project area attributed to better on-farm management practices and spillover effects.

19. The project area consists of eight targeted districts in two districts that were selected based on their vulnerability to climate change risks in terms of the extent of the physical area and number of households that could be affected, and areas where the capacity of rural people to adapt was most limited.

3.2 Paradigm shift potential

Scale: High

20. The project will alter farmers' behaviour and governance structures in the Indus Basin through improved access to climate information, upscaling of climate-resilient extension services to poor and vulnerable farmers, and enhancement of information services for climate change adaptation. Together, these activities will address key barriers that contribute to the high vulnerability of the water and agriculture sectors in Pakistan and provide long-term pathways towards transforming the farming systems of the Indus Basin to become more resilient and withstand climate risks and impacts.

21. The project will work with government stakeholders to improve the governance structures and provide information tools to planners and policymakers so they can better understand climate risks and make informed decisions in governing agriculture and water management in the Indus Basin. The project will improve the enabling environment for supporting poor agricultural producers in transitioning to climate-resilient agriculture.

22. The project will also establish new and innovative information systems and build local capacities at household and governmental levels to generate, disseminate and utilize vital data and information on climate change and its impacts on water resources and farming systems. This will facilitate learning and knowledge exchange among different groups on climate-resilient agriculture practices, which will be further enhanced through knowledge dissemination products, such as training materials, the ACWA Portal, public awareness campaigns and radio and mobile phone service messaging over the long-term.

3.3 Sustainable development potential

Scale: High

23. The project will help poor farmers increase their agriculture productivity, which is highly susceptible to climate risks (higher temperatures, variable rainfalls), thereby stimulating growth in the local economy, improving food and nutrition security, and increasing the empowerment of women and minority groups.

24. The project will also deliver environmental co-benefits in the form of reductions in greenhouse gases associated with improved agricultural practices. Using the EX-Ante Carbon-balance Tool, the AE has estimated that reduced residue burn, reduced water pumping, better land-use practices, improved soil quality and the higher water availability in groundwater systems will lower greenhouse gas emissions by approximately 0.9 tonnes per hectare per year in the project area.

3.4 Needs of the recipient

Scale: High

25. The agriculture sector in Pakistan is highly susceptible to climate impacts. The feasibility study highlights that climate change will significantly impact the agriculture sector and decrease farmers' income on average by 2–5 per cent annually. Most farmers in the project area are landless and currently have limited adaptive capacity to adapt to implement climate resilient farming methods. The project therefore addresses barriers faced by vulnerable farmers and helps them adapt to changing climatic conditions – such as increasing temperatures and changing rainfall patterns – in order to achieve climate-resilient agriculture.

3.5 Country ownership

Scale: High

26. Project is aligned with national priorities, and addresses the priorities identified in Pakistan's Nationally Determined Contribution (NDC). It was developed in close consultation with key government agencies and stakeholders, which ensure that the project aligns with sectoral priorities and policies.

27. The provincial governments of Punjab and Sindh have both shown a strong sense of ownership through their co-financing of USD 8.0 million and USD 4.7 million, respectively. They will channel these resources through FAO towards implementation of project activities.

3.6 Efficiency and effectiveness

Scale: High

28. The economic benefits of the project are based on higher agricultural yields compared to the counterfactual, where it is expected to decline with climate change. The economic internal rate of return (EIRR) for the entire project is 18.8 per cent, which is well above the FAO hurdle rate of 10 per cent. Those returns are robust to delays, changes in costs and different yield scenarios. Farmers generally have incentives to sustain the investments, as net profits are higher when using the resilient agricultural methods. However, some of the on-farm costs are

higher than under the current situation, meaning that consecutive bad years could strain farmers' ability to sustain the new techniques.

29. The investments under components 1 and 3 develop systems to disseminate knowledge widely and solve collective action problems in water resource management. Grant funding is appropriate for these types of public goods. The farming practices developed under component 2 will generate sufficient economic benefits and private profits for poor farmers, but they will not generate direct financial returns to the government that could be used to service a loan.

IV. Assessment of consistency with GCF safeguards and policies

4.1 Environmental and social safeguards

30. **Environmental and social risks and impacts.** The proposal emphasizes improved farming practices and water management, as these expected benefits of the project will increase the resilience of target communities to the impacts of climate change. Farmer field schools and women's open schools will be set up to provide training to farmers on such practices. In addition, extension services will be provided to farmers in the target communities to improve their adaptive capacities.

31. Some of the potential environmental and social risks that have been identified in the ESMF include: (i) changes in tenant-landlord relations owing to increases in land value from increased agricultural productivity; and (ii) bonded labour and age-inappropriate work. Furthermore, increased agricultural production may result in increased pesticide use, and the construction activities for the installation of new agrometeorological stations may involve localized and temporary air and noise pollution, and health and safety risks. Measures have been proposed to avoid the potential environmental and social risks identified.

32. The installation of evapotranspiration equipment and agrometeorological stations may require the acquisition of land by the Pakistan Meteorological Department. With respect to land acquisition from private owners, the project will seek consent from the affected persons and follow national standards to compensate them. The AE will apply the most stringent standards of the national, AE and GCF standards. The AE is advised to ensure that the most stringent standard complies with the GCF standard on land acquisition and involuntary resettlement.

33. The project triggers a number of environmental and social safeguards standards.

34. **Labour and working conditions.** The project has the potential risk of child labour/age-inappropriate work and bonded labour in agricultural activities to be implemented by project-trained farmers. To mitigate this, the AE has included child labour and bonded labour on the non-eligibility list of activities and are excluded from project support. Project locations with bonded labour and/or child labour will be identified during the environmental and social screening prior to the implementation of activities and trainings on safe, decent rural employment; age-appropriate work will also be offered. The AE is advised to monitor the practice of child and bonded labour during project implementation in line with activities that will be prohibited by the project in the non-eligibility list.

35. **Resource efficiency and pollution prevention.** The project will not procure pesticides for agricultural activities implemented by the targeted communities. To mitigate the risk of increased use of pesticides to increase agricultural productivity, the project will provide basic occupational health and safety training on the safe handling of pesticides for agricultural purposes. Additionally, the ESMF has annexed its guidelines on pesticide management, which will be used to guide farmers in using pesticides during the project.

36. **Biodiversity conservation and sustainable use of living natural resources.** Since the project involves agriculture, beneficiary farmers will be engaged in the primary production of living natural resources. The project will likely support the production of the following crops: rice, wheat, sugarcane and cotton. It will also support animal husbandry services of small livestock, such as chickens and goats, which will be provided by the women's open schools. In cases where agricultural inputs such as seeds are provided by the project via the farmer field schools and women's open schools, the AE will ensure that such seeds are certified and registered.

37. **Indigenous peoples.** The ESMF has identified groups in the two target provinces that may be termed as ethnic minorities, such as the Hindu Scheduled Castes and Scheduled Tribes in Sindh, and the tribal fishing peoples of Punjab, which may be considered indigenous. The AE has triggered its standard on indigenous peoples and cultural heritage. This means that free, prior, and informed consent will be required, and ongoing consultations, including the participatory monitoring and evaluation of the project, will continue throughout the project with respect to ethnic minorities. A social inclusion planning framework is annexed to the ESMF with details of actions that will be undertaken during the implementation of the project in instances where ethnic minorities are present. Measures to be undertaken include consultations to obtain free, prior, and informed consent from ethnic minorities and the development of social inclusion management plans at the subproject level. There is an outline of the content of a social inclusion management plan in the framework, which includes social assessments for collecting baseline information about ethnic minorities and identifying and assessing the potential impacts of subprojects on these communities. The budget in the ESMF includes an ethnic minority specialist who will be responsible for addressing issues related to ethnic minorities, including benefit-sharing with such groups.

38. Implementation arrangements consist of project implementation units at the national, provincial and district levels. The project will have provincial safeguards specialists in the provincial project implementation unit and a lead safeguards specialist. The former will be responsible for carrying out the quality assurance of environmental and social screenings; preparing the safeguards documentation; ensuring monitoring and reporting on action plans; and receiving grievances on the project. The latter will provide capacity-building, such as training on environmental and social safeguards, to project staff, partners engaged by the AE in the implementation of the project, and responsible entities.

39. *Stakeholder engagement.* The AE provided a report on stakeholder consultations undertaken during the preparation of the project at the national, provincial and village levels, which includes a summary of feedback received. The AE submitted evidence of attendance at stakeholder meetings, which was annexed to the ESMF. Consultations were used to inform communities who may be affected about the project, collect information, provide feedback to communities and confirm broad community support for the project. The ESMF includes commitments to continue stakeholder consultations during project implementation, which will be facilitated by the local project staff.

40. **Grievance redress mechanism.** A project-level grievance redress mechanism has been designed for the project, taking into account inputs received during consultations with potential project-affected peoples and ethnic minorities during the preparation of the project. The mechanism includes the possibility of resolving grievances through traditional means of community discussion or through project staff at local level, who will in turn present them to the provincial safeguards specialists for resolution or directly to the lead safeguards specialist. Contact details for the lead safeguards specialist will be provided. Telephone and email contact details of the institutional-level grievance redress mechanism of the AE, which can also receive concerns and facilitate resolution of concerns related to the project, have been included in the ESMF.

4.2 Gender policy

41. The AE has submitted a gender assessment and thus complies with the operational guidelines of the GCF Gender Policy and Action Plan. The gender assessment provides the context of gender issues in Pakistan and the rural areas of Punjab and Sindh districts targeted by the project. Evidence was gathered in relation to the legal and regulatory framework for gender matters, which was found to be conducive to engaging in gender-related work. It was highlighted that women have less access to services (such as education and information technology) and resources (such as land and finance) due to cultural traditions that accord unequal opportunities along gender lines. In addition, the gender assessment outlines the roles and responsibilities of women and men in the agricultural sector, including the division of labour in crop agriculture and animal husbandry. The assessment indicates that women have more tasks to fulfil than men, and they conduct both reproductive and productive activities. For example, many tasks concerning livestock management and vegetable cultivation for consumption are undertaken by women. However, agricultural extension services provided by mainly male extension workers do not target agricultural tasks performed by female farmers. The gender assessment includes opportunities presented by the project to ensure women's participation and access to project benefits.

42. Consultations were undertaken with both female and male farmers, selected non-governmental organizations working in the target districts, and national, provincial and district authorities. Stakeholder engagement through consultations also gathered evidence concerning the situation of women and men in the project districts and identified their respective vulnerabilities; this evidence supplemented the gender assessment.

43. The AE has included a project-level gender action plan with actions aligned to the project activities, outcomes and impacts in the logic framework. Performance indicators with sex-disaggregated targets have been integrated and are also included in the logic framework as they relate to fund-level impact, outcome and outputs. Baseline data has been provided for some indicators and will be collected during the baseline survey of other indicators in order to rationalize the set targets. Timelines and responsibilities for implementation of activities have also been provided. The gender action plan includes financial resources for the implementation of its activities that focus primarily on gender-differentiated issues and support women as beneficiaries of the project. This supports the mainstreaming of gender considerations into the project activities.

44. Activities in the gender action plan that respond to issues discussed in the gender assessment and opportunities presented by the project to ensure women's access to project benefits include the provision of agricultural inputs, such as seed packets, small ruminants and poultry, through women's open schools. This addresses some of the issues related to the lack of financial resources available to the women in project areas. In addition, the project will provide access to structured agricultural extension services through women's open schools and farmer field schools, which will contribute to farmers' adaptive capacity for agricultural activities.

45. Implementation arrangements involve two full-time project-recruited gender and nutrition specialists who will lead the implementation of the project-level gender action plan for the project working with project staff in the project management unit.

4.3 Risks

4.3.1. Overall project assessment (medium risk):

46. The funding proposal requests a grant of USD 34.99 million from GCF (73 per cent of total financing) for investing in agriculture and water management to improve adaptation to climate change in eight districts in the Punjab and Sindh provinces of Pakistan. The two provincial governments are providing USD 12.68 million in co-financing, and the AE provides no co-financing; and

47. The funding proposal states that although the project creates economic benefits, this would not directly generate financial returns and thus enable repayment of loans if debt financing was sought. The Government of Pakistan has weak debt affordability, and the current account deficit is expected to widen. These factors support the grant financing requested by the AE.

4.3.2. AE/executing entity capability to execute the current project (low risk):

48. The AE, FAO, has managed 573 projects at a total cost of USD 314 million in Pakistan for more than 70 years. The FAO country office for Pakistan is currently managing 20 projects throughout the country, with an annual budget of USD 20 million. The AE will also serve as the executing entity (EE), and this function will be carried out by the FAO country office in Pakistan. The funding proposal stated that the AE and EE functions will be segregated to ensure project oversight and supervision; and

49. FAO has also cooperated closely with other development partners working in agriculture and water management in Pakistan (e.g. the International Center for Tropical Agriculture, United Nations Development Programme, World Bank, etc.). The AE is expected to coordinate with other partners where necessary to benefit from the lessons they have learned.

4.3.3. Project-specific execution risks (medium risk):

50. Use of data in decision-making: component 1 of the project enhances information services for water management, mainly by investing in digital technologies and equipment, water management systems, and training in the use of the data and technologies. The technologies and systems are expected to provide real-time data and be readily available for decision-making in terms of distribution and use of resources. However, the AE stated political decisions are beyond the scope of the project. The project may face challenges if the political decisions are not coherent with the project activities. The AE mentioned that as a preventive measure, the project is proposing to help establish and strengthen systems that are requested and have been discussed extensively with the government. Also, different measures that actively facilitate the use of data/information, such as information-sharing systems, government coordination mechanisms and policy forums, will be carried out to inform decision-makers. The AE also commits to monitoring and measuring the extent to which policymakers use the data and information generated by the systems under component 1;

51. Delays in execution due to security issues or natural hazards: the AE has identified the security situation and potential flooding in target areas as the highest risks. The local security issues will be monitored, and the project's annual workplan and budget will be reviewed if the security concerns are likely to affect staff or producers in target areas. As for flooding, the preventive measures are highly dependent on existing irrigation infrastructure. The project will introduce crop varieties that require shorter cropping periods and promote the diversification of crops to minimize risks of damage from the potential flooding;

52. Farmers' access to financial services: as identified by the AE, the existing exploitive relationship between middlemen and the target farmers could undermine the project activities. The middlemen are often the sole source of credit to farmers and have entrenched relationships with farmers as mentioned in the feasibility study. Component 3 proposes to improve farmers' access to financial and supply chain services through financial and value-chain literacy training. In partnership with microfinance institutions, the project will inform farmers of the cost of

middlemen credits and alternatives to middlemen in the form of microfinance, insurance and other products available in the project area. It will also provide training for risk officers at microfinance institutions to assess the credit risk of farmers who use the practices promoted by the project. However, the incentives for financial service providers to reach out and better connect with farmers are limited. This is due to the (i) high cost of competing with middlemen and verifying farmers' income sources, which often involves physical visits to remote areas; and (ii) uncertain benefits of the new practices in early stages of the project. However, the AE said that the ability of monitoring and reporting to capture the impact of farmers' access to appropriate financial services is somewhat limited; and

53. Economic and financial viability: as per in the funding proposal, the economic analysis of the project considered the stream of benefits that would result from the adoption of climate-resilient agriculture practices through project activities. The analysis resulted in an EIRR of 18.8 per cent over a 20-year period and a financial internal rate of return of 12.6 per cent over a 10-year period. A sensitivity analysis was also performed, showing an increase in project cost, decrease/delays in project benefits, and an exclusion of environmental benefits and value of carbon (since the project focuses on adaptation benefits). The project maintains a positive net present value when the investment cost increases by 50 per cent, but the decrease in benefits is more sensitive, resulting in a negative net present value with a 50 per cent decrease in benefits. In addition, the project still maintains an EIRR of 15.5 per cent and 13.2 per cent with the delays in flows of benefits by one and two years, respectively.

4.3.4. GCF portfolio concentration risk (low risk):

54. In case of approval, the impact of this proposal on the GCF portfolio risk remains non-material and within the risk appetite in terms of concentration level, results area or single proposal.

4.3.5. Compliance (high risk):

55. Compliance rates this proposal as a high risk due to current uncertainty as to Pakistan's ability to meet international anti-money-laundering and countering the financing of terrorism standards (as the country is being reviewed by the Financial Action Task Force) and the potential for significant consequences, including "black-listing" from the global financial system. The AE has indicated that it is aware of this potential risk and has committed to fairly tight control and oversight of funds. Furthermore, the activities to be undertaken under the project primarily relate to training and capacity-building, and do not include such elements as large infrastructure payments, complex procurements or cash transfers that would create risks for money laundering and terrorist financing.

Summary risk assessment		Rationale
Overall programme	Medium	<ul style="list-style-type: none"> GCF financing accounts for 73% of total financing. The AE has an extensive track record in the country and is acting as an EE The project success will depend on the use of data generated through the project investment in actual decision-making
Accredited entity (AE)/executing entity (EE) capability	Low	
Project-specific execution	Medium	
GCF portfolio concentration	Low	
Compliance	High	

4.4 Fiduciary

56. FAO will serve as both the AE and EE for this project. In its role as AE, FAO will be responsible for the overall management of this project, including all aspects of project appraisal; administrative, financial and technical oversight and supervision throughout project implementation; assurance that funds are effectively managed to deliver results and achieve objectives; quality assurance of project monitoring, as well as ensuring the timeliness and quality of reporting to GCF; and project closure and evaluation.

57. FAO country office in Pakistan will bear the overall responsibility for fulfilling the EE function on this project. The EE function will be fulfilled by a dedicated project delivery team anchored in the FAO country office in Pakistan. The FAO country office will host a project management unit (PMU) comprising project-recruited staff and government staff and will be responsible for supporting the execution of day-to-day activities together with participating federal and provincial governments and other stakeholders. The PMU, headed by a full-time, to be recruited project coordinator, will coordinate the work of two province project implementation units and eight district project implementation units to deliver the project and coordinate with all stakeholders. Led by the PMU, these units will collectively perform all EE functions on this project, including the preparation of annual work plans and budgets in collaboration with key government counterparts, overall day-to-day project management, monitoring of project progress, and reporting to the Project Oversight Committee and the FAO–GCF project supervision team. Along with specialized FAO-HQ technical experts, who will directly backstop the project, the project-recruited staff and government staff in the PMU, province project implementation units and district project implementation units will collectively comprise a project delivery team.

58. The project will be executed directly by FAO in accordance with its rules, regulations, policies and procedures. It will be subject to the FAO audit regime, including the external and internal audit functions, and all procurements will be done by FAO in line with the FAO Procurement Manual.

4.5 Results monitoring and reporting

59. As an adaptation project, the intervention expects to benefit 1.3 million direct beneficiaries and 16 million indirect beneficiaries. The project will deliver benefits directly to 8 per cent of the targeted rural population and indirectly to 100 per cent of the targeted rural population, of which women comprise 636,000 of the direct beneficiaries and 7.9 million of the indirect beneficiaries as per the gender-disaggregated metrics for the GCF core indicator.

60. Overall the funding proposal and logic framework sufficiently apply GCF fund-level (impact and outcome) results management framework/performance measurement framework indicators, and the project has incorporated baselines and data collection methods that can inform progress reporting on expected results. With regard to project performance level, as a technical assistance/training-based grant project, measurements for behavioural change have been integrated, which are essential for delivering the expected project results.

61. Regarding section H.1, the logic framework complies overall with GCF standards.

62. The funding proposal theory of change would benefit from further details on the causal pathways at project level and in relation to the climate rationale (which are ideally tested in implementation either with project performance management indicators or impact data/evidence generated to attribute changes to GCF investment).

63. Under section H.2, the Secretariat notes the application of impact assessment tools for data collection and recommends that the AE (i) clarify how it identified methodologies to be applied in collaboration with the Secretariat; and (ii) provide details on the intention to conduct the final independent evaluation as an impact evaluation rather than a process performance

evaluation. Additionally, in the detailed budget, the AE needs to ensure that sufficient budget is allocated to conduct the impact assessment/evaluation and collect essential project-level data for results reporting and adaptive management.

4.6 Legal assessment

64. The accreditation master agreement was signed with the AE on 8 June 2018 and became effective on 4 October 2018.

65. The AE has provided a legal opinion/certificate confirming that it has obtained all internal approvals and has the capacity and authority to implement the project.

66. The proposed project will be implemented in Pakistan, a country in which GCF is not provided with privileges and immunities. This means that, among other things, GCF is not protected against litigation or expropriation in this country, the risks of which need to be further assessed. The Secretariat submitted a draft privileges and immunities agreement to the Government of Pakistan in 2015. Following a call held in February 2017, no response has been received.

67. The Heads of the Independent Redress Mechanism and the Independent Integrity Unit have both expressed that it would not be legally feasible to undertake their redress activities and/or investigations, as appropriate, in countries where the GCF is not provided with relevant privileges and immunities. Therefore, it is recommended that disbursements by GCF are made only after GCF has obtained satisfactory protection against litigation and expropriation in the country or has been provided with appropriate privileges and immunities.

4.7 List of proposed conditions (including legal)

68. In order to mitigate risk, it is recommended that any approval by the Board be made subject to the following conditions:

- (a) Signature of the funded activity agreement in a form and substance satisfactory to the Secretariat within 180 days from the date of Board approval; and
- (b) Completion of legal due diligence to the satisfaction of the Secretariat.

Independent Technical Advisory Panel's assessment of FP108

Proposal name:	Transforming the Indus Basin with Climate Resilient Agriculture and Water Management
Accredited entity:	Food and Agriculture Organization of the United Nations (FAO)
Project/programme size:	Small

I. Assessment of the independent Technical Advisory Panel

1.1 Impact potential *Scale: High*

1. The Indus basin is the major breadbasket for Pakistan.¹ While the fertile land enables agriculture to take place, the water of the glacier-fed Indus River system, supplied through an extensive network of irrigation channels, compensates for evaporative losses in the arid and semi-arid environment. As a western Himalayan river, the Indus is also affected by the southwest monsoon and causes occasional floods. Therefore, within the area surrounding the Indus River system, both drought and flood are known hazards. Several of the worst droughts in recorded history have been experienced in Pakistan during the past 15 years.

2. In spite of receiving flows from the Indus River system, Pakistan is one of the 36 most stressed water-scarce countries, where per capita annual water availability has declined from 5,237m³ in 1962 to 1,188 m³ in 2018. In recent times, the country has been facing the adverse impacts of climate variability and change. There has been a gradual increase in surface temperature in Pakistan, especially in the Punjab and Sindh provinces. Available meteorological data and subsequent trend analyses suggest that the average surface temperature has increased by 0.6 °C during the past century. With such an effect from global warming, the Himalayan glaciers and snow in the mountains are melting fast. Unfortunately, the resultant change in the flow of glacier-fed rivers such as the Indus has not been found to be useful for farmers: the additional run-off from glacier/snow melt is not found to be in synchronization with the crop calendar, which has caused the vulnerability of farmers to gradually increase.

3. As elsewhere in arid and semi-arid conditions, the target provinces of Punjab and Sindh are likely to face much increased surface temperature,² a reduction in diurnal temperature range, further increase in the ratio for glacier and snow melt, erratic rainfall, a shift in availability of water at both spatial and temporal scales, higher potential evapo-transpiration (ET₀) rates and a further rise in crop water requirement for cropping systems that are economically attractive to poor farmers. While crop agriculture is sensitive to any of these climate change-induced phenomenon in the arid and semi-arid Indus basin, a simultaneous occurrence of more than one or all of the above phenomena might be detrimental for farming in future decades.

4. Acknowledging the fact that between 60 and 75 per cent of the total flow of the Indus River system is contributed by glaciers and snow ice, the long-term availability of water in the Indus basin irrigation system is at severe risk. Moreover, the invigorated monsoon occurring

¹ About 90 per cent of the country's cultivated areas belong to the Indus basin.

² Projected to increase by 3 °C to 9 °C by 2100 depending on scenarios.

under climate change will result in increased rainfall³ and subsequent run-off causing floods. The ET₀ related problems are projected to result in a 6 per cent increase in crop water requirement by 2025. Moreover, an increase in temperature will lead to a decrease in crop yield by 2050, with much pronounced impacts in Punjab. All the above projections clearly highlight that agriculture in Pakistan is likely to face devastating impacts that will affect the entire 207.8 million population of the country. As the majority of the rural population in Punjab and Sindh provinces depend on agriculture, the projected adverse impact will be severe in those two provinces.

5. Agriculture in Pakistan is critical for the economy, its overall food security, people's employment and even export revenues. The contribution of the agriculture sector to gross domestic product is 19.5 per cent. Agricultural production provides for over 90 per cent of national food supply, which is substantial when considered with regard to the large total population. The sector employs over 40 per cent of the labour force and generates about 75 per cent of export revenues. The two target provinces are key in provisioning of agricultural goods and services in Pakistan. However, the agrarian economy not only engages millions of smallholder households, the majority of which are in Punjab and Sindh, it also draws its lifeline from the Indus basin in the form of water for an irrigation coverage of over 18 million hectares. Given the impact of climate change, not only will food production be severely affected, but rural people's livelihoods, well-being and food security will be significantly undermined.

6. Such a scenario under climate change warrants multifaceted immediate actions on the ground so that the Government of Pakistan, including the respective provincial governments, will have an opportunity to organize themselves for improved extension, goods and services by gaining advanced knowledge and science while poor smallholder farmers will benefit from climate information, field-based hands-on training, demonstrations, and extension support to irrigate their crop-fields based on scientific rationale and self-managed water governance under a new policy regime.

7. The objective of the proposed project is to transform agriculture in the Indus basin by increasing resilience among the most vulnerable farmers and strengthening the Government of Pakistan's capacity to support commitments to adapt. The specific objectives of the project include the following:

- (a) To develop the country's capacity to generate and use information relevant to coping in agriculture and water management by putting in place state-of-the-art technologies;
- (b) To build farmers' resilience through skills, knowledge and technologies; and
- (c) To create a wider enabling environment for continuous adaptation and expanded sustainable uptake of climate resilient approaches.

8. The project, if approved, will be implemented in five districts of Punjab (i.e. Dera Ghazi Khan, Khanewal, Lodhran, Multan and Muzaffargarh) and three districts of Sindh province (i.e. Badin, Sanghar and Umerkot). The proposal presents a workplan spanning six years to accomplish the tasks, organized in three work streams. The project budget is estimated at USD 47.69 million. GCF is requested to cover USD 34.99 million of the estimated cost as grant.

9. The project aims at delivering institutional strengthening at all levels, especially the data acquisition and analytical capacity and human resources development of key institutions dealing with climate information and advisory services, agriculture extension and irrigation management. This will generate services for public use, which will indirectly benefit 16 million

³ The proportion of precipitation falling as rain is expected to increase from the 1971-2000 average of 58 per cent to 2071-2100 average of 66 to 75 per cent.

people (7.9 million are women) within the target districts as well as others outside the target districts of Pakistan.

10. The project will directly benefit 1.3 million people representing about 200,000 households. The number of direct beneficiaries corresponds to about 5.9 per cent of the total population of Pakistan. In this regard, about 0.64 million women will benefit in terms of increased food supply and nutrition, in addition to taking preparatory measures upon receipt of climate information and warnings. An estimated 48,000 women will benefit from training and extension activities, specifically targeted for women (such as open field schools and nutrition training). The focus of field trainings will be the use of agricultural advisories and early warnings as well as adaptive technologies and practices in order to safeguard crops and even enhance production by practicing appropriate agronomic measures. The latter will be guided by local-level water allocation and scientific advice. Farmers' field schools, knowledge exchange visits and demonstration-oriented extension will be the major pathways to enhance farmers' adaptive capacities, in addition to loss-preventing climate information services and equitable water allocation at local levels.

1.2 Paradigm shift potential

Scale: High

11. The water resource represented by the Indus basin is a lifeline for millions of people in Pakistan. However, due to the expansion of irrigated agricultural activities, gradual deterioration of the canal irrigation system due to inappropriate management, prevailing inequity in water sharing between the "head" and "tail" of a canal system, water loss, which is related to climate variability and change, all individually and/or simultaneously contribute to a water regime, primarily for agricultural production, that is performing at suboptimal levels. No knowledge-based practices have been applied to water management. This project entails a shift from traditional practices to a knowledge-driven management system in water use and agricultural production, which will contribute to resilience to climate change. As such, there is little scope for innovation in the project.⁴ However it aims at improving the management system on the basis of science and advanced knowledge which, with the advent of greater scientific understanding of the water regime in the Indus basin, could have been implemented earlier.

12. The project is aimed at both the macro-level (i.e. institutional capacity and policy integration) and the micro-level (i.e. strengthening adaptive capacity of farmers). For the latter, the project will cover only eight vulnerable districts, which represent only 2.6 million of a total of 14 million hectares of net cultivable area of Pakistan. Therefore, the project offers a significant potential for scaling up, which is likely to be realized in future years given that the relevant institutions will have greatly strengthened capacity to promote informed decision-making for safeguarding agriculture under climate change. The extension of climate resilient agriculture (CRA) and on-farm water management (OFWM) techniques in particular can potentially reach millions of rural farmers within the target provinces and across the country.

13. The project emphasizes knowledge and learning, starting from the institutional level and including water users (i.e, farmers) at the grassroots level. The proposed project places particular emphasis on building capacity at institutional level, to generate and deliver knowledge and learning and to provide climate-informed extension and advisory services. The emphasis is to gather, generate and transfer knowledge to farmers through learning windows, which are conducive to their knowledge uptake. The tools and techniques that are likely to be employed are all either tested in Pakistan conditions and/or have received farmers' vetting

⁴ The application of state-of-the-art technologies for generating information on ET₀-based water budgeting is indeed new in Pakistan, however it has already been applied elsewhere.

through participatory appraisal during the project formulation. The major national institutions have been involved in this process and are all involved in the project. The project will most likely contribute to the creation and strengthening of knowledge, collective learning processes, and strengthening of institutions involved.

14. A number of activities are dedicated to an enhanced understanding of sustainable water management at farm and micro-watershed levels. The managers deployed at regional and/or subdistrict levels (by national/provincial institutions) will also have opportunities to learn and apply the knowledge base to strengthen decision-making in relation to water management for agriculture. Such decision-making processes are reinforced by incorporation of climate information and subsequent agricultural advisories, which will help integration of advanced climate knowledge to strengthen the adaptive capacity of vulnerable producers. The dissemination plan considers traditional tools, such as radio messages, tailored to suit local languages and dialects, and also modern tools such as mobile phone-based messaging.

15. Suitable platforms are chosen to capture lessons learned and to share across stakeholder groups, which will enable others, both within and outside Pakistan (through participation in regional/international forums), to learn from good practices.

16. The project will enhance the capacities of relevant institutions in terms of (i) climate data generation and analysis; (ii) issuance of water/agricultural advisories; (iii) skills enhancement of personnel; and (iv) packaging and dissemination of CRA and OFWM protocol and messaging, among others. Efforts will be made to fine-tune relevant policy and regulatory regimes, including standards for the application of irrigation, to utilize both knowledge-driven and equitable management of water to optimize water usage in ameliorating drought conditions (and to a lesser extent, to reduce dependence on groundwater abstraction at the cost of deteriorating aquifers in water-scarce “tails” of the canal irrigation system).

17. The project will establish the necessary budgetary allocations with both federal and provincial governments to ensure continued delivery of the enabling conditions necessary to continue the process of transformation of agriculture in the Indus basin. Public education will contribute towards creating a common understanding regarding OFWM, which should encourage conflict resolution and the equitable sharing of critically important water resources. All of the above indicate that adequate arrangements are duly considered in the creation of an enabling environment, which will provide long-term benefits to irrigated farming systems across Pakistan, even beyond completion of the project.

18. The project is likely to contribute to the operationalization of the National Water Policy of Pakistan 2018 and other relevant policies and regulatory frameworks to improve climate-responsive planning and development. The project also aims to provide assistance to the provincial government offices to achieve coherence between the implementation of the National Water Policy and the existing National Climate Change Policies. Moreover, the project promises to provide hands-on assistance in the drafting and formulation of standards and regulations for the field-level implementation of higher-level policies in the target provinces. The knowledge-sharing platforms will create opportunities for stakeholders to participate in improving the policy and regulatory regimes related to climate change and environmentally sound agriculture and resource management in Pakistan.

1.3 Sustainable development potential

Scale: High

19. The project directly contributes to meeting the following Sustainable Development Goals (SDGs) in Pakistan:

- (a) SDG-2: Zero hunger by means of food production, food security and nutrition;
- (b) SGD-5: Gender equality (concerns regarding women and minority groups); and
- (c) SDG-13: Enhanced climate action (by reducing vulnerability and increasing adaptive capacities).

The project is also likely to contribute indirectly to the following goal:

- (a) SDG-1: Ending poverty (through incremental increase in income).
20. The project will help provide an incremental increase in income for participating poor farming households, especially due to improved management practices against drought-related crop loss and degradation of soil quality. It is also expected that improved productivity will contribute to an increased return to labour and indirect contribution to local economies by means of additional gains in relation to agricultural input supply, trading and agro-processing.
 21. Water efficiency is likely to be a positive externality of the management of water at farm level based on potential evapo-transpiration (ET_0) data, which foresees lower water usage at the “heads” and reduced dependence on groundwater abstraction at the water-deprived “tails”. The latter will result in gains from reduced operation of pumps and the resultant decrease in greenhouse gas emissions (estimated to be 0.9 tonnes per hectare per annum in the project areas). Improved water regimes will contribute to improved soil quality.
 22. In South Asia, poor smallholders in vulnerable areas suffer chronically from intra-household inequitable food distribution, to the disadvantage of women in particular. Therefore, productivity gains essentially have the potential to contribute to the improvement of women’s nutrition in hazard-affected households. A large number of women in the target areas will benefit directly due to the reduction in drought-related crop loss. Moreover, 48,000 women who are working as agricultural producers will benefit directly due to an explicit and targeted programme developed for their inclusion in extension activities. This will not only help them address drought-related problems, it will also contribute directly to their economic empowerment, simultaneously inspiring other women producers in their neighbourhood. The outreach programme on nutrition will enhance women’s knowledge in the target areas, which will also help to achieve social co-benefits.
 23. The equitable distribution of water on the basis of enhanced ET_0 knowledge and local planning on crop-rotation and irrigation will help achieve greater social harmony and reduction of social tension between farmers at “heads” and “tails” of water distribution channels. The application of knowledge and advisories in water planning, if practiced well under the new National Water Policy, will likely reduce “water grabbing” at the “heads”, resulting in social coherence and more equitable water regimes.
 24. The project proposes adding weather data stations under the Pakistan Meteorological Department (PMD). These will increase the coverage of existing weather stations maintained by the PMD, which demonstrated a strong commitment to invest in operation and maintenance costs both during and beyond the project timeline. Such investments are vital towards ensuring sustainability of the advancements being made under the project.
 25. In view of the above analysis, it appears that the sustainable development potential of the project is high.

1.4 Needs of the recipient

Scale: High

26. Although Punjab and Sindh are known as the predominant breadbasket for the 207.8 million Pakistani population, about 90 million people in the two provinces are estimated to be exposed to risks associated with climate change. In addition to such a huge population at risk of climate related hazards, over two-thirds of the population living in rural areas lives in poverty, leaving little capacity to adapt and overcome vulnerability. The plight of the smallholders is particularly important to note. Their adaptive capacity is significantly lower compared to other farmers.

27. The current ranking of the country, at 147 out of 188 countries ranked in the Human Development Index, clearly indicates that the climate vulnerable population in rural Punjab and Sindh needs interventions to address climate-induced drought and to safeguard their production potential. The project targets eight vulnerable districts, which are home to a total of 16 million people. Most of the households in the selected districts (60 per cent in Punjab and 72 per cent in Sindh) do not have a secure food supply, therefore experiencing occasional food insecurity. Women in these food insecure households face the brunt and receive disproportionately low levels of nutrition compared to males.

28. Most agricultural producers are tenant farmers. Therefore, an excessive drought year results in their further economic marginalization. The increase in drought intensity in the recent past forced poor people to sell cheap labour in the form of bonded and child labour in both the provinces.

29. The Government of Pakistan has been tackling food insecurity and abject poverty, especially involving poor smallholder farmers in the Indus basin. However, the extent of adverse impacts often overwhelms the government's efforts. The nationally determined contribution (NDC) of Pakistan highlighted the estimated requirement of USD 7 to 14 billion per annum to meet adaptation needs. The financial allocation needed to adequately address the complex set of issues in the Indus basin is not immediately available, due to a variety of investment requirements in various economic and social sectors. The current federal climate-related expenditure appears to be between 5.8 and 7.6 per cent of the total expenditures in the federal budget, which is inadequate.

30. Since many of the capacity-building services are targeted at acquiring public goods and services (such as technologies, knowledge and information needed by vulnerable farmers), there is hardly any private sector investment in these areas. There is therefore no chance of private sector crowding out. The absence of alternative sources of financing facilitates mobilization of GCF financing in the project.

31. If GCF financing is mobilized, as proposed, the institutional and policy strengthening and extension related to CRA and OFWM will remove specific barriers to the development of a new regime of knowledge-driven and climate-resistant agricultural practices, leading to greater water governance and equitable distribution of water resources in the irrigated agriculture of the Indus basin. The project offers an opportunity to remove critical barriers in irrigated agriculture involving advanced climate knowledge, decision-making, and safe agronomic choices to tackle drought. The role of both climate-related agricultural advisories with adequate lead-time and ET₀-based water usage planning executed by the stakeholders are key to address climate-induced drought in the irrigated agricultural landscape of the Indus basin. The opportunity to mobilize GCF funds for such purposes should not be wasted.

32. From the above analysis, the independent Technical Advisory Panel (iTAP) finds the needs of the recipient for the project to be high.

1.5 Country ownership

Scale: High

33. The development vision for Pakistan is expressed in the 2011 Pakistan Framework for Economic Growth, which emphasizes the need to address climate change in order to achieve the vision. The document proposes to “climate-proof economic growth from the impacts of climate change, paying particular attention to the agricultural, water and energy sectors”. Meanwhile, Pakistan adopted the National Climate Change Policy in 2012, where adaptation in the agriculture sector is duly emphasized. In the NDC, Pakistan indicates its commitment to achieve the following:

- (a) Behavioural changes in consumption patterns;
- (b) Application of scientific and technological knowledge in adaptations at the national, provincial and sectoral levels;
- (c) Integration of climate change concerns in economic planning and decision-making;
- (d) Building up necessary institutions at all levels; and
- (e) Development of low carbon emission scenarios with all possible options for implementation.

The objectives of such policies in national documents are in full coherence with the country’s national climate change policies and strategies.

34. The Food and Agriculture Organization of the United Nations (FAO) is an international agency, known for its leadership in promoting agricultural development throughout the world. FAO is the proposed accredited entity for the project and has a track record in the advancement of agricultural production in South Asian countries, especially in Pakistan. Since beginning its involvement in Pakistan, FAO has managed 573 projects with a total actual cost of USD 314 million, evidence of the extent of its experience in the field of agricultural development in the country.

35. The agencies working towards implementation of the project are also experienced in delivering public goods and services in Pakistan. The Pakistan Meteorological Department (PMD), with constrained capacities, has been gathering and analysing weather data for understanding climate variability and change. The existing weather stations are maintained by PMD. In addition to PMD, the accredited entity will involve national and provincial institutions such as Pakistan Agricultural Research Council, the National Agricultural Research Council, Pakistan Council for Research in Water Resources, Agricultural and Irrigation Departments of Punjab and Sindh, and the Sindh Irrigation and Drainage Authority, among others. All these institutions will lend their technical expertise and personnel as well as local skills and equipment to facilitate implementation of the project under the leadership of FAO. For the dissemination of climate information and advisories, the existing platform provided by the Pakistan Agriculture Information System will be further consolidated and used. The National Climate Change Council, established under the Pakistan Climate Change Act (in 2017) will be involved to bring about changes in policy and the regulatory regime. The project proposed further collaboration with major projects led by the World Bank and other development partners in the Indus basin, as well as with non-governmental organizations, to deliver capacity-building on CRA and OFWM.

36. The project has met the requirement for engaging civil society organizations and for identification of necessary actions through a participatory process. The inclusion of a separate goal for outreach to 48,000 female farmers clearly indicates that gender sensitivity was fully considered in the participatory appraisal stage.

37. The proposed involvement of national experts in developing the training materials for overall institutional and grassroots capacity-building will be vital to maintain the desired quality of training. Moreover, this will enable partnering institutions not only to interact with the Project Management Unit but also to exert influence in decision-making at the desired delivery levels. The involvement of national non-governmental organizations in the final delivery of training at the farmers' level will ensure that messaging will not perhaps be lost due to local sensitivities regarding language, dialect, religion-based differences, ethnicity and so on.

38. The national designated authority has been fully involved in the development of the project since inception.

39. The co-financing in every sub-component of the project, coming from respective provincial governments, is indirect evidence of how the project captures country ownership. Overall, the country ownership appears high for the project.

1.6 Efficiency and effectiveness

Scale: High

40. The project budget estimates a cost of USD 47.69 million, where USD 34.99 million is requested as grant from GCF. The co-financing committed for the project is estimated at USD 12.7 million with a co-financing ratio of about 1:2.8 – which is quite impressive. As explained earlier, Pakistan's own efforts as regards the significant financial requirements highlighted in the NDC are inadequate to face the challenges of exacerbated drought resulting from climate change. In addition to being a developing country, Pakistan's low standing in terms of the Human Development Index signifies that the country has been struggling to invest at a level desirable to achieve higher social and economic development. Since the goods and services to be generated under the project are almost entirely related to provision of public goods and services, Pakistan's request for full concessionality as grant is justified.

41. The project, if approved and subsequently implemented, will safeguard against a potential loss of production to the value of USD 66 million, when compared to a "no action scenario". This is the cost of avoided loss. However, the losses likely to be incurred due to degradation of soil and groundwater aquifers have not been included in the estimation of avoided loss. In addition, increased production from the business as usual baseline would probably generate an additional net cash flow of USD 91 million in the next 20 years. Moreover, the potential savings from burning less fuel for groundwater irrigation – considered to be the last resort in the case of severe drought – will contribute to savings of both cash and greenhouse gas emissions. All these aspects suggest that the project is on a strong financial footing.

42. Indeed, the overall net present value and internal rate of return for the project are positive for both these cases. This suggests that, with the GCF contribution and co-financing from the provincial governments of Punjab and Sindh, poor farming households will make an incremental net profit, in addition to meeting their sustainable development goal-related requirements.

43. The project appears cost-effective, when one estimates a delivery cost of USD 39 per direct beneficiary. The reach of the project coverage appears comparable to GCF-financed projects for adaptation, taking into consideration a comparable level of investment and size of target beneficiaries. Cost efficiency for the project may also be assessed by comparing the cost spread per beneficiary in other projects financed by Pakistan's development partners in the Indus basin. The Sindh resilience project exhibits USD 26 per beneficiary, while the Strengthening Markets for Agriculture and Rural Transformation project in Punjab (SMART) project costs USD 120 per beneficiary. The average cost per beneficiary for the proposed project

appears close to the lower end of the spread in recently implemented projects in the Indus basin.

44. The project is targeting the application of best practices, be it in institutional strengthening or in advancing CRA and OFWM on the ground. The best example of the application of sector-wide best practice involves the monitoring of evapo-transpiration by adopting modern analytical methods, which will eventually be put into practice to bring better governance in the distribution of irrigation water at various scales and also to address prevailing social conflicts. The use of mobile technology for the dissemination of advisories will involve various technologies, some of which are state-of-the-art and will be extremely useful for national agencies such as PMD for future sustainable application. In order to ensure continued use of the equipment for weather data acquisition beyond the project timeline, there is a commitment for investments to cover the operation and maintenance costs, thus improving effectiveness of the service.

45. In view of the above assessment, it appears to the iTAP that the overall effectiveness and efficiency of the project is high.

II. Overall remarks from the independent Technical Advisory Panel

46. The iTAP recommends the Board approve the project without conditions.

Response from the accredited entity to the independent Technical Advisory Panel's assessment (FP108)

Proposal name: Transforming the Indus Basin with Climate Resilient Agriculture and Water Management

Accredited entity: Food and Agriculture Organization of the United Nations (FAO)

Impact potential
FAO takes note of the assessment.
Paradigm shift potential
FAO takes note of the assessment.
Sustainable development potential
FAO takes note of the assessment.
Needs of the recipient
FAO takes note of the assessment.
Country ownership
FAO takes note of the assessment.
Efficiency and effectiveness
FAO takes note of the assessment.
Overall remarks from the independent Technical Advisory Panel: FAO thanks the iTAP for its review of the proposal.



Food and Agriculture Organization
of the United Nations

Annex 5

Gender Assessment and Action Plan

Transforming the Indus Basin with Climate Resilient Agriculture and Water Management

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Currency Equivalents

(Exchange rate Effective June 2018)
Currency Unit = Pakistani Rupee (PKR)
USD 1 = PKR 115.6
PKR 1 = USD 0.0086

Pakistani Fiscal Year

January 1 – December 31

Abbreviations and Acronyms

ACWA	Agri-Climate-Water Portal
CAPP	Connected Agriculture Platform Punjab
CBO	Community-Based Organization
FAO	Food and Agriculture Organization of United Nations
GAP	Gender Action Plan
GCF	Green Climate Fund
GDP	Gross Domestic Product
GNI	Gross National Income
HDI	Human Development Index
IFPRI	International Food Policy Research Institute
ILO	International Labour Organization
IUCN	International Union for Conservation of Nature
LHV	Lady Health Visitor
MoCC	Ministry of Climate Change
NARC	National Agriculture Research Council
NGO	Non Government Organization
NRSP	National Rural Support Program
PPAF	Pakistan Poverty Alleviation Fund
RAP	Regional Office for Asia and the Pacific
SDG	Sustainable Development Goal
WOS	Women Open School

1. INTRODUCTION

1.1. Project Introduction from Gender Perspective

The proposed project, “Transforming the Indus Basin with Climate Resilient Agriculture and Climate-Smart Water Management,” aims to strengthen the resilience of agricultural producers in Pakistan’s Indus River Basin in the face of climate change. The Basin spans over 18 million hectares, the vast majority of which is rural. The world’s largest continuous irrigation system is found in the Basin, which contributes to 90 percent of Pakistan’s food production. The Basin is inhabited by more than 90 million people, and approximately half of them are women. The project will target the most vulnerable districts of the two major provinces of the Basin, Punjab and Sindh.

At the national level, the project will endow the government institutions responsible for monitoring weather and climate change with tools and mechanisms to gather, interpret and disseminate information related to climate change. The information will be shared with the authorities, in charge of agriculture and water management of the River Basin, for their activities to promote resilience to climate change. Female officials with technical background are very few at the relevant institutions, and the female technical community has to be strengthened.

Trainings on on-farm techniques will benefit 100 000 farmers from the target districts and emphasise adaptive management to the changing climate. All major crops and animals are taken care of jointly by women and men through mostly segregated tasks, but most interventions rarely give satisfactory attention to distinct contributions of women farmers and to the benefits of coordination between women and men.

Livestock is a neglected sub-sector compared to crop agriculture, but a very important one in terms of national economy as well as food, nutritional and financial security of the farmers. Although women are in charge of the animals on a daily basis with little involvement of men, it is the latter that hold the decision-making power. The crops considered of little financial importance are in the exclusive care of women. Field consultations strongly suggest that female farmers are more open than men to cultivating new crops and raising livestock whose economic significance is yet unproven, as long as they do not need to sacrifice other responsibilities.¹ Vegetables, which provide significant improvement in nutritional security, are such crops and have been embraced already by some women farmers in the region. They offer valuable entry points for diversification: one of the key elements in adaptation to climate that is no longer predictable. One of the largest obstacles in leveraging these aspects of female farmers is their meagre access to knowledge and resources, which is linked to their weak social capital.

The project will promote the distribution of timely information on climate and agriculture as well as sharing of knowledge and skills obtained by farmers through their direct involvement in the project with other farmers in the Basin. The rural Pakistani society considers certain modes of communication suited for men; but not for women. It also sees diminished importance of education for women than for men, leading to a gender gap in the practical capacity of utilising technology. Despite the acknowledgement by the National Climate Change Policy of the importance of gender mainstreaming, recently launched activities, such as mobile-phone based information services, appear geared exclusively toward men in its content and skills required for access. These factors create gender-differentiated preferences in terms of mode of communication, which need to be taken into account for effective implementation of the project. Young women have skill sets different from those of older women, in particular with respect to information technology; they represent valuable assets that the entire female community can benefit

¹ This is probably due to the fact that, compared to men, their socioeconomic condition is considerably worse and hence they feel stronger needs to improve their lives.

from.

The project will also raise awareness on various subjects related to adaptation to climate change, including gender, along the entire value chain – from policy, public administration, education to agricultural input, product, credit and insurance and consumption – so that adaptation to climate change by farmers will be socioeconomically feasible, and hence sustainable.

Climate resilient agriculture will contribute to food and nutritional security, leading to climate resilient communities. Women empowered through more dynamic participation in agriculture would result in more gender-neutral food distribution within households and better health for both women and children, especially for girls, reducing malnutrition and stunting that prevail in the rural areas of Pakistan.

1.2. Objectives of the Assessment

1.2.1: Rationale

Gender equality and women's empowerment constitute fundamental dimensions of human development. If a significant portion of the humanity does not enjoy progress, we cannot claim to have achieved human development.² The importance of engaging all stakeholders – women, men, minority groups and youths – has been increasingly recognised around the world for any social intervention to be sustainable, and Pakistan has ratified many international agreements and goals related to the subject, including the Universal Declaration of Human Rights, the Convention on the Elimination of All Forms of Discrimination against Women, and adopted the Sustainable Development Goals. The country has thus officially committed itself to achieving gender equality in all facets of life.

The Food and Agriculture Organization of the United Nations (FAO) recognizes that gender equality is key to its mandate to achieve food security for all. As evidenced by *FAO Policy on Gender Equality*³ and *Regional Gender Strategy for Asia and the Pacific*,⁴ the Organization further sees rural women as agents of change whose engagement is indispensable to meet the Sustainable Development Goals (SDGs), not only the one on gender, but any of the 17 SDGs.

1.2.2: Objective

The objective of the Gender Assessment is to provide the foundation for effective gender mainstreaming in the Green Climate Fund (GCF) project, "Transforming the Indus Basin with Climate Resilient Agriculture and Climate-Smart Water Management." The Analysis examines the socioeconomic conditions of women and men targeted by the project and elucidates gender-specific roles, constraints and needs, thereby allowing a strategic approach to the integration of gender dimensions into the project, summarised as the Gender Action Plan (GAP). The underlying theory of change is: the project will create effective opportunities to empower women through paying sufficient attention to existing gender differences, which will allow communities in the Indus Basin to adapt to climate change in a sustainable manner.

2. METHODOLOGY

The Gender Assessment focuses on the situation of rural women in the areas targeted by the project: Punjab Districts of Dera Ghazi Khan, Khanewal, Lodhran, Multan, and Muzaffargarh, and Sindhi Districts of Badin, Sanghar and Umerkot.

² United Nations Development Programme, 2016. *Human Development Report 2016: Human Development for Everyone*. New York: UNDP.

³ Food and Agriculture Organization of the United Nations, 2013. *FAO Policy on Gender Equality: Attaining Food Security Goals in Agriculture and Rural Development*. Rome: FAO.

⁴ Regional Office for Asia and the Pacific, FAO, 2017. *Regional Gender Strategy and Action Plan for Asia and the Pacific 2017-2019*. Bangkok: FAO.

It draws on the information obtained through consultations with farmers and provincial government officials, gender analyses of the country recently produced,⁵ and other relevant information sources – such as research articles, policies and statistics on agriculture, climate change and gender – and contributions from the FAO Pakistan Offices and Regional Office for Asia and the Pacific (RAP).

The purpose of the consultations was to extract key issues pertaining to the lives of female farmers in the rural areas through basic questions on the topic (see Section 8.1). The key issues were then assessed in detail with the aid of literature search, whose results are summarized in Sections 5 Gender in Rural Pakistan: Overview and 6 Gender in Punjab and Sindh. The detailed assessment led to identification of risks and opportunities for female farmers facing climate change, and contributed to project formulation, establishment of implementation modalities and specifying beneficiaries (see Section 7).

A total of 696 farmers in the target districts were consulted, of which 343 were women. Women's views on various issues were collected through meetings exclusively for women, participants and organisers alike. Institutional meetings were held at national, provincial and district levels. At the national level, the institutions consulted were the Ministry of Climate Change (MoCC), Irrigation Research Institute, International Food Policy Research Institute (IFPRI), National Agriculture Research Council (NARC), International Labour Organization (ILO), International Union for Conservation of Nature, National Rural Support Program (NRSP), Potohar Organization for Development Advocacy, Pakistan Poverty Alleviation Fund (PPAF) and Hashoo Foundation.⁶ Provincial and district level consultations were held with Irrigation Departments (Punjab and Sindh), On-Farm Water Management Department in Multan (Punjab), Agriculture Extension Wing of Department of Agriculture in Multan (Punjab), Livestock and Dairy Department in Dera Ghazi Khan (Punjab), Forest Department (Sindh), and selected non-government organizations (NGOs) working in the target districts (see Section 8.2).

To the greatest extent possible, the Assessment is based on official statistics and published research results pertaining to target districts and field consultations conducted in those districts. Where relevant information could not be found, it relies on that of the rural areas of the target provinces, of the entire target provinces, or of the whole nation. Where no such information is available, the Assessment may refer to the general consensus among the professionals in the field or anecdotes.

3. RELIGIOUS, LEGAL AND ADMINISTRATIVE FRAMEWORK

3.1. Protection of Women and Gender Equality: Pakistan

The holy Qur'an establishes complete and genuine equality between women and men.⁷ Not only the holy Qur'an, but also Hadith and other Islamic guidance indicate that women have a right to inheritance. The Pakistan Ordinance (1947) established Pakistan's nationhood, and at the same time, granted full suffrage to women. The Interim Constitution of Pakistan (1953) reaffirmed the right of women to vote in national elections, and the Constitution of Pakistan (1973) defined that there will be no discrimination on the basis of sex alone and that "steps shall be taken to ensure full participation of women in all spheres of national life."⁸ Pakistan is a signatory to the United Nations Convention on the Political Rights of Women (1952),⁹ the International Covenant on Economic, Social and Cultural Rights (1966), the Beijing Platform of Action

⁵ Food and Agriculture Organization of the United Nations, 2018. *Gender Stocktaking Exercise* (draft).

Samee, Duree *et al.*, 2015. *Women in Agriculture in Pakistan*. Islamabad: FAO.

⁶ Hashoo Foundation aims to serve marginalised communities particularly women, children and young people across its targeted areas. (Hashoo Foundation, About Us, 2018, <http://hashoofoundation.org/about-us/> accessed 3 June 2018)

⁷ Al Khayat, M. H., 2003. *Woman in Islam and her role in human development*. Cairo: World Health Organization Regional Office for the Eastern Mediterranean.

⁸ Articles 25(2) and 34, respectively.

⁹ It stipulates full suffrage for women.

(1995),¹⁰ and the United Nations Convention for Elimination of all forms of Discrimination against Women (1981).

In 2000, the National Commission on the Status of Women was established for mainstreaming gender aspects in policies, laws and justice.¹¹ The awareness by politicians that violence against women is a provocative subject led in 2002 to formal enunciation of the National Policy for Development and Empowerment of Women.¹² The momentum was further strengthened by Criminal Law (Amendment) Act (2004) on honour killings, Protection for Women (Criminal Law Amendment) Act (2006), and Criminal Law (Second Amendment) Act (2011) on acid crimes, and Domestic Violence (Prevention and Protection) Act (2012).¹³ Sexual harassment has been addressed by: Criminal Law Amendment Act (2010); Protection against Harassment of Women at the Workplace Act (2010); and, Prevention of Anti Women Practices - Criminal Law (Third Amendment) Act (2011).^{14, 15} Gender Crime Cell was established within the National Police Bureau in 2006 to gather, collate, and analyse data on gender-based violence, but it does not widely publicise the data.¹⁶ The government has recognized the high vulnerability of women and children to climate change events and created Gender and Child Cells in the National Disaster Management Authority and its provincial counterparts.¹⁷ The Child Marriage Restraint Act has existed since 1929.

Pakistan Vision 2025: One Nation – One Vision proposes seven pillars for the future of the country, the first of which is “People First: developing social and human capital and empowering women” associated with SDG goals of poverty, health, education and gender.¹⁸ A comprehensive national policy on gender, however, does not exist to date.

3.2. Protection of Women and Gender Equality: Punjab and Sindh

The Punjab Government created a Women Development Department in 2012, together with its first Women Empowerment Packages, in order to address the social and economic issues faced by women in the province. The actions taken include: (i) the amendment of Land Revenue Laws to facilitate the accession of title of inherited property; (ii) the promulgation of the 2016 Punjab Prevention of Violence Against Women Act; (iii) the enactment of the 2014 Punjab Commission on Status of Women Act; and, (iv) the subsequent establishment of the Commission. While initiatives for non-farming women outnumber those for farming women in the Packages of 2016, 3 000 women participated in veterinary training, and 12 000 heifers and sheep/goats were distributed to them. In addition, 110 000 plots were allocated on joint ownership of husbands and wives.¹⁹

In 1979, the Women Development Cell was established in the Planning and Development Department of Sindh with the aim to address women's issues through an institutionalised system. Following its downsizing, the Women Development Department was created in 2003 to focus on women's empowerment and gender equality; it has produced a Provincial Policy for the Development of Women

¹⁰ Both specify that women have a right to inheritance.

¹¹ National Commission on the Status of Women, 2009. <http://www.ncsw.gov.pk/> (accessed 2 May 2018)

¹² Bashir, Ahmad et al., 2010. *National Policy for Development and Empowerment of Women: A study of its efficacy in the elimination of Violence Against Women*. Saarbrücken: VDM Verlag Dr. Müller.

¹³ United Nations Women, Asia and the Pacific, undated. *Legislation on Violence against Women and Girls*. <http://asiapacific.unwomen.org/en/countries/pakistan/evaw-pakistan/legislation-on-vaw> (accessed 2 May 2018)

¹⁴ *Legislation on Violence against Women and Girls. ibid.*

¹⁵ Anti-Terrorism Act 1997

This Act provides for the prevention of terrorism and sectarian violence and for speedy trial of heinous offences (such as kidnapping for ransom). The law covers *issues of child molestation and gang rape* (*Legislation on Violence against Women and Girls. ibid.*)

¹⁶ The data remain unavailable to policy makers, program administrators, the media, or funding or service provision agencies.

¹⁷ Asian Development Bank, 2016. *Pakistan Country Gender Assessment, Volume 1 of 2: Overall Gender Analysis*. Manila: Asian Development Bank.

¹⁸ Ministry of Planning, Development and Reform, 2014. *Pakistan 2025: One Nation – One Vision*. Islamabad: Government of Pakistan.

¹⁹ Women Development Department, undated. *Punjab Women Empowerment Package 2016*.

<https://wdd.punjab.gov.pk/system/files/pwei2016.pdf> (accessed 29 March 2018)

and a Gender Reform Action Plan.²⁰ The Sindh Rural Support Organization²¹ runs Union-Council Based Poverty Reduction Programs for underprivileged communities in the rural areas, which remain as some of the major actions of its kind in the province. The Programs focus on women and poor households identified through a Poverty Scorecard Survey and provide access to community-managed microloans and grants for income generation.²² Some create employment opportunities by training youth in technical skills.²³

3.3. Crop Agriculture, Livestock and Climate Change Policies on Gender

3.3.1: Gender and Agriculture Policy

The draft Agriculture and Food Security policy defines the government's primary function as a regulator and facilitator, which creates an enabling and proactive environment for the following goals: (i) inclusive growth that draws in vulnerable group such as small farmers, sharecroppers and non-agriculture workers; (ii) improvement of resource scarcity and degradation issues particularly related to land and water; and, (iii) rapid reduction in hunger and malnutrition. Although it does not contain an independent section on women or gender, it suggests targeted productivity enhancement programs for landless, small farmers and livestock breeders with a special focus on women: rural poultry, bee keeping, certified nurseries, tissue culture, goat enterprise, mushroom production and seed enterprises.²⁴ These activities are indeed well known around the world as tasks compatible with women's household responsibilities.

3.3.2: Gender and Livestock Policy

In comparison with crop agriculture, livestock tends to be neglected, although half of value-added in the agriculture sector is owed to livestock.²⁵ It also serves as a life-saving mechanism for many rural farmers by acting as: savings; readily accessible cash source; and, means for food and nutrition security.²⁶ Most of the regulatory framework of the sector dates from the 19th century, however, when rural and market contexts were vastly different from those of today.²⁷ No clear strategies, policies or operational guidelines exist on vaccination, breed improvement or veterinary health maintenance.²⁸

3.3.3: Gender and Climate Change Policy

The National Climate Change Policy formulated in September 2012 recognises women as powerful agents of change, in addition to the importance of the participation of women and female gender-experts in all policies, initiatives and decisions relating to climate change. At the same time, it acknowledges the vulnerability of women during extreme weather events and disasters, and consequently, the need to address this vulnerability. It emphasises mainstreaming gender perspectives into efforts on climate change adaptation at national and regional levels, motivated by its recognition of women's contribution to natural resource management.²⁹

²⁰ Women Development Department, Government of Sindh. <http://www.sindh.gov.pk/dpt/WDD/index.html> (accessed 29 March 2018)

²¹ A not-for-profit organization established in 2003 with the funds of the Government of Sindh. <http://www.srso.org.pk/intro.htm#bgr> (accessed 4 May 2018)

²² Union Council Based Poverty Reduction Programme, undated. *Union Council Based Poverty Reduction Programme (UCBPRP): Monthly Progress Report (Month of February 2018)*. http://www.srso.org.pk/reports/monthly/EUCBPRP_Feb-2018.pdf (accessed 29 March 2018)

²³ Union Council Based Poverty Reduction Programme (UCBPRP): *Monthly Progress Report (Month of February 2018)*. *ibid*.

²⁴ Ministry of National Food Security and Research, undated. *Agriculture and Food Policy (draft)*. <http://mnfsr.gov.pk/mnfsr/userfiles1/file/Policy%20Draft%2029%20September.pdf> (accessed 18 April 2018)

²⁵ Amin, Humera *et al.*, 2010. Gender and Development: Roles of Rural Women in Livestock Production in Pakistan. *Pakistan Journal of Agricultural Sciences*. Vol. 47(1), 32-36.

²⁶ *Women in Agriculture in Pakistan*. *ibid*.

²⁷ International Fund for Agricultural Development, Asia and the Pacific Division, Programme Management Department, 2013. *Livestock and Access to Markets Project – Design completion report: Main report and appendices*. Rome: IFAD.

²⁸ *Livestock and Access to Markets Project – Design completion report: Main report and appendices*. *ibid*.

²⁹ Ministry of Climate Change, 2012. *National Climate Change Policy*. Islamabad: Government of Pakistan.

4. SOCIAL PARTICIPATION OF PAKISTANI WOMEN

4.1. Rural Women's Voice in Politics

About a fifth of parliamentary seats is held by women in Pakistan; women's political representation is relatively strong in the region.³⁰ The female parliamentarians have been instrumental, together with nongovernmental advocates, in supporting new legislation to prevent attacks using acid against women,³¹ but further integration of female farmers' concerns and needs into the political agenda remains insufficient. In October 2017, Islamabad hosted the 10th Annual Conference on Rural Women, whose participants demanded that the government give official recognition to women working in farms or with livestock as agriculture workers and called for the development of a rural women manifesto before the next elections.³² No tangible results have come about as of early 2018.

As the Ministry of Finance put it, "agriculture is the lifeline of Pakistan's economy,"³³ contributing to 19 percent of the Gross Domestic Product.³⁴ When we consider its role in providing raw material, such as cotton, to value-added sectors, its weight in the economy is far larger; in 2015, garment, textile and footwear exports totalled nearly USD 13.6 billion, equal to 61 percent of all merchandise exports.³⁵ No major crop is cultivated and harvested by men alone, and crop harvesting is almost exclusively done by women. As one rural woman in Sindh remarked, a household no longer functions properly when the women are absent while that cannot be said for the absence of men.³⁶ Existing policies, plans and programmes and institutional arrangements, however, take contributions and needs of women farmers rather perfunctorily into account, if at all. In the rural areas, the landowners, who are all male, exercise power and influence over small landholders and landless tenants, as financial and other resources are concentrated in their hands. They are also very active in the political system of the country; more than half of the total seats in the national assembly are claimed by them.³⁷

4.2. Community-Based Organizations

Social capital, which includes social community networks, is crucial in bringing about changes to women's lives; it gives bargaining power in formal negotiations, pooled resources, a base for bartering and information exchange,³⁸ and experience in organization management and planning. However, community networks are largely absent in the rural areas among women.³⁹

In the targeted districts of Punjab and Sindh, 22 709 Community-Based Organizations (CBOs) and 56 Local Support Organizations (a designation used interchangeably with CBOs and Grass Root Level Organizations in Pakistan)⁴⁰ had been developed by various NGOs at the most local administrative level (Union Council) with a cumulative membership of 540 005 in 2016-17.⁴¹ The organizations may be segregated by gender or mixed; among the CBOs, 12 percent were exclusively for women, 78 percent mixed, the rest were for

³⁰ UNDP Pakistan, undated. *Gender Equality*. <http://www.pk.undp.org/content/pakistan/en/home/ourwork/gender-equality.html> (accessed 10 April 2018)

³¹ Quoted in *Human Development Report 2016*. *ibid*.

³² Kundi, Asma, 2017. Greater role for rural women in decision-making demanded. *Dawn*, October 17, 2017.

³³ Ministry of Finance, the Government of Pakistan, undated. *Pakistan Economic Survey 2015-2016*, Chapter 2, Agriculture. http://www.finance.gov.pk/survey/chapters_17/02-Agriculture.pdf (accessed 1 May 2018)

³⁴ Ministry of Finance, the Government of Pakistan, undated. *Pakistan Economic Survey 2017-2018*, Chapter 2, Agriculture. http://www.finance.gov.pk/survey/chapters_18/02-Agriculture.pdf (accessed 10 May 2018)

³⁵ International Labour Organization, 2017. *Asia-Pacific Garment and Footwear Sector Research Note*. Issue 7, February 2017. Geneva: ILO.

³⁶ Field Consultation, February-March 2018.

³⁷ *Women in Agriculture in Pakistan*. *ibid*

³⁸ Agha, Nadia, 2017. Women farmers. *Dawn*, 17 September 2017. <https://www.dawn.com/news/1358150> -- accessed 6 May 2018.

³⁹ Women farmers. *ibid*

⁴⁰ Pakistan Centre for Philanthropy. Assessment of Community Organizations (COs) <http://www.pcp.org.pk/iso.html> (accessed 8 May 2018)

⁴¹ National Rural Support Programme, 2017. *23rd Annual Progress Report, 2016-2017*. Islamabad: NRSO.

Union Council Based Poverty Reduction Programme (UCBPRP), undated. *Monthly Progress Report (Month of February 2018)*.

Rural Support Programme, 2017. *Outreach*. #34, July – September 2017.

Thardeep Rural Development Programme, 2018. *Realizing Rural Potential: Together We Can, Annual Report 2016-2017*. Karachi: TRDP.

men only.⁴² The organizations segregated by gender were all concentrated in the Badin District of Sindh; other districts did not have any.

During the consultations, female farmers expressed their satisfaction for Women Open Schools not only in terms of enabling them to engage in vegetable production, but also as opportunities to socialise.⁴³ The Schools have thus shown potential as the base for networks that encompass broader actions.

4.3. Female Professionals

In accordance with the social status of women and the opportunities that it grants, female professionals are scarce in technical fields related to the project. The government jobs related to gender are also dominated by men.

4.3.1: Climate and Water Resources Management

The Ministry of Climate Change employs 4 female and 39 male professionals at the national level.⁴⁴ The Pakistan Meteorological Department, which operates at the national level, has 5 female and 95 male staff members.⁴⁵ Pakistan Council of Research in Water Resources has 4 female and 18 male professionals at the Headquarters, no female and 10 male professionals in Punjab, and no female and six male professionals in Sindh.⁴⁶ The Indus River System Authority counts no female and four male professionals.⁴⁷ Eleven female and 32 male managers work for Punjab's Environmental Protection Department, Head Office in Lahore,⁴⁸ and 1 female and 35 male district officers are deployed at district level.⁴⁹ No female and six male managers work for the Environment Protection Agency in Sindh.⁵⁰ No female irrigation professional is employed at the Irrigation Departments of Punjab.⁵¹

The teaching staff at the Faculty of Agriculture Engineering of Sindh Agriculture University, Tandojam with six Departments (Irrigation and Drainage,⁵² Land and Water Management,⁵³ Farm Power and Machinery,⁵⁴ Energy and Environment,⁵⁵ Farm Structure,⁵⁶ Basic Engineering⁵⁷) counted 3 female and 28 male members.

⁴² National Rural Support Programme, 2017. *23rd Annual Progress Report, 2016-2017*. Islamabad: NRSO.

Union Council Based Poverty Reduction Programme (UCBPRP), undated. *Monthly Progress Report (Month of February 2018)*.

Rural Support Programme, 2017. *Outreach*. #34, July - September 2017.

Thardeep Rural Development Programme, 2018. *Realizing Rural Potential: Together We Can, Annual Report 2016-2017*. Karachi: TRDP.

⁴³ Field consultation, February-March 2018.

⁴⁴ Ministry of Climate Change, 2018. Contact Us. <http://www.mocc.gov.pk/frmDetails.aspx> (accessed 21 May 2018)

⁴⁵ Capacity Building of Meteorological Department, undated. Higher Education. <http://www.pmd.gov.pk/cbp/index.php?type=f> (accessed 27 April 2018)

⁴⁶ Pakistan Council of Research in Water Resources, 2017. Technical Staff. http://www.pcrwr.gov.pk/about.php?view_members (accessed 4 April 2018)

⁴⁷ IRSA, 2011. Indus River System Authority. <http://www.pakirsa.gov.pk/IRSAAuthority.aspx> (accessed 4 April 2018)

⁴⁸ Environment Protection Department, 2018. Contact Directory – EPA. http://epd.punjab.gov.pk/contactus_contact_directory_epa (accessed 19 May 2018)

⁴⁹ Environment Protection Department, 2018. Contact Directory – Districts. http://epd.punjab.gov.pk/contactus_contact_directory_districts (accessed 19 May 2018)

⁵⁰ Environment Protection Agency Sindh, undated. Contact Us. <http://epasindh.gov.pk/html/contactus.html> (accessed 19 May 2018)

⁵¹ Irrigation Department, undated. Contact Us. http://irrigation.punjab.gov.pk/Correspondence/Contact_Us.aspx (accessed 9 April 2018). No comparable data is available for Sindh.

⁵² Sindh Agriculture University, Tandojam, Faculty of Agriculture Engineering, Department of Irrigation and Drainage, 2018. <http://fae.sau.edu.pk/id/index.php> (accessed 26 April 2018)

⁵³ Sindh Agriculture University, Tandojam, Faculty of Agriculture Engineering, Department of Land and Water Management, 2018. <http://fae.sau.edu.pk/lwm/index.php> (accessed 26 April 2018)

⁵⁴ Sindh Agriculture University, Tandojam, Faculty of Agriculture Engineering, Department of Farm Power and Machinery, 2018. <http://fae.sau.edu.pk/fpm/index.php> (accessed 26 April 2018)

⁵⁵ Sindh Agriculture University, Tandojam, Faculty of Agriculture Engineering, Department of Energy and Environment, 2018. <http://fae.sau.edu.pk/ee/index.php> (accessed 26 April 2018)

⁵⁶ Sindh Agriculture University, Tandojam, Faculty of Agriculture Engineering, Department of Farm Structure, 2018. <http://fae.sau.edu.pk/fs/index.php> (accessed 26 April 2018)

⁵⁷ Sindh Agriculture University, Tandojam, Faculty of Agriculture Engineering, Department of Basic Engineering, 2018. <http://fae.sau.edu.pk/be/index.php> (accessed 26 April 2018)

4.3.2: Information Technology

The Ministry of Information Technology and Telecommunication has 2 female and 29 male professionals.⁵⁸ Among the managers at Punjab Information Technology Board, one of total 12 is female, who is the Chief Finance Officer.⁵⁹ No similar Department appear to form part of the Government of Sindh.

The female-male ratio at the Department of Computer Sciences, University of Agriculture, Faisalabad, was 1 to 14 for teaching staff,⁶⁰ but 1 026 to 1 218 for students, close to an even distribution between genders.⁶¹ Information Technology University has over 5 female and 28 male members in the IT field among its 59 teaching staff.⁶² University Institute of Information Technology at Pir Mehr Ali Shah Arid Agriculture University Rawalpindi has 8 female and 12 male teaching staff.⁶³ The Department of Statistics and Computer Science of the University of Veterinary and Animal Sciences, Lahore-Pakistan counted no female and 10 male teaching members.⁶⁴ The data indicates that the younger generation is likely to become much more gender balanced in the IT professional arena.

4.3.3: Agriculture Sector

One female and 44 male professionals constitute the cadre at the Ministry of National Food Security and Research, which is in charge of food grain and agriculture.⁶⁵ No women is among the 11 senior management of the Pakistan Agricultural and Research Council.⁶⁶ The National Agriculture Research Centre is home to 15 female and 37 male professionals.⁶⁷

In Punjab, all 44 manager positions in relation to agriculture extension are taken up by men.⁶⁸ We find 85 female and 299 male Agricultural Technical Officers at the headquarters in Lahore, no female and 36 male Agriculture Officers at the district Level, in addition to no female and 2 970 male Field Assistants.⁶⁹ At the Agriculture, Supply and Prices Department of Sindh, which includes the Agriculture Extension Wing, all 80 managerial functions are given to men, and female professionals are 44 Researchers and 1 Price Inspector (while there are no male Researchers and 46 male Price Inspectors).⁷⁰ The Punjab Food Department counts 2 female and 102 male employees.⁷¹

The Livestock and Dairy Development Board counts one female and seven male managers,⁷² while at the

⁵⁸ Ministry of Information Technology and Telecommunication, 2018. Ministry Officials. <http://www.moitt.gov.pk/frmDetails.aspx#> (accessed 5 April 2018).

⁵⁹ Punjab Information Technology Board, undated. Organogram. <https://www.pitb.gov.pk/organogram> (accessed 6 April 2018)

⁶⁰ Department of Computer Science, University of Agriculture, Faisalabad, 2018. Employee's Directory. <http://www.uaf.edu.pk/employees.aspx?param=DEPT&id=12&id1=24> (accessed 10 May 2018)

⁶¹ Personal communication with University officials, May 2018.

⁶² Information Technology University, 2018. Faculty. <https://itu.edu.pk/faculty-itu/> (accessed 10 May 2018)

⁶³ University Institute of Information Technology at Pir Mehr Ali Shah Arid Agriculture University Rawalpindi, 2015. Faculty. http://www.uar.edu.pk/uiit/faculty.php?dept_id=31

⁶⁴ Department of Statistics and Computer Science of University of Veterinary and Animal Sciences, Lahore-Pakistan, undated. Faculty. <http://www.uvas.edu.pk/academics/faculties/FLSBM/bio-stat-comp/faculty/> (accessed 11 May 2018)

⁶⁵ Personal communication with Ministry officials in April 2018.

⁶⁶ Pakistan Agricultural Research Council, undated. Senior Management. <http://parc.gov.pk/index.php/en/senior-managements> (accessed 5 April 2018)

⁶⁷ Scientific Staff, undated. Listed on each page of the 15 Institute found at <http://www.parc.gov.pk/index.php/en/research-institutes-narc> (accessed 9 April 2018)

⁶⁸ Personal communication with Punjab Government officials in October 2017.

⁶⁹ Personal communication with Punjab Government officials in October 2017.

⁷⁰ Personal communication with Sindh Government officials in October 2017.

⁷¹ For Core Team: Punjab Food Department, Government of Punjab, Core Team, 2015. https://food.punjab.gov.pk/core_team (accessed 31 May 2018)

For Secretariat: Punjab Food Department, Government of Punjab, Contact Us, 2015. https://food.punjab.gov.pk/system/files/Annex-D1.pdf#overlay-context=contact_us (accessed 31 May 2018)

For Directorate of Food: Punjab Food Department, Government of Punjab, Contact Us, 2015. https://food.punjab.gov.pk/system/files/Annex-E1.pdf#overlay-context=contact_us (accessed 31 May 2018)

For Food Department: Punjab Food Department, Government of Punjab, Contact Us, 2015. https://food.punjab.gov.pk/system/files/Annex-F1.pdf#overlay-context=contact_us (accessed 31 May 2018)

⁷² Livestock and Dairy Development Board, undated. Board of Directors. <http://lddb.org.pk/board-of-directors/> (accessed 6 April 2018)

provincial level 5 female and 141 male managers work for the Livestock and Dairy Development in Punjab.⁷³ Comparable data was not available from the Livestock and Fisheries Department of Sindh. The teaching staff and other professionals involved in pedagogy at the University of Veterinary and Animal Sciences, Lahore consists of 33 female and 160 male members.⁷⁴

The University of Agriculture, Faisalabad has seven faculties, including Veterinary Sciences and Animal Husbandry, and among its teaching and other professional staff 130 are female and 538 are male.⁷⁵ At the same University, 9 657 female and 14 174 male students were enrolled during 2015-2016.⁷⁶ At the Sindh Agriculture University, Tandojam, the Faculty of Animal Husbandry and Veterinary Sciences counted 6 female and 44 male, the Faculty of Agricultural Social Science 2 female and 21 male, the Faculty of Crop Production 21 female and 44 male, and the Faculty of Crop Protection 3 female and 22 male teaching staff members.⁷⁷ Judging from the numbers of students above, the coming generation is expected to be much more gender balanced in agriculture related fields.

4.3.4: Gender

The Women Development Department of Punjab has a female Secretary, but the total number of female professionals is three as opposed to five for men.⁷⁸ No comparable data is available for the Women Development Department of Sindh.

5. GENDER IN RURAL PAKISTAN: OVERVIEW

The vast majority of the rural population in Pakistan depend on natural resources for their livelihood, but rural women generally do not have assets to their names, productive or non-productive, unlike other segments of the population. They do not assume official roles and have little decision-making power in the public as well as in the private sphere; they are obliged to abide by the rules of a patriarchal society. The practice prevails due to cultural traditions that accord unequal opportunities along the gender line throughout life since birth. It results in a low literacy rate and scant exposure to the outside world, further exacerbating the gap with the rest of the population. Their lives are characterised by: (i) poverty from exploitative wages; (ii) ill health from indoor use of solid fuel for cooking, lack of safety measures when exposed to hazardous chemicals, unsatisfactory access to health facilities, and disadvantaged position in food distribution within households; (iii) insufficient exploitation and appreciation of their knowledge, skills and contributions; and, (iv) lack of autonomy.

The Human Development Index (HDI) is at 0.550, 147th among 188 countries and territories.⁷⁹ The Gender Inequality Index value is 0.546, 130th out of 159 countries; the Gender Development Index value is 0.742, placing Pakistan in Group 5, composed of countries with the lowest equality in HDI achievement between men and women.⁸⁰ Given that these measurements are for the

⁷³ Personal communication with Department officials in April 2018.

⁷⁴ University of Veterinary and Animal Sciences, undated. UVAS List. <http://www.uvas.edu.pk/tel-index.htm> (accessed 8 May 2018)

⁷⁵ University of Agriculture, Faisalabad, 2018. Employee's Directory – Complete List. <http://uaf.edu.pk/employees.aspx?param=AZ> (accessed 26 April 2018)

⁷⁶ University of Agriculture, Faisalabad, undated. *Annual Report 2015-16*.

⁷⁷ Sindh Agriculture University, Tandojam, Faculty of Animal Husbandry and Veterinary Sciences, 2017. Department faculty lists available through <http://fahvs.sau.edu.pk/> (accessed 10 May 2018)

Sindh Agriculture University, Tandojam, Faculty of Agricultural Social Science, 2017. Department faculty lists available through <http://fass.sau.edu.pk/> (accessed 10 May 2018)

Sindh Agriculture University, Tandojam, Faculty of Crop Production, 2017. Department faculty lists available through <http://fcpd.sau.edu.pk/> (accessed 10 May 2018)

Sindh Agriculture University, Tandojam, Faculty of Crop Protection, 2017. Department faculty lists available through <http://fcpt.sau.edu.pk/> (accessed 10 May 2018)

⁷⁸ Women Development Department, 2013. Core Team. http://wdd.punjab.gov.pk/core_team (accessed 30 April 2018)

⁷⁹ *Human Development Report 2016*. *ibid*.

⁸⁰ *Human Development Report 2016*. *ibid*.

entire country, we expect the rural conditions to be much less favourable for women.

5.1. Basic Statistics

5.1.1: Population

Women in Pakistan represent 49 percent of the population,⁸¹ and well over half of the women live in the rural areas,⁸² comprising nearly one-third of the total population.

5.1.2: Literacy and Education

The urban and rural gap in literacy appears widening, as well as that of gender.⁸³ Girls' education is limited, and many, particularly in the rural areas, have access only to basic religious teachings.⁸⁴ The proportion of the national population, aged ten years and older and have ever attended schools, was 62 percent in 2014-15: in urban areas 77 percent and in rural areas 53 percent, and 51 percent among women and 72 percent among men.⁸⁵ In 2016, the national estimate for out-of-school rate for primary-school age children was over 20 percent and that for girls nearly 30 percent.⁸⁶ Over a quarter of adult women reach at least a secondary level of education, compared to 46 percent among men.⁸⁷ The Right to Free and Compulsory Education Act enacted in 2012 mandates school attendance and guarantees free education until 16 years of age.

5.1.3: Poverty and Wealth

Poverty reduction in the country has not seen a steady decline in the past five decades, and a large proportion of the population hovers around the poverty line; more than a half of the national population had experienced poverty⁸⁸ in ten years prior to 2012.⁸⁹ Poverty and wealth in the rural areas are household issues, rather than individual. When a household loses the male head, the widow assumes the role, aided by male relatives who accompany her when the need arises, such as traveling.⁹⁰ The most fundamental, productive asset in agriculture is land. In general, higher poverty is observed among sharecroppers (who are without land) than among landowners, and the majority of the rural poor are landless.⁹¹ Sale and purchase of land are rare, and unequal landholding has remained more or less unchanged from the 1970s to the 2000s.⁹² As of 2004-2005, per-capita income inequality was widening in all provinces. Income inequality within rural areas as well as that among urban residents were also deteriorating.⁹³

5.1.4: Marriage

Many girls are married off at a young age to much older men without their consent, particularly in the rural areas. In 2016, 19 percent of women aged 18-22 in the country (urban and rural Pakistan) were married before turning 18, albeit a dramatic decline over time.⁹⁴

⁸¹ The World Bank. *Population, female (% of total population)* <https://data.worldbank.org/indicator/SP.POP.TOTL.FE.ZS> (accessed 2 May 2018)

⁸² The World Bank. *Rural population (% of total population)* <https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS> (accessed 10 May 2018)

⁸³ Raizul Haq, 2017. Literacy rate in Pakistan slips by 2%. *Dawn*, 26 May 2017. <https://tribune.com.pk/story/1419396/economic-survey-literacy-rate-pakistan-slips-2/> (accessed 1 May 2018)

⁸⁴ *Women in Agriculture in Pakistan*. *ibid.*

⁸⁵ *Pakistan Social and Living Standards Measurement 2014-2015*. *ibid.*

⁸⁶ UNESCO Institute for Statistics, undated. *Education: Number of out-of-school children of primary school age* <http://data.uis.unesco.org/index.aspx?queryid=123> <http://data.uis.unesco.org/index.aspx?queryid=121> (accessed 3 May 2018)

⁸⁷ Food and Agriculture Organization of the United Nations Pakistan, 2018. *Gender Stocktaking Exercise* (draft).

⁸⁸ Defined as less than 2,350 calories intake per adult equivalent per day.

⁸⁹ G. M. Arif, G. M. and Farooq, Shujaat, 2012. *Dynamics of Rural Poverty in Pakistan: Evidence from Three Waves of the Panel Survey*. Islamabad: Pakistan Institute of Development Economics.

⁹⁰ Field consultation, February-March 2018.

⁹¹ Ahmed, Syud Amer and Gautam, Madhur, 2013. *Agriculture and Water Policy: Toward Sustainable Inclusive Growth*. Washington, D.C.: The World Bank.

⁹² *Agriculture and Water Policy: Toward Sustainable Inclusive Growth*. *ibid.*

⁹³ Jamal, Haroon, 2009. *Income Inequality in Pakistan: Trends, Determinants and Impact*. Islamabad: UNDP.

⁹⁴ Malé, Chata and Wodon, Quentin, 2016. *Basic Profile of Child Marriage in Pakistan*. Health, Nutrition and Population Knowledge Brief. Washington, DC.: the World Bank.

The birth rate is 38.7 per 1,000 women aged 15-19, and for every 100,000 live births in the nation, 178 women die from pregnancy related causes.⁹⁵ The statistics for rural women are unavailable but considering their significantly more constrained access to education and health care, most likely higher percentages of them marry and give births early in their lives and die from complications caused by child birth.

5.2. Labour Division and Decision Making

Gender roles in agriculture differ within and across districts and households, depending on several factors: age and matrimonial status (unmarried, married, widowed); household composition (number, age and gender of members, and existence of women engaged in income-generating work); location of the activity; household's economic situation; education received; social restrictions; and economic returns of particular activities. Economic reasoning may occasionally play a larger role than cultural norms in determining the allocation of labour; a widow with no other sources of income will carry out agricultural work generally performed by men. Age differentiation in activities occurs more among women than among men.

Women who participate in agricultural work in Pakistan are not officially registered as farmers, unlike men. All adult and able-bodied female members of farm households are usually fully engaged to tend landowner's or family farms. Their contribution as formal labour force is severely underestimated; 73 percent of Pakistani women are engaged in agriculture,⁹⁶ but nationwide, slightly over a quarter of female population belong to the formal labour force,⁹⁷ while 83 percent of men do.⁹⁸ Women are largely employed by the informal sector, especially in rural areas, which disadvantages women in terms of wage and legal protection.⁹⁹ Work for landowners belongs to the informal sector, where the mode and value of payments are decided verbally and without consideration of the national minimum wage.¹⁰⁰

5.2.1: Crop Agriculture

A common framework exists for division of labour according to gender, although no household may be exactly alike. While some work may be performed by both women and men, certain tasks are often considered exclusively men's: input purchase, pesticide application, machinery use, and on-field irrigation. Gender-based segregation of roles appears the strictest for machine use, and women's tasks become men's after a machine for that task become available to the villagers: ploughing, tilling, planting, field watering, etc. Men tend to be more involved in the early stages of cultivation and animal raising, whereas women focus more on later stages and tasks that require hand dexterity or are time consuming: planting, transplanting and harvesting crops; tending animals; and, food and seed processing and storage.

5.2.2: Livestock

Rural women carry heavy responsibilities in management of livestock, which contributes to nearly half of the total agricultural value added nationally;¹⁰¹ milk and meat are the two main products of livestock sector that makes up 11 percent of GDP.¹⁰² Many products are exported, where "meat & meat preparations (HS 0201 to 0210 & 1602)" represented the largest value with US\$ 167 million in 2011 and achieved an average per-annum growth rate of 39 percent; the trade is mainly with the Gulf region to

⁹⁵ *Gender Stocktaking Exercise. ibid.*

⁹⁶ The World Bank, 2017. *Employment in agriculture, female (% of female employment) (modeled ILO estimate)*. <https://data.worldbank.org/indicator/SL.AGR.EMPL.FE.ZS?view=chart> (accessed 1 May 2018)

⁹⁷ The World Bank. *Labour force participation rate, female (% of female population ages 15-64) (modeled ILO estimate)* <https://data.worldbank.org/indicator/SL.TLF.ACTI.FE.ZS> (accessed 1 May 2018)

⁹⁸ The World Bank. *Labour force participation rate, male (% of male population ages 15+) (modeled ILO estimate)* <https://data.worldbank.org/indicator/SL.TLF.CACT.MA.ZS?page=1> (accessed 1 May 2018)

⁹⁹ *Gender Equality, ibid.*

¹⁰⁰ Women farmers. *ibid.*

¹⁰¹ Amin, Humera et al., 2010. Gender and Development: Roles of Rural Women in Livestock Production in Pakistan. *Pakistan Journal of Agricultural Sciences*. Vol. 47(1), 32-36.

¹⁰² Rehman, Abdul et al., 2017. Livestock production and population census in Pakistan: Determining their relationship with agricultural GDP using econometric analysis. *Information Processing in Agriculture*. No.4, 2017. 168-177.

satisfy demand for *halal* products.¹⁰³ Almost all of the national milk output is consumed in the villages or sold in the cities through middlemen, who often hand smallholders around half the final retail price.¹⁰⁴

With respect to livestock, men are in charge of fodder production, feed and medicine purchase, stallfeeding, animal sale, breeding and curing.¹⁰⁵ Women clean the animal sheds, collect fodder, water the animals, oversee cattle grazing, collect and process dairy products and manure.¹⁰⁶ Dairy and other goods processed or produced by women are usually sold by men, who keep the cash generated.

5.2.3: Household Chores

Pakistani women in the rural areas spend on average 85 hours per week on household chores.¹⁰⁷ The unequal burden between women and men of household work starts early in life around the world and is more pronounced in some regions. In the Middle East, North Africa and South Asia, girls aged 5-14 spend close to twice as many hours per week on household chores as boys of the same age, whereas the world average is that girls aged 5–9 and 10–14 spend 30 percent and 50 percent more of their time, respectively, than boys of the same age.¹⁰⁸ Household responsibilities deprive girls of important opportunities to learn, grow, and enjoy their childhood.¹⁰⁹ They also perpetuate the gender stereotypes and the burden on women and girls.¹¹⁰

5.2.4: Supplementary Income

Both women and men in rural areas supplement household income by working as day-labourers in agriculture and non-agricultural jobs. The overwhelming majority of women's such jobs involve harvesting, in particular cotton. As a rule, rural children participate in the family's income-generating activities.

The society does not allow women to relocate to the cities for work, and they engage in construction works and tile making,¹¹¹ provided that the commute to the location does not compromise their household responsibilities. Such opportunities are difficult to find, and the lack of employment for women causes severe impacts on family expenditure, savings and debt position.¹¹² In 2011, only 4 percent of rural women aged 18-60 had worked as non-agricultural employees.¹¹³ In the off-season, some rural women and children go to nearby better-off villages and cities to beg for food and money.

5.2.5: Decision Making

Generally in South Asia, women are much more likely to be involved in decisions that are perceived as routine in the family economy, such as food purchases, than those that are considered major events.¹¹⁴ There appears no differences in women's decision-making power among Hindus and Muslims in the Region.¹¹⁵

¹⁰³ Trade Related Technical Assistance Programme, United Nations Industrial Development Organization, undated. *Enhancing Livestock Sector Export Competitiveness: Policy Recommendation Paper*. UNIDO

¹⁰⁴ International Fund for Agricultural Development, Asia and the Pacific Division, Programme Management Department, 2013. *Livestock and Access to Markets Project – Design completion report: Main report and appendices*. Rome: IFAD.

¹⁰⁵ *Women in Agriculture in Pakistan*. *ibid*.

¹⁰⁶ *Women in Agriculture in Pakistan*. *ibid*.

¹⁰⁷ Nazli, Hina, et al., 2012. *Pakistan Rural Household Panel Survey 2012 (Round 1) - Household Characteristics*. Washington, D.C.: International Food Policy Research Institute.

¹⁰⁸ United Nations Children's Fund, 2016. *Harnessing the Power of Data for Girls: Taking stock and looking ahead to 2030*. New York: UNICEF.

¹⁰⁹ Reuters, 2016. Girls spend 40 per cent more time on unpaid household chores than boys: report. The Express Tribune, October 7, 2016.

¹¹⁰ . Girls spend 40 per cent more time on unpaid household chores than boys: report. *ibid*.

¹¹¹ NoorMmemon, Irfana et al., 2015. Women Labour Participation of Agricultural Production in Sindh Pakistan. *Journal of Resources Development and Management*. Vol. 10, 2015, 87-97.

¹¹² Women Labour Participation of Agricultural Production in Sindh Pakistan. *ibid*.

¹¹³ Pakistan Rural Household Panel Survey 2012 (Round 1) - Household Characteristics. *Ibid*.

¹¹⁴ Jejeebhoy, Shireen J. and Sathar, Zeba A., 2001. "Women's Autonomy in India and Pakistan: The Influence of Religion and Region." *Population and Development Review* Vol. 27, No. 2, December 2001, :687–712.

¹¹⁵ Women's Autonomy in India and Pakistan: The Influence of Religion and Region. *ibid*.

Whereas 83 percent of women in urban parts of Islamabad Capital Territory consulted family members on education of children, 40 percent of rural women of the Territory did so;¹¹⁶ this may be because of lack of involvement of rural women in such matters. Control over household budget was reported by 11 percent and 5 percent of urban and rural women in the Territory,¹¹⁷ and slightly over half of rural husbands and over two-thirds of urban husbands were open to accepting wives' points of view.¹¹⁸

Women in rural Pakistan make financial contributions through farm work and household work (which is essential, but only indirectly related to income), but do not derive any additional autonomy as a result.¹¹⁹ Water User Associations, which determine the allocation of irrigation water, are formed by registered landowners who are all men.¹²⁰ Migration of men for supplementary income and their absence confers women additional decision-making power, but at the same time, it may bind them to extended-family living arrangement and limit their authority.¹²¹ Women's cash income generation, on the other hand, has a greater potential for increasing their decision-making power in the household.¹²² Subtle differences exist within regions, however, and possibly among communities as well.¹²³

5.3. Agriculture Resources and Service

5.3.1: Land and Livestock

In agricultural sector, land mostly belongs to male members of the household. Women, even if they have rights, are not given access to land titles.¹²⁴ Nationwide, 11percent of urban households and 41percent of rural households own land.¹²⁵ In 2012-2013, 89 percent of ever-married women aged 15-49 did not own a house, and 96 percent did not own any land.¹²⁶

Proportionately more of rural than urban households own livestock: 64 percent and 12 percent, respectively. The proportion of households that own livestock has decreased by 7 percentage-points in rural areas and 5 percentage-points in urban areas between 2006-07 and 2012-2013.¹²⁷ Data regarding women's livestock ownership is unavailable, but is considered to be as low as that of land.

5.3.2: Agriculture Extension Services

Agriculture extension's main objective is to transfer effectively the latest knowledge and research results to the farmers for the sake of better farm management; their services are essential for improvement of rural livelihoods and food security. Despite the decentralization of governmental functions, strong mandate of Provincial Departments concerned, and innovations recently introduced,¹²⁸ the services in

¹¹⁶ Taj, Sajida, et al., 2004. "Assessment of Rural and Urban Women's Participation in the Decision Making in Family Matters." *Pakistan Journal of Life and Social Sciences*. Vol.2, No. 1, 2004, 28-32.

¹¹⁷ Assessment of Rural and Urban Women's Participation in the Decision Making in Family Matters. *ibid*.

¹¹⁸ Assessment of Rural and Urban Women's Participation in the Decision Making in Family Matters. *ibid*.

¹¹⁹ Sathar, Zeba A, Yesha and Kazi, Shahnaz, 2000. "Women's Autonomy in the Context of Rural Pakistan." *The Pakistan Development Review*. Vol. 39, No. 2, Summer 2000, 89–110.

¹²⁰ *Gender Analysis in Agriculture Punjab – Pakistan: Field Insights – 11-13 May 2011*. *ibid*.

¹²¹ Women's Autonomy in the Context of Rural Pakistan. *ibid*.

¹²² Women's Autonomy in the Context of Rural Pakistan. *ibid*.

¹²³ Women's Autonomy in the Context of Rural Pakistan. *ibid*.

¹²⁴ *Women in Agriculture in Pakistan*. *ibid*.

¹²⁵ *Pakistan Demographic and Health Survey, 2012-2013*. *ibid*.

¹²⁶ *Pakistan Demographic and Health Survey, 2012-2013*. *ibid*.

¹²⁷ *Pakistan Demographic and Health Survey, 2012-2013*. *ibid*.

¹²⁸ The Extension and Adaptive Research Division of the Directorate General of Agriculture in Punjab has established an institute for education in agricultural science, organized Farmer Field Schools for mango, citrus and vegetable growers, established the Plant Clinics in collaboration with CABI (Centre for Agriculture and Biosciences International). Source: Extension & Adaptive Research, Directorate of General Agriculture, Government of the Punjab, 2014. <http://ext.agripunjab.gov.pk/services> (accessed 18 April 2018)

The Agriculture Extension Services Sindh has given advisory services and organized awareness campaigns for modern crop production and post-production practices: information dissemination on climate change impacts and integrated pest management; introduction of new crop varieties and farm-machinery on pilot basis, etc. They have broadcasted TV programs on modern agricultural practices and weekly live radio programs. Mobile phone service has been introduced for information sharing within the department and among progressive farmers. A mobile van service with films on latest agricultural practices was launched to show at village and UC levels to both male and female framers. Source: Agriculture, Supply and Prices Department, Government of Sindh, 2017. <http://www.sindhagri.gov.pk/AgricultureExtension.html> (accessed 18 April 2018)

Pakistan have been deemed ineffective by many, not being able to promote sustainable agriculture and alleviate rural poverty.^{129, 130}

5.3.3: Livestock Extension Services

The public livestock sector suffers from inadequate and tardy disbursement of government funds.¹³¹ As a result, staff mobilization is limited, equipment is often out of order, and supply of vaccines and medicines is chronically insufficient.¹³² To compound the difficulties, no official system exists for cost recovery for services delivered and medicines dispensed.¹³³ Private providers fill some of the vacuum with respect to veterinary consultations and medicines, but the farmers consider the fees charged excessive (Rs 500-1,000, roughly equivalent to US\$4.3-8.6).¹³⁴ The human resources at public institutions are far from adequate; female staff members are very few, many positions remain vacant, deployment of available personnel is neither strategic nor rational (i.e., not based on animal counts, area covered, or workload), supervision and monitoring are weak, and no appropriate incentives are in place for the staff.¹³⁵

The private sector in the field is limited to animal health, and very few private agents have been trained on livestock production extension.¹³⁶ The sector is unregulated, which leaves the competency of workers unchecked. In fact, many of the para-veterinary workers are trained through donor-funded projects and not necessarily qualified for their tasks, but charge high fees for their services.¹³⁷ Partly due to the multiplicity of factors at work,¹³⁸ farmers are often unable to tell the quality of the services provided.¹³⁹ To overcome the scarcity of trained veterinary staff,¹⁴⁰ the number of veterinary training institutes and universities needs to be increased, especially those for women.

5.3.4: Agricultural Credit

Pakistan has a number of financial institutions in the agriculture sector,¹⁴¹ ranging from commercial banks and development finance institutions to microfinance institutions.¹⁴² Among them, the First Women Bank promotes asset ownership by women and provides resources to business entities, where female participation and contribution are significant.¹⁴³ In collaboration with the International Labour Organization, it has provided finance to nearly 3,000 women in the rural areas to combat child labour in

¹²⁹ Shahbaz, Babar and Ata, Salman, 2014. Agricultural Extension Services in Pakistan: Challenges, Constraints and Ways forward. https://www.researchgate.net/publication/284003781_Agricultural_Extension_Services_in_Pakistan_Challenges_Constraints_and_Ways_forw (accessed 4 May 2018).

¹³⁰ The factors responsible for unsatisfactory performance include: low extension-worker-to-farmers ratio; poor incentive mechanism for extension workers; lack of specialized knowledge and on-job trainings; and, absence of effective M&E system (*Agricultural Extension Services in Pakistan: Challenges, Constraints and Ways forward. ibid.*). The service agents themselves have identified: unavailability of field assistant's office at the Union Council level (the lowest level of government, comprising of a large village and nearby smaller ones); lack of teaching equipment, facilities, means for travel and other resources; poor coordination between research and extension organizations; insufficient knowledge of the agents on improved agricultural technologies; spatial dispersion among farmers; farmers' illiteracy; and, difficulty in communicating with farmers (*Agricultural Extension Agents and Challenges for Sustainable Development (A Case Study of Peshawar Valley. ibid.)*).

¹³¹ *Livestock and Access to Markets Project – Design completion report: Main report and appendices. ibid.*

¹³² *Livestock and Access to Markets Project – Design completion report: Main report and appendices. ibid.*

¹³³ *Livestock and Access to Markets Project – Design completion report: Main report and appendices. ibid.*

¹³⁴ Exchange took place at the rate of 115.820 Pakistani rupees/USD on 1 May 2018.

¹³⁵ *Livestock and Access to Markets Project – Design completion report: Main report and appendices. ibid.*
Enhancing Livestock Sector Export Competitiveness: Policy Recommendation Paper. ibid.

¹³⁶ *Livestock and Access to Markets Project – Design completion report: Main report and appendices. ibid.*

¹³⁷ *Livestock and Access to Markets Project – Design completion report: Main report and appendices. ibid.*

¹³⁸ Agricultural Technology Adoption Initiative, undated. Coordinating Farmers with Cellphones: Technology Innovation in Livestock Extension Services in Pakistan. <https://www.atai-research.org/project/coordinating-farmers-with-cellphones-technology-innovation-in-livestock-extension-services-in-pakistan/> (accessed 6 May 2018)

¹³⁹ *Livestock and Access to Markets Project – Design completion report: Main report and appendices. ibid.*

¹⁴⁰ *Enhancing Livestock Sector Export Competitiveness: Policy Recommendation Paper. ibid.*

¹⁴¹ Zarai Taraqati Bank, the First Micro-Finance Bank, First Women Bank, National Bank of Pakistan, Allied Bank of Pakistan, Bank Islami Pakistan, Habib Bank, Bank of Punjab, Punjab Provincial Cooperative Bank, SME Bank, Khushali Bank, Tameer Microfinance Bank, Sindh Provincial Co-operative Bank, Muslim Commercial Bank, the Bank of Punjab, and United Bank.

¹⁴² Economic Pakistan, 2008.

<https://economicpakistan.wordpress.com/2008/01/15/banks-financial-institutions-of-pakistan/> (accessed 18 April 2018)

¹⁴³ Top Bank Profile, 2014. First Women Bank. *The Banker, Pakistan*. <http://www.thebanker.com.pk/first-women-bank.html> (accessed 6 May 2018)

the carpet weaving industry, but their primary focus is not the poor female farmers.¹⁴⁴

It is inherently difficult to estimate the size of the informal sector in which the lenders are friends, relatives, commission agents, merchants, private moneylenders, etc., but it appears that about 50 percent of credit needs in rural agriculture is met by this sector.¹⁴⁵ Farmers remain reluctant to borrow from formal institutions, because of high interest rate, distance from home to bank, untimely disbursement, complex procedure, unlawful demands of officials, and lack of collateral that is asked by non-microfinance lenders. These factors are practically insurmountable for women, who usually have much less skills, knowledge, mobility and other resources related to formal financial instruments.¹⁴⁶ Credit for livestock is much harder to come by than for crops, and there is no credit specifically for livestock. Most livestock credit is provided by the informal sector,¹⁴⁷ which may be a result of accommodating female farmers who are prominent in livestock. The situation is nonetheless penalizing; commercial lenders in the informal sector are often regarded as one of the most important elements that keep farmers trapped in poverty.

5.3.5: Agricultural Insurance

Due to marginal involvement of the private sector and to lack of reliable data on calamities, cropping pattern, and so on, the agricultural insurance sector remained underdeveloped for a long time.¹⁴⁸ In 2008, however, the State Bank of Pakistan implemented crop loan insurance, which is mandatory for farmers requesting a loan from a financial institution for any of the five major crops: wheat, rice, sugarcane, cotton, and maize.¹⁴⁹ Livestock insurance is available on a limited basis and covers cattle, buffalo, small ruminants and poultry, written on a small-scale by various private insurance companies.¹⁵⁰

Unfortunately, the Government's payment of premium on behalf of smallholder farmers is not done in a structured manner, resulting in delays and discouraging banks from targeting smaller farmers.¹⁵¹ The claim-to-premium ratio has remained at approximately 50 percent.¹⁵² Consequently more insurance companies are now offering crop loan insurance products. Approximately 10 insurance companies offered crop loan insurance in 2013 as compared to only four in 2008.¹⁵³

In April-July of 2017, there were 6,347,260 micro-insurance policy holders in Pakistan, but only 1 percent were on agriculture and livestock despite the fact that half of the policy holders resided in rural areas.¹⁵⁴

5.3.6: Mobile Phone and the Internet

Pakistan offered one of the most affordable mobile-broadband prices in Asia and the Pacific in 2015, despite its low Gross National Income per capita (GNI p.c.): prepaid mobile-broadband plans at prices below US\$ 2 per month, representing less than 2 percent of GNI p.c.¹⁵⁵ However, it ranked 146th out of 175 countries in 2016¹⁵⁶ in terms of ICT Development Index;¹⁵⁷ less than 60 percent of the population

¹⁴⁴ First Women Bank. *ibid.*

¹⁴⁵ Bashir, Muhammad Khalid and Azeem, Muhammad Masood, 2008. Agricultural Credit in Pakistan: Constraints and Options. *Pakistan Journal of Life and Social Sciences*. Vol. 6, No.1, 2008. 47-49.

¹⁴⁶ Abdullah, et al., 2015. Agricultural Credit in Pakistan: Past Trends and Future Prospects. *Journal of Applied Environmental and Biological Sciences*. Vol. 5, No. 12, 2015. 178-188.

¹⁴⁷ *Livestock and Access to Markets Project – Design completion report: Main report and appendices. Ibid.*

¹⁴⁸ Shabbir, Al Hassan, undated. Overview of agricultural insurance: Pakistan. AgriHunt. <https://agrihunt.com/articles/pak-agri-outlook/overview-of-agricultural-insurance-pakistan/> (accessed 6 May 2018)

¹⁴⁹ Thanvi, Kashif Umar, 2013. Agriculture Finance Support Facility. Crop Loan Insurance in Pakistan. <https://www.agrifinfacility.org/resource/crop-loan-insurance-pakistan-0> (accessed 6 May 2018)

¹⁵⁰ Overview of agricultural insurance: Pakistan. *ibid.*

¹⁵¹ Crop Loan Insurance in Pakistan. *ibid.*

¹⁵² Crop Loan Insurance in Pakistan. *ibid.*

¹⁵³ Crop Loan Insurance in Pakistan. *ibid.*

¹⁵⁴ *Microwatch: A Quarterly Update on Microfinance Outreach in Pakistan. Ibid.*

¹⁵⁵ International Telecommunication Union, 2016. *Measuring the Information Society Report 2016*. Geneva: ITU.

¹⁵⁶ *Measuring the Information Society Report 2016. Ibid.*

¹⁵⁷ A composite index that combines 11 indicators and used to monitor and compare developments in information and communication technology (ICT) between countries and over time. (Source: International Telecommunication Union, 2018. The ICT Development Index (IDI): conceptual framework and methodology. <https://www.itu.int/en/ITU-D/Statistics/Pages/publications/mis2017/methodology.aspx>, accessed 7 May 2018)

owned a mobile phone in 2015 and 18 percent individuals had internet access in 2015.^{158, 159}

The conservative segment of the Pakistani society is of the opinion that women would be negatively influenced by the vulgarity emitted through television and by the uncontrolled access via mobile phones to nefarious influences, which include men.¹⁶⁰ Slightly less than 30 percent of Sindhi women in 2014 justified domestic violence on the part of husbands if wives used mobile phone, television or social media.¹⁶¹ Indeed, the gender gap in mobile-phone ownership in Pakistan (86% of men versus 27% of women) is the highest in South Asia, where the regional average gap is already among the largest in the world at 11 percentage points.¹⁶² One of the contributing factors to the low rate is the lack of technical literacy and confidence among rural women to fully exploit the functions of a mobile device.¹⁶³

5.3.7: Traditional Media

In 2002, the Government of Pakistan liberalized the media, which led to a sharp increase in the number of television stations and sensationalism at the expense of quality journalism.¹⁶⁴ Owing to the near monopoly over terrestrial broadcasting, the Pakistan Television Corporation – an autonomous public organization – remains the only accessible channel to rural viewers, most of whom are without access to cable or satellite broadcasts.¹⁶⁵ The mainstream media has an urban base, whose market trend and financial priorities skew the content in favour of the cities.¹⁶⁶ The popularity of television programs is measured among the urban audience; one of the channels was forced in 2010 to cut back on the coverage of flooding in Sindh due to its low rating.¹⁶⁷

Despite the growth of television industry, FM radio is still popular in both urban and rural areas.¹⁶⁸ Radio Pakistan remains the primary source of news and information on radio, because privately owned radio stations are not allowed to broadcast original news and because their transmitter range is limited to 50 km. Consequently, political voices off the mainstream are seldom broadcast.¹⁶⁹ Pakistan Broadcasting Corporation, a public network, owns 22 of FM community stations. Aided by powerful transmitters, they target local communities and broadcast music, talk shows, as well as youth- and women-oriented programs in local languages. No other program exists in Pakistan that could be called community news.¹⁷⁰ The rural population constitutes a major contributor in the national economy, but their plight is rarely communicated among themselves or to the urban population who tend to have more political and financial leverage. The available literature recognizes the rural population as distinct audience, but not rural women.

5.4. Water Supply and Sanitation

The lack of safe drinking water and appropriate sanitation facilities and low-quality health services affect both women and men; the prevalence of infectious diseases,¹⁷¹ especially hepatitis, in many areas is one of such consequences. Sanitation is an issue that goes beyond physical health for women and girls; lack

¹⁵⁸ *Measuring the Information Society Report 2016. ibid.*

¹⁵⁹ With respect to internet access, the country ranks 120th among 175 countries. (Source: *Measuring the Information Society Report 2016. ibid.*)

¹⁶⁰ Siraj, Mahrukh, undated. *A model for ICT based services for agriculture extension in Pakistan*. Rawalpindi-Pakistan: CABI South Asia.

¹⁶¹ *Multiple Indicator Cluster Survey 2014, Sindh Final Report. ibid.*

¹⁶² Burjorjee, Deena M. and Bin-Humam, Yasmin, 2018. *New Insights on Women's Mobile Phone Ownership*. Washington, D.C.: Consultative Group to Assist the Poor.

¹⁶³ *New Insights on Women's Mobile Phone Ownership. ibid.*

¹⁶⁴ International Media Support, 2009. *Between radicalisation and democratisation in an unfolding conflict: Media in Pakistan*. Denmark: IMS.

¹⁶⁵ Yusuf, Huma, 2013. *Mapping Digital Media: Pakistan*. London: Open Society Foundations.

¹⁶⁶ Riaz, Saqib. Challenges to Rural Journalism in Pakistan, *FWU Journal of Social Sciences*. Winter 2015. Vol.9, No.2. 71-81.

¹⁶⁷ *Mapping Digital Media: Pakistan. ibid.*

¹⁶⁸ *Mapping Digital Media: Pakistan. ibid.*

¹⁶⁹ *Mapping Digital Media: Pakistan. ibid.*

¹⁷⁰ *Mapping Digital Media: Pakistan. ibid.*

¹⁷¹ *Health System Profile: Pakistan. ibid.*

of safe toilet facilities exposes women to risk of harassment, humiliation and assault.¹⁷² Girls' school enrolment is positively and significantly associated with the availability of usable toilets.¹⁷³

5.5. Health

The health of Pakistani people is characterized by high population growth rate, high infant and child mortality rate, high maternal mortality ratio, and both communicable and non-communicable diseases.¹⁷⁴ The total expenditure on health was 2.6 percent of GDP and that per capita \$129 in 2014.¹⁷⁵ The total *public health expenditure* as percentage of GDP was 0.91 percent in 2016-2017,¹⁷⁶ whereas the average of OECD countries was reported 8.2 percent of GDP in 2013.¹⁷⁷

The country's public primary care is carried out by Basic Health Units, Rural Health Centres, and Maternal and Child Health Centres; these are the institutions that provide basic obstetric care in the rural areas with community outreach programs offered through Lady Health Visitors (LHVVs).¹⁷⁸ A large portion of medical consultations is estimated to take place in the private sector: two-thirds according to a report published in 2007.¹⁷⁹ Most of the private hospitals are concentrated in urban areas, and the legislations on the accreditation of doctors, nurses and LHVVs are rarely enforced.

Rural women are highly susceptible to diseases, and more so than rural men, due to: higher burden of on-farm and off-farm activities; less balanced nutrient intake; and, early pregnancies. A great danger is posed to the expectant mother and the unborn child when they have to travel from the village to the nearest health facility, usually in an urban area, and on a donkey cart.¹⁸⁰ Malnutrition, diarrhoea, acute respiratory illness, other communicable and vaccine-preventable diseases cause high infant and perinatal mortality rates; high fertility rate, low skilled birth attendance rate (40%), illiteracy, malnutrition and insufficient access to emergency obstetric care services cause high maternal mortality.¹⁸¹

Malnutrition is widespread among children and women, especially of child-bearing age,¹⁸² due to poor nutritional knowledge, heavy burden of responsibilities, low socioeconomic status, lack of leisure time, unequal distribution of food resources among men and women, multiple pregnancies within short intervals, big family size and poor health facilities.¹⁸³ Due to malnutrition, 30-40 percent of Pakistani children are stunted.¹⁸⁴

Cooking and heating indoors constitute a major issue in Pakistan, as most rely on solid biomass fuels, such as wood, charcoal, crop waste, dung, shrubs and coal.¹⁸⁵ Smoke as well as various pollutants produced under incomplete combustion – carbon monoxide, polyaromatic hydrocarbons, and sulphur dioxide – are causes of ill health: acute respiratory illness, pneumonia, chronic obstructive lung disease, cancer, and

¹⁷² Plan International, undated. Toilets keep women and girls healthy and safe. <https://plan-international.org/pakistan/toilets-keep-women-and-girls-healthy-and-safe> (accessed 7 May 2018)

¹⁷³ Hayat, Fatima Akram, 2017. The Relationship between Access to Toilets and School Enrollment in Pakistan. Thesis. Georgetown University, 2017. https://repository.library.georgetown.edu/bitstream/handle/10822/1044655/Hayat_georgetown_0076M_13782.pdf?sequence=1 (accessed 7 May 2018)

¹⁷⁴ Regional Health Systems Observatory, 2007. *Health System Profile: Pakistan*. Cairo: World Health Organization.

¹⁷⁵ World Health Organization. Pakistan. <http://www.who.int/countries/pak/en/> (accessed 7 May 2018)

¹⁷⁶ Ministry of Finance, the Government of Pakistan, undated. *Pakistan Economic Survey 2017-2018*, Chapter 11, Health and Nutrition. http://www.finance.gov.pk/survey/chapters_18/11-Health.pdf (accessed 10 May 2018)

¹⁷⁷ Çevik, Savaş and Taşar, M. Okan, 2013. Public Spending On Health Care and Health Outcomes: Cross country Comparison. *Journal of Business, Economics & Finance*. Vol. 2, No. 4, 2013. 82-100.

¹⁷⁸ Quoted in *Health System Profile: Pakistan*. *ibid*.

¹⁷⁹ *Health System Profile: Pakistan*. *ibid*.

¹⁸⁰ *Health System Profile: Pakistan*. *ibid*.

¹⁸¹ *Health System Profile: Pakistan*. *ibid*.

¹⁸² Planning Commission, Planning and Development Division, undated. *National Nutrition Survey 2011*. Government of Pakistan.

¹⁸³ *Health System Profile: Pakistan*. *ibid*.

¹⁸⁴ *Health System Profile: Pakistan*. *ibid*.

¹⁸⁵ *Multiple Indicator Cluster Survey 2014, Sindh Final Report*. *ibid*.

possibly tuberculosis, asthma, cataracts, and low birth weight.¹⁸⁶ Since cooking is the responsibility of women, they run higher risks of illness from smoke than men.

5.6. Coping with Negative Shocks¹⁸⁷

According to a survey conducted in 2012, medical expenses represented by far the most common negative economic shocks that rural households experienced in the preceding two years, close to 60 percent of households reporting such events. The second most reported was loss of or need to repair housing due to floods in 2010 and 2011; over a quarter of households in Pakistan was affected. However, most households did not have any coping mechanism in mind for shocks to come; not to act upon the possibility of negative shocks was the strategy for most households, more than half that belonged the lowest and more than 40 percent of that made up the highest quantiles of per-capita expenditure. The tendency of no-plan was the highest for flood related shocks, and households were better prepared for wedding and medical expenses; for weddings, 26 percent of households coped with additional members of household earning income, and 12 percent decreased non-essential expenses. Other coping mechanisms included: substitution of cheaper food, reduction of food consumption, informal borrowing, and assistance from other people and organizations.

6. GENDER IN PUNJAB AND SINDH

6.1. Basic Statistics – Punjab and Sindh

6.1.1: Population¹⁸⁸ – Punjab and Sindh

Based on the 2017 Census, Punjab has a provincial population of 110 million and Sindh has a population of 48 million. The targeted districts of Punjab and Sindh¹⁸⁹ contain 3.45 million households and 21.5 million people: 10.5 million females, 11.0 million males, and 739 transgenders.

In the two provinces, the average household size is 6.2 persons, with a negligible difference between urban and rural areas of the same province. The population growth rate since 1998 has averaged 2.7 percent per year. Nearly half or more of the population live in rural areas: 63 percent of households in Punjab and 49 percent in Sindh. In rural Punjab, persons aged less than 15 years of age comprised 44 percent of total in 2017, and in rural Sindh it was 46 percent in the same year.¹⁹⁰

6.1.2: Literacy and Education – Punjab and Sindh

In Punjab and Sindh, the two target provinces of the proposed project, the literacy rates were considerably lower in the rural areas than the national average of 58 percent in 2016-2017 and more so for rural women: 44 percent in rural Punjab and 19 percent in rural Sindh.¹⁹¹ In the rural areas of the targeted districts in Punjab and Sindh, the rates for women were in the ranges of 31-38 percent and 13-19 percent, respectively.¹⁹² In 2014, the literacy rate among young women aged 15-24 was 76 percent in Punjab, urban and rural combined,¹⁹³ and more than half of the same group was literate in Sindh.¹⁹⁴ The overall low literacy rates imply that the ability of the rural female population to use information

¹⁸⁶ Multiple Indicator Cluster Survey 2014, Sindh Final Report. *ibid.*

¹⁸⁷ Pakistan Rural Household Panel Survey 2012 (Round 1) - Household Characteristics. *ibid.*

¹⁸⁸ Pakistan Bureau of Statistics, 2018. Block Wise Provisional Summary Results of 6th Population & Housing Census-2017 [As on January 03, 2018]. <http://www.pbscensus.gov.pk/> (accessed 18 April 2018)

¹⁸⁹ Punjab (Lodhran, Dera Ghazi Khan, Muzaffargarh, Multan and Khanewal) and Sindh (Badin Sanghar and Umerkot).

¹⁹⁰ Pakistan Bureau of Statistics, 2018. Population by Selective Age Groups. <http://www.pbs.gov.pk/content/population-selective-age-groups> (accessed 8 May 2018)

¹⁹¹ Ministry of Finance, undated. *Pakistan Economic Survey 2017-2018*, Chapter 10, Education. http://www.finance.gov.pk/survey/chapters_18/10-Education.pdf (accessed 10 May 2018)

¹⁹² Pakistan Bureau of Statistics, 2016. *Pakistan Social and Living Standards Measurement 2014-2015*. Islamabad: Government of Pakistan.

¹⁹³ Multiple Indicator Cluster Survey 2014, Punjab Final Report. *ibid.*

¹⁹⁴ Multiple Indicator Cluster Survey 2014, Sindh Final Report. *ibid.*

technologies and to access information may be very limited, but the high rates for young women indicate their potential for bringing about changes.

Punjab, with 65 percent, has the highest proportion among the provinces of inhabitants aged ten years and older that have ever attended school, followed by Sindh with 61 percent.¹⁹⁵ When disaggregated by district, a significant difference between genders was found in some, one of which was Dera Ghazi Khan (one of our target districts) with 30 percent women and 58 percent men.¹⁹⁶ The same held for primary school completion rates of different districts; 23 percent among women and 54 percent among men in Dera Ghazi Khan was one of the largest discrepancies in the country.¹⁹⁷

Among the children aged 5-9 years in Punjab in 2014, 58 percent were enrolled in schools corresponding to the official education level for the age group.¹⁹⁸ In Sindh in the same year, 45 percent of primary-school aged children were attending schools, and girls-to-boys ratio in primary schools was 86 to 100.¹⁹⁹ In the eight targeted districts, 15 505 schools exist, among which less than 5 000 are for girls and the rest are for boys.²⁰⁰ The schools employ approximately 10 000 female and 19 000 male staff in total, and 84 percent of them are primary schools.²⁰¹ The field consultations indicated that a considerable variation exists among the villages: from the majority of children enrolled to only a couple of boys attending.²⁰² The overall income level appeared the most important determinant, and the common constraint for girls' education was the lack of safe transportation and reliable school facilities.²⁰³

6.1.3: Poverty and Wealth – Punjab and Sindh

The official statistics show that 30 percent and 18 percent of households in Punjab and Sindh, respectively, own land,²⁰⁴ but those with legally recognisable ownership may be considerably less. The farmers who claim to own land may not have documents that prove the transfer of ownership, a situation that owes largely to low literacy. In one Hindu minority village, the sons of the landowner who sold the land to the farmers do not consider the sale legitimate and have demanded eviction.²⁰⁵ Around 93 percent of women in Punjab and 95 percent in Sindh do not own land.²⁰⁶ Among ever married women aged 15-49, 2.1 percent own land jointly and 7.8 percent own a house jointly in the rural areas of Pakistan.²⁰⁷ For men, the proportions were 20.7 percent and 34.1 percent, respectively.²⁰⁸ There is no household in the rural areas that is composed solely of men, and the statistics imply that women are excluded from the concept of household ownership of land and house.

Household ownership of livestock, the most common form of assets after land, is distributed between 22 percent and 52 percent in the targeted districts.²⁰⁹ Livestock acts as a buffer against income fluctuation

¹⁹⁵ *Pakistan Social and Living Standards Measurement 2014-2015. ibid.*

¹⁹⁶ *Pakistan Social and Living Standards Measurement 2014-2015. ibid.*

¹⁹⁷ *Pakistan Social and Living Standards Measurement 2014-2015. ibid.*

¹⁹⁸ *Multiple Indicator Cluster Survey 2014, Punjab Final Report. ibid.*

¹⁹⁹ *Multiple Indicator Cluster Survey 2014, Punjab Final Report. ibid.*

²⁰⁰ Bureau of Statistics, undated. *Punjab Development Statistics 2016*. Government of the Punjab.

Sindh Bureau of Statistics, 2017. *School Education Statistics Sindh 2015-16*. Karachi: Government of Sindh.

²⁰¹ *Punjab Development Statistics 2016. ibid.*

School Education Statistics Sindh 2015-16. ibid.

²⁰² Field consultation, February-March 2018.

²⁰³ Field consultation, February-March 2018.

²⁰⁴ *Multiple Indicator Cluster Survey 2014, Punjab Final Report. ibid.*

Multiple Indicator Cluster Survey 2014, Sindh Final Report. ibid.

²⁰⁵ Field consultation, February-March 2018.

²⁰⁶ *Women in Agriculture in Pakistan. ibid.*

²⁰⁷ National Institute of Population Studies and ICF International, 2013. *Pakistan Demographic and Health Survey, 2012-2013*. Islamabad and Calverton: NIPS and ICF International.

²⁰⁸ *Pakistan Demographic and Health Survey, 2012-2013. ibid.*

²⁰⁹ Pakistan Bureau of Statistics, undated. *Agricultural Census 2010 – Pakistan Report*, Punjab Province Tabulation.

http://www.pbs.gov.pk/sites/default/files/aco/publications/agricultural_census2010/Tabulation%20%28TABLES%29%20of%20Punjab%20Province.pdf (accessed 14 May 2018)

Pakistan Bureau of Statistics, undated. *Agricultural Census 2010 – Pakistan Report*, Sindh Province Tabulation.

http://www.pbs.gov.pk/sites/default/files/aco/publications/agricultural_census2010/Tabulation%20Sindh-Province.pdf (accessed 14 May 2018)

and a means of investment and food security. It is also a ready source of cash for many smallholder farmers to buy inputs such as seeds and pesticides, to pay for school fees, to purchase daily groceries, medicines, and so on. Large animals can bear large family expenses: weddings and major medical treatments.²¹⁰ Unlike the cash crops, the production of milk and dairy goods (butter, ghee, cheese, yoghurt) and meat are affected little by seasonal changes.²¹¹

In Southern Punjab and Sindh, about two-thirds of the households were below the poverty line for one or more of the three years, 2000, 2004 and 2010; only one-third had never experienced poverty.²¹² Other provinces have not had such a prevalence of poverty.²¹³ The wealth disparity in the rural areas is large; according to the wealth quintiles index, 39 percent of the inhabitants fell in the category of the poorest households in Sindh in 2014.²¹⁴ In other words, a large segment of the population, especially in the rural areas of Punjab and Sindh, is highly vulnerable to climate change.

6.1.4: Marriage – Punjab and Sindh

In the Provinces of Punjab and Sindh, the percentage of women aged 20-49 years who were first married before age 18 was 21 percent²¹⁵ and 31 percent,²¹⁶ respectively, in 2014. In Punjab in 2014, 19 percent of women aged 15-19 and 15 percent of women aged 20-24 were married and their spouse was 10 or more years older.²¹⁷ The proportions were 12 percent and 15 percent, respectively, in Sindh.²¹⁸

6.2. Labour Division and Decision Making – Punjab and Sindh

6.2.1: Crop Agriculture – Punjab and Sindh

Punjab produces most of the agricultural goods in the country: 78 percent of wheat, 70 percent of rice, 69 percent of cotton, 68 percent of sugarcane, 80 percent of maize, and 87 percent of gram, 80 percent of mangoes, 77 percent of guava, and 97 percent of citrus fruits.²¹⁹ Sindh, as the second largest province in terms of agricultural output,²²⁰ produces approximately the rest of the national production of these agricultural goods, including 25 percent of cotton.²²¹

Cotton is one of the major cash crops of Pakistan and supports the vital industrial and export sector (in particular, the textile and clothing industry).²²² Of the total area dedicated to cotton production in 2011, approximately 80 percent was in Punjab and 20 percent was in Sindh.²²³ An estimated 1.6 million producers of cotton are mostly small-scale farmers with less than 5 hectares of land.²²⁴ Most rural women

Punjab: Khanewal 35%, Lodhran 39%, Multan 37%, Muzaffargarh 26%, and Dera Ghazi Kahn 22%.
Sindh: Badin 52%, Sanghar 49%, Umerkot 26%.

²¹⁰ *Women in Agriculture in Pakistan. ibid.*

²¹¹ *Women in Agriculture in Pakistan. ibid.*

²¹² *Dynamics of Rural Poverty in Pakistan: Evidence from Three Waves of the Panel Survey. ibid.*

²¹³ *Dynamics of Rural Poverty in Pakistan: Evidence from Three Waves of the Panel Survey. Ibid.*

²¹⁴ *Multiple Indicator Cluster Survey 2014, Sindh Final Report. ibid.* Comparable data was not available for Punjab.

²¹⁵ Sindh Bureau of Statistics and UNICEF, 2015. *Multiple Indicator Cluster Survey 2014, Sindh Final Report*. Karachi: Sindh Bureau of Statistics and UNICEF

²¹⁶ . Bureau of Statistics Punjab and UNICEF Punjab, 2016. *Multiple Indicator Cluster Survey 2014, Punjab Final Report*. Lahore: Bureau of Statistics Punjab and UNICEF Punjab.

²¹⁷ *Multiple Indicator Cluster Survey 2014, Punjab Final Report. ibid.*

²¹⁸ Sindh Bureau of Statistics and UNICEF, 2015. *Multiple Indicator Cluster Survey 2014, Sindh Final Report*. Karachi: Sindh Bureau of Statistics and UNICEF.

²¹⁹ *Women in Agriculture in Pakistan. ibid.*

²²⁰ *Women in Agriculture in Pakistan. ibid.*

²²¹ United States Department of Agriculture, 2018. *Pakistan Cotton Production Forecast to Surpass Last Season*.

<https://ipad.fas.usda.gov/highlights/2018/01/pakistan/index.pdf> (accessed 1 May 2018)

²²² Wheat, rice, sugarcane, maize and cotton account for 24% of the value added in overall agriculture and 4.7% of GDP (ILO, 2017).

²²³ Rana, Muhammad Ahsan et al., 2013. *Exploring Dynamics of Cotton Seed Provision in Sindh: Informing Policy and Business Decisions*. London: International Growth Center.

²²⁴ Shafiq Ur Rehman, 2015. *Cotton and Products Annual. Global Agricultural Information Network*. USDA Foreign Agricultural Service. https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Cotton%20and%20Products%20Annual_Islamabad_Pakistan_4-1-2015.pdf (accessed 1 May 2018)

in Punjab and Sindh²²⁵ are engaged in labour-intensive work of cotton-picking by hand at very low wages. Punjabi women's participation in work on their own farm in rainfed agriculture villages is significantly greater than that found in the irrigated villages (69% as compared to 40% in Central Punjab).²²⁶ For rice cultivation in Punjab, women spend 2-3 hours for every hour spent by men.²²⁷ Women's main activities are transplanting, harvesting and threshing, all by hand. Transplanting and threshing are done by women only; harvesting is done jointly, but women put in six days whereas men spare four hours of their time.²²⁸ Wheat is often considered men's crop, but women spend eight hours for the crop compared to men's time allocation of ten hours.²²⁹ The task differentiation leads to that of knowledge and skills; neither men nor women can grow cash crops all by themselves.

The cultivation of rice and cotton in Sindh claims a bulk of women's time spent on agricultural activities; 39 percent and 50 percent are dedicated to rice and cotton, respectively.²³⁰ Nearly 80 percent of Sindhi women are involved in various stages of rice and cotton cultivation and almost all of them in cotton picking, but only 33 percent participate in the selling of cotton.²³¹

Women are also extensively engaged in the production of other cash crops: field preparation, seed preparation, planting, transplanting, weeding, sowing, fodder cutting, harvesting, threshing, sealing, storage and processing²³² for home use.²³³ They are also in charge of the cultivation of pulses, fruits and vegetables, as well as fodder²³⁴ collection and a very good part of livestock rearing,²³⁵ in addition to feeding and clothing the whole family, fetching water, collecting wood and making cow dung patties for use as fuel.²³⁶ Rural women report 12 -14 hours of work per day. Men are mainly responsible for input purchase, mechanized work, chemical handling, product sales and water management.

Work for landowners is mostly paid in kind. In northern Sindh: both male and female farmers are paid 40 kilograms of wheat upon harvesting half an acre, without which the family would not survive.²³⁷ Small farmers tend to receive less compensation from the landowners. In a village in Badin District, farmers are expected to harvest 5 kg of rice per day and 40 kg per acre.²³⁸ The amount beyond this quota is kept by the farmers and used to purchase medicine and other necessities.²³⁹ In the same village, the landowner provides flour on a monthly basis, but the ration is often not enough for household consumption; the villagers must borrow extra flour from the landowner, and the amount borrowed is deducted from the following distribution of profits.²⁴⁰ The tenants also borrow money from the landowner through a supervisor.²⁴¹ In some villages, landlords allow women to operate kitchen gardens on the terms that they share half of the vegetables produced with him.^{242, 243}

²²⁵ In Sindh, more than 500,000 farmers work in cotton picking, majority of which are women. (Source: Call for recognizing women's role in Sindh agriculture. *Dawn*, 17 December 2014. <https://www.dawn.com/news/1151239> - accessed 10 April 2018).

²²⁶ Women's Autonomy in the Context of Rural Pakistan. *ibid.*

²²⁷ Pennells, Linda, 2011. *Gender Analysis in Agriculture Punjab – Pakistan: Field Insights – 11-13 May 2011.*

<https://www.google.co.uk/#q=Pennells%2C+L.+%282011%29+Gender+Analysis+in+Agriculture+Punjab+%E2%80%93+Pakistan> (accessed 25 February 2018)

²²⁸ *Gender Analysis in Agriculture Punjab – Pakistan: Field Insights – 11-13 May 2011. ibid.*

²²⁹ *Gender Analysis in Agriculture Punjab – Pakistan: Field Insights – 11-13 May 2011. ibid.*

²³⁰ Quoted in *Women in Agriculture in Pakistan. ibid.*

²³¹ *Women in Agriculture in Pakistan. ibid.*

²³² *Women in Agriculture in Pakistan. ibid.*

²³³ Women are not involved in commercial processing or grading of fruits and vegetables (Source: Women farmers. *Ibid.*)

²³⁴ Pulses: chickpea, black gram, mung bean, mash and lentil. Fodder: sorghum, millet, maize, mott grass, berseem, oats and Lucerne. Vegetables: turnip, cauliflower, okra, pea, potato, onion, chili and tomato.

²³⁵ Cattle, buffaloes, sheep, goats, camels, horses, mules and asses.

²³⁶ Personal communication with the Agriculture Department of Punjab officials in February 2018.

²³⁷ Women farmers. *ibid*

²³⁸ Field consultation, February-March 2018.

²³⁹ Field consultation, February-March 2018.

²⁴⁰ Field consultation, February-March 2018.

²⁴¹ Field consultation, February-March 2018.

²⁴² Field consultation, February-March 2018.

²⁴³ Some landlords do not allow such activity at all.

6.2.2: Livestock – Punjab and Sindh

Milking is done by rural women, and Punjab supplies most of the 40 billion litres of milk consumed in Pakistan.²⁴⁴ A survey in Punjab showed that the contribution of rural women was higher in activities such as fodder offering, shed cleaning, animal watering, milking, poultry raising, ghee and egg selling and goats and sheep management, whereas the role of men was bigger in fodder cutting and transportation of fodder.²⁴⁵

Over 70 percent of the rural women in Sindh are deeply involved in livestock management; 81 percent of the women clean the animal sheds, 70 percent water the animals, 67 percent milk the animals, 77 percent process milk to extract grease, 82 percent conduct poultry husbandry, 88 percent supervise grazing, and 73 percent feed the animals.²⁴⁶ The majority of households in Sindh also keep poultry, taken care of by women.²⁴⁷ The women sell meat as well as collect and sell eggs.²⁴⁸ As in Punjab, the overall involvement of Sindhi women in livestock is considered much bigger than men; the women are responsible for 60-80 percent of the tasks related to feeding and milking of cattle, in addition to cutting fodder, cleaning sheds, milking dairy animals, processing animal products and looking after the health of the herd.²⁴⁹ In both provinces, small ruminants (e.g., sheep and goats) and poultry are owned and managed by women without the involvement of men. Women may own large livestock if it is given to them by the husband's family at the time of marriage. It is said that the animals are healthier when looked after by women.

6.2.3: Household Chores – Punjab and Sindh

All household chores fall on the shoulders of women: water fetching, fuelwood collection, care of the children and the elderly; planning for and delivering food and clothes for the entire family; cleaning the house and its surroundings; making handicraft for home use and supplementary income. For men, home is a place to relax and take a break from work.²⁵⁰ It is women who ensure that this need is met, leaving little break time for themselves. Interactions outside the household are usually left to men, who sell agricultural products and purchase inputs on behalf of the family; one estimate for rice production in Punjab indicates that men spend only ten minutes to two days per year for each of these two tasks.²⁵¹ In the Chakwal District of Punjab, the overwhelming bulk of household chores were carried out by rural women, while men participated in the education and socialisation of the children, conflict management, and formal social matters.²⁵²

6.2.4: Supplementary Income – Punjab and Sindh

Women receive as low as PKR 150-200 (approximately USD 1.3-1.7) for picking 40 kilograms of cotton,²⁵³ the major economic activity for women in Punjab and Sindh.

Embroidery, knitting and handicraft-making are an integral part of chores for many rural Sindh households,²⁵⁴ and girls learn early in their lives to stitch *rilli* quilts²⁵⁵ to support the extended family. In Sindh, temporal migration of men in search of work to urban areas has been reported during the off-

²⁴⁴ Quoted in *Women in Agriculture in Pakistan*. *ibid.*

²⁴⁵ Gender and Development: Roles of Rural Women in Livestock Production in Pakistan. *ibid.*

²⁴⁶ *Women in Agriculture in Pakistan*. *ibid.*

²⁴⁷ *Women in Agriculture in Pakistan*. *ibid.*

²⁴⁸ *Women in Agriculture in Pakistan*. *ibid.*

²⁴⁹ Arshad, Shafaq et al., 2010. Gender and Decision Making Process in Livestock Management. *Sarhad Journal of Agriculture*. Vol. 26, No.4, 2010, 693-696.

²⁵⁰ Field consultation, February -March 2018.

²⁵¹ *Gender Analysis in Agriculture Punjab – Pakistan: Field Insights – 11-13 May 2011*. *ibid.*

²⁵² Nosheen, Farhana, et al., 2011. "Gender Division of Labour in Household Management and their Perception regarding Training Needs in Potohar Region." *Pakistan Journal of Agricultural Sciences*. Vol. 48, No. 1, 83-88.

²⁵³ Many of them are Kolhi and Bheel-minority Hindu Dalits who have less resource and access to health facilities than the other rural populations (Call for recognizing women's role in Sindh agriculture, 2014).

²⁵⁴ *Women in Agriculture in Pakistan*. *ibid.*

²⁵⁵ Traditional quilt handmade from cloth, sequins, beads and tassels, specific to Sindh.

season.²⁵⁶

6.2.5: Decision Making – Punjab and Sindh

In the case of rice in Punjab, men make the decisions at most steps during production, ranging from preparing the seedbed to selling/bartering.²⁵⁷ In contrast, women make decisions regarding only 2 of the 19 steps for rice cultivation and use: grinding flour or cleaning rice for home use; and, further food preparation at home.²⁵⁸ Livestock management is considered to be mainly the responsibility of women, but their involvement in decision-making appears very little, hampered by male dominance and traditional belief systems (as well as by age, if it concerns a young woman).²⁵⁹

The landowners have the final say in which crop and variety to cultivate or not, although he may be open to suggestions from the farmers who work for him. In one Sindhi village, the landowner decided against switching to *Bt* cotton based on the farmers' observation that the nearby farm with the same soil did not do well with the genetically modified cotton.²⁶⁰ In another village in Sindh, the landowner did not allow female farmers to grow vegetables.²⁶¹

It is usually men who sell dairy and other goods processed or produced by women to outsiders and keep the cash income. According to the women consulted in the field, all spending decisions are made jointly for the benefit of the entire households. In rural Pakistan, 37 percent of married women aged 15-49 reported that decisions over the wife's cash earning were made jointly (by the wife and husband) and 47 percent of the same group responded that decisions were made mainly by the wife.²⁶² With respect to their husband's cash earnings, the percentages dropped to 35 percent jointly and 1.7 percent mainly by the wife.²⁶³ The comparable rates for the urban population indicated that women's decision-making power is much stronger.²⁶⁴ In terms of sub-regional differences, Northern Punjabi women have weaker economic autonomy but greater mobility and decision-making power compared to women in Southern Punjab.²⁶⁵

The rural women consulted²⁶⁶ did not see injustice or inconvenience in the current arrangement, but this needs to be interpreted in the context of their view of justice. In Punjab in 2014, 40 percent of women believed that a husband is justified in resorting to violence toward his wife if she goes out without telling him, neglects the children, argues with him, refuses sex with him or burns the food.²⁶⁷ The gravest offense according to women was the neglect of children (27% agreed to use of violence by husbands), followed by going out without telling her husband or arguing with him (26% agreed).²⁶⁸ In the same year in Sindh, 37 percent of women saw it just that husbands use violence when a wife neglects the children, 37 percent agreed to hitting and beating if she argued with him, 36 percent if she went out without telling her husband, 35 percent if she does not perform household chores, almost 30 percent if the wife refuses to have sex with the husband and about the same percentage if she burns the food.²⁶⁹ To approximately 28 percent of Sindhi women, it was reasonable that husbands hit and beat their wives if they used mobile phone, television or social media.²⁷⁰ When the urban and rural areas of Sindh were compared, it emerged that the rural women were more accepting of domestic violence.²⁷¹ Justification was higher among

²⁵⁶ Field consultation, February -March 2018.

²⁵⁷ *Gender Analysis in Agriculture Punjab – Pakistan: Field Insights – 11-13 May 2011. ibid.*

²⁵⁸ *Gender Analysis in Agriculture Punjab – Pakistan: Field Insights – 11-13 May 2011. ibid.*

²⁵⁹ Gender and Decision Making Process in Livestock Management. *Ibid.*

²⁶⁰ Field consultation, February-March 2018.

²⁶¹ Field consultation, February-March 2018.

²⁶² *Pakistan Demographic and Health Survey, 2012-2013. ibid.*

²⁶³ *Pakistan Demographic and Health Survey, 2012-2013. ibid.*

²⁶⁴ *Pakistan Demographic and Health Survey, 2012-2013. ibid.*

²⁶⁵ Women's Autonomy in the Context of Rural Pakistan. *ibid.*

²⁶⁶ Field consultation, February-March 2018.

²⁶⁷ *Multiple Indicator Cluster Survey 2014, Punjab Final Report. ibid.*

²⁶⁸ *Multiple Indicator Cluster Survey 2014, Punjab Final Report. ibid.*

²⁶⁹ *Multiple Indicator Cluster Survey 2014, Sindh Final Report. ibid.*

²⁷⁰ *Multiple Indicator Cluster Survey 2014, Sindh Final Report. ibid.*

²⁷¹ *Multiple Indicator Cluster Survey 2014, Sindh Final Report. ibid.*

women who were from poorer households, less educated and ever married.²⁷²

6.3. Agriculture Resources and Services – Punjab and Sindh

6.3.1: Land and Livestock – Punjab and Sindh

The majority of women and men in Punjab (97% and 68%, respectively) and Sindh (99% and 79%, respectively) do not own agricultural land.²⁷³ In terms of ownership by households, 31 percent in Punjab Province own agricultural land, whereas only 18 percent in Sindh.²⁷⁴ The rates of livestock ownership by households range from 22 to 52 percent of agricultural households.²⁷⁵

6.3.2: Agriculture Extension Services – Punjab and Sindh

The farmers in Punjab and Sindh are almost unanimously dissatisfied with the agriculture extension services. According to them, they almost never see an extension agent.²⁷⁶ One of the prominent reasons is the dearth of staff; in Punjab, each Agriculture Officer is responsible for 20-40 villages or up to 10 000 people.²⁷⁷ Another is that the agents in both public and private sectors target large and medium scale farmers,²⁷⁸ who are more willing to and easily take up new approaches, casting to the sidelines the bulk of the farmer population who are small and resource-poor. As a result, the poor farmers mostly depend on private companies for information who may not be well informed and are likely to promote their own business.²⁷⁹

The situation with respect to female field staff is improving, but still very few of them are active in either sector, public or private.²⁸⁰ In Punjab, the first female specialist in extension was hired in 2007, and since then the number of female specialists has increased to 85.²⁸¹ While male Agriculture Officers are involved in the establishment of Farmer Field Schools, female Officers' main tasks are the training of women farmers on clean cotton picking and kitchen gardening.²⁸² The qualification required for the post is a diploma that is conferred after three years of study, which has discouraged women from pursuing the career.²⁸³ All positions of District Officers and above at the Extension and Adaptive Research Division in Punjab as well as that of the Director General of Agriculture – 44 in all – are occupied by men and none by a woman.²⁸⁴ With respect to targeting rural women, insufficient efforts have been made on the part of extension services, in spite of their contribution to agriculture, including vegetable farming.²⁸⁵

Mobile agricultural services have gained attention lately as a promising tool to improve the efficiency and cost-effectiveness of extension efforts; the Government of Punjab developed such services called AgriSmart. The database for the application will eventually comprise of: farmer advisory services; plant clinics; crop reporting; pest scouting and warnings; farmer trainings; agricultural input monitoring; soil

²⁷² Multiple Indicator Cluster Survey 2014, Sindh Final Report. *ibid.*

²⁷³ Pakistan Demographic and Health Survey, 2012-2013. *ibid.*

²⁷⁴ Multiple Indicator Cluster Survey 2014, Punjab Final Report. *ibid.* and Multiple Indicator Cluster Survey 2014, Sindh Final Report. *ibid.* As indicated earlier in the document, legally recognizable ownership is likely to be much lower.

²⁷⁵ Agricultural Census 2010 – Pakistan Report, Punjab Province Tabulation. *ibid.*

Agricultural Census 2010 – Pakistan Report, Sindh Province Tabulation. *ibid.*

Punjab: Khanewal 35%, Lodhran 39%, Multan 37%, Muzaffargarh 26%, and Dera Ghazi Kahn 22%.
Sindh: Badin 52%, Sanghar 49%, Umerkot 26%.

²⁷⁶ Field consultation, February-March 2018.

²⁷⁷ Consultation meeting with Agriculture Extension Punjab officials in October 2017.

²⁷⁸ Agricultural Extension Services in Pakistan: Challenges, Constraints and Ways forward. *ibid.*

²⁷⁹ Agricultural Extension Services in Pakistan: Challenges, Constraints and Ways forward. *ibid.*

²⁸⁰ Agricultural Extension Services in Pakistan: Challenges, Constraints and Ways forward. *ibid.*

²⁸¹ Consultation meeting with Agriculture Extension Punjab officials in October 2017.

²⁸² Consultation meeting with Agriculture Extension Punjab officials in October 2017.

²⁸³ Consultation meeting with Agriculture Extension Punjab officials, October 2017.

²⁸⁴ Personal communication with Punjab Government officials in February 2018.

²⁸⁵ Agricultural Extension Services in Pakistan: Challenges, Constraints and Ways forward. *ibid.*

sampling and testing; fertilizer monitoring and testing; and, research trials.²⁸⁶ The application has aided in creating an accurate record of field staff activities and reducing their time spent on departmental tasks – which comes at the expense of fieldwork – from 67 percent to 15 percent.²⁸⁷ In Sindh, development of a similar service was explored under the Australia-Pakistan Agriculture Sector Linkages Programme.²⁸⁸ Women continue to form a group distinct from men in the age of digitisation: (i) the rates of mobile phone ownership and literacy among women are considerably lower; (ii) female farmers need to connect with female extension workers capable of understanding their needs and communicating directly and openly; and, (iii) many rural women believe that mobile ownership is undesirable for them. Efforts of neither of the two provinces consider these aspects.

Under the name of m-Agriculture (or mAgri), major private telecommunication companies, such as Telenor and Mobilink, have launched consultancy and advisory services in collaboration with local governments. Telenor launched, *Khushal Zamindar*, a mobile information service on agriculture;²⁸⁹ in Punjab, it distributed 125 000 smartphones to provide access to their mobile platform²⁹⁰ with real-time information on market prices, new techniques, and weather forecasting.²⁹¹ The service of Mobilink, *Ba Khabbar Kisaan*, utilises interactive voice response technology and provides information on various topics – optimised cultivation methods, modern farming techniques, health, weather, crop insurance, and markets – and a platform for sales, in addition to a 24/7 helpline.²⁹² Despite the sophistication of services to be provided, none of them refer to information pertaining to agricultural tasks undertaken by female farmers; it may be a natural response to the fact that it is men who have the decision-making power. A study conducted in Sindh showed that slightly under half of farmers, who used the mobile-phone service for buying inputs and selling products, neither agreed nor disagreed as to whether the service expanded their market information.²⁹³

The field consultations revealed that the farmers are still exploring an effective use of these services.²⁹⁴ Farmers who could sign their own names were rare among the 696 who participated in consultation meetings, and most women did not own mobile phones. Women in some villages were not allowed to, although they could borrow their husband's or children's when needed. It is unlikely that the mobile-phone services as described above can be used effectively by these women. A handful of male farmers who accessed m-Agriculture service answered affirmative to the question whether it was useful but did not volunteer to share information on how or whether they shared the information with other villagers without access. Spread of new information appeared certain only when a risk-taking farmer manages to demonstrate the improved results.

6.3.3: Livestock Extension Services – Punjab and Sindh

Considering the numerous responsibilities with respect to livestock that women shoulder as well as the fact that it is not acceptable for female farmers to interact with male outsiders, strengthening of female cadre in the field of livestock is nearly synonymous with strengthening of the sector, which is already contributing to nearly half of the total agricultural value added nationally.²⁹⁵ However, the services for both women and men remain neglected, especially for women and more so than agriculture extension

²⁸⁶ Punjab Information Technology Board, Government of the Punjab, undated. Modern Farmer Extension Services through Agrismart. <https://www.pitb.gov.pk/agrismart> (accessed 6 May 2018)

²⁸⁷ Modern Farmer Extension Services through Agrismart. *ibid.*

²⁸⁸ Fitzgerald, Robert *et al.*, 2015. Mobile phone agriculture extension service models. *Dawn*, 16 November 2015. <https://www.dawn.com/news/1219893> (accessed 6 May 2018)

²⁸⁹ Baloch, Asma, 2016. m-Agriculture An emerging field to Revive Agriculture in Pakistan. *Phone World*. <https://www.phoneworld.com.pk/m-agriculture-an-emerging-field-to-revive-agriculture-in-pakistan/> (accessed 6 May 2018)

²⁹⁰ Telenor Group, 2016. Mobile agriculture service launched in Pakistan. <https://www.telenor.com/mobile-agriculture-service-launched-in-pakistan/> (accessed 6 May 2018)

²⁹¹ Mobile agriculture service launched in Pakistan. *ibid.*

²⁹² Mobilink's mobile-based agricultural service launched to for Farmers across Pakistan. *ibid.*

²⁹³ Chhachhar, Abdul Razaque, *et al.*, 2017. Performance and Efforts Regarding Usage of Mobile Phones among Farmers for Agriculture knowledge. *Asian Social Science*, Vol. 13, No. 8, 2017.

²⁹⁴ Field consultation, February-March 2018.

²⁹⁵ Amin, Humera *et al.*, 2010. Gender and Development: Roles of Rural Women in Livestock Production in Pakistan. *Pakistan Journal of Agricultural Sciences*. Vol. 47(1), 32-36.

services.

In Punjabi districts, the animal-to-veterinarian ratios were over ten times more than what are considered acceptable internationally,²⁹⁶ and the effectiveness of many Veterinary Hospitals was not up to the required levels in 2013.²⁹⁷ According to the official data published by the Department of Livestock and Dairy Development, there existed 566 Veterinary Hospitals and 1 654 Veterinary Dispensaries in Punjab, where some 126 million animals received treatment, including vaccination and castration during 2014-15.²⁹⁸ Comparable data for Sindh was not available.

The Livestock and Dairy Development officials for the Dera Ghazi Khan District of Punjab Province provide a contrasting picture of the sector.²⁹⁹ Their recent activities include: farmer reach-out, vaccination in view of the emerging prevalence of *Haemorrhagic septicaemia* and other cattle diseases, advice on breeds and feed, and installation of a 24-hour helpline for farmers. They have established one Civil Veterinary Dispensary for each Union Council; seven female veterinarians in total are working for the Dispensaries. For each town, a Civil Veterinary Hospital has been established, and for each *kasba* (remote areas), one Civil Veterinary Centre. A 28-day training was given by veterinarians to female and male veterinary assistants, ten each, who in turn trained community members. Seven Mobile Veterinarian Dispensaries have been set up and are in service five days a week in the most remote villages. They acknowledged that more technical staff members are required for effective results.³⁰⁰

Aware of the mAgriculture trend, the Livestock and Dairy Development of Punjab is developing a mobile-based extension service in their domain. Recognising that mobile-phone initiatives to provide price, weather, crop advisories and such have had little impact on farm results, and reasoning that it may have been due to insufficiently localised information, the new service aims at establishing a crowd-sourced platform for aggregated, locally relevant and reliable information on farm inputs – including artificial inoculation – with the participation of distributed and part-time calling agents.³⁰¹ However, the prominent role of women in the dairy industry is not discussed in relation to this development.

6.3.4: Agricultural Credit – Punjab and Sindh

During 2013-14, a total of PKR 234 266 million (USD 2 015 million) of loans were generated in Punjab: about two-thirds by commercial banks, a quarter by one of the public banks specialising in agriculture, Zarai Taraqiati Bank, and the rest by agricultural cooperative societies.³⁰² Among the 78 279 farmers who were granted loans by the Bank in 2014-15, only ten were landless, the poorest farmers who are our targets. These financial institutions extend loans on guarantee and ability to repay, putting the poorest at the greatest disadvantage.³⁰³ The same public bank disbursed PKR 12 522 million (USD 108 million) as

²⁹⁶ *Livestock and Access to Markets Project – Design completion report: Main report and appendices. ibid.*

²⁹⁷ *Enhancing Livestock Sector Export Competitiveness: Policy Recommendation Paper. ibid.*

²⁹⁸ Bureau of Statistics, Planning and Development Department, undated. *Punjab Development Statistics 2016*. Government of the Punjab.

²⁹⁹ Field consultation, February-March 2018.

³⁰⁰ The training by veterinarians was given to 20 veterinarian assistants (10 male and 10 female) on feed improvement, vaccination schedule, milk products and other livestock management practices. The 28-day training included 13 days in the field. These groups in turn trained communities on vaccination, livestock management, nutritional benefits from dairy, etc. Initially it was meant for female veterinarian assistants, but male assistants were also trained; assistant couples were encouraged to participate. Twenty videos on capacity building and medicine were provided.

Under the Mobile Veterinarian Dispensary scheme, one veterinarian and two assistants provide veterinary extension services at the doorsteps of farmers in the most remote villages. Their visits are announced to the villagers beforehand.

Livestock and dairy development project using community facilitators was implemented. Resource persons were trained to look after their own village. Some 230 groups were formed, each group comprising of 20 people and covering 55 Union Councils (equal presentation by gender, but separate training was given to each gender).

³⁰¹ Coordinating Farmers with Cellphones: Technology Innovation in Livestock Extension Services in Pakistan. *ibid.*

Hasanain, Ali, 2016. Experience Pool: Crowd-sourcing farmer feedback about farm inputs' quality; *OpenIDEO*.

<https://challenges.openideo.com/challenge/agricultural-innovation/beneficiary-feedback/experience-pool-crowd-sourcing-farmer-feedback-about-the-quality-of-farm-inputs> (accessed 6 May 2018)

³⁰² Bureau of Statistics, undated. 2016 Statistical Pocket Book of the Punjab. Lahore: Government of the Punjab.

³⁰³ Pervaiz, Urooba, et al., 2011. Disbursement of Agricultural Loans, Constraints and It's Future Policy Implication. *Sarhad Journal of Agriculture*. Vol.27, No.2, 2011, 323-328.

loans during 2014-15 in Sindh, but no information is available on the amount of land owned by the farmers who took out loans.³⁰⁴ The impact per monetary unit of credit is larger for smallholder farmers, but significantly less loans are extended to them than to large landowners.³⁰⁵ Women's ability to obtain loans by themselves for agricultural production appears to depend on their association with community networks, but they are few and far between.³⁰⁶

Microfinance is much more widely available for poor farmers in both provinces.³⁰⁷ In the second quarter of 2017, Punjab counted 2 417 fixed offices, 45 026 mobile offices, 3 874 304 active borrowers and gross loan portfolio of PKR 130 212 million (USD 1 120 million). For Sindh, the numbers were: 713 fixed offices, 16 676 mobile offices, 997 202 active borrowers and PKR 30 969 million (USD 266 million) gross loan portfolio. As for the number of borrowers and the amount borrowed nationwide, they were equally split between women and men. Nearly 90 percent in terms of active borrowers and gross loan portfolio amount concerned unsecured loans, indicating that the poor farmers without collaterals were given the funds through microfinancing.³⁰⁸

The Connected Agriculture Platform Punjab (CAPP) program was launched in 2018: an initiative to integrate technological service provision and mobile loans to small farmers.³⁰⁹ The Program aims to connect all stakeholders in the agriculture value chain, including agriculture extension workers.³¹⁰ During the first phase of the project, up to 110 000 mobile phones with the application will be disbursed, accompanied by 500 on-the-ground training sessions in 72 facilitation centres for 25 000 farmers across Punjab.³¹¹ It is not known in what way and how many female farmers are to benefit from the programme, who are limited in ICT skills and whose access to credit is more constrained than men's.

6.3.5: Agricultural Insurance – Punjab and Sindh

During April-July 2017 in Punjab, 5 218 439 insurance policy holders were insured for the sum of PKR 134 827 million (USD 1 160 million), and in Sindh, 882 971 holders for PKR 25 781 million (USD 222 million).³¹² As for insurance based on mobile technology, Telenor's CAPP does not include insurance, while Mobilink's *Ba Khabbar Kisaan* claims to provide crop insurance.³¹³

6.3.6: Mobile Phones and the Internet – Punjab and Sindh

In 2010-11, Punjab and Sindh counted 62 million and 30 million mobile subscribers, 57 percent and 28 percent of the population, respectively.³¹⁴ About 17 percent of the women population in Punjab has ever used a computer, while the rate was 5.6 percent in Sindh. Regarding internet usage, 7.3 percent of the women population have ever used the internet in Punjab while in Sindh, the proportion was 2.7 percent.³¹⁵

³⁰⁴ Bureau of Statistics, undated. Sindh Development Statistics 2016. Karachi: Government of Sindh.

³⁰⁵ Kbandker, Shahidur R. and Faruquee, Rashid, R., 2001. The Impact of Farm Credit in Pakistan. Policy Research Working Paper 2653. Washington D.C.: World Bank.

³⁰⁶ Women farmers. *ibid*

³⁰⁷ Pakistan Microfinance Network, 2017. *Microwatch: A Quarterly Update on Microfinance Outreach in Pakistan*. Issue 44, Quarter 2, April-June 2017.

³⁰⁸ The most preferred institutions were MFBs (microfinance banks licensed and prudentially regulated by the State Bank of Pakistan to exclusively service microfinance market), followed by MFIs (microfinance institution providing specialized microfinance services), together claiming over 70% of active borrowers and 85% of gross loan portfolio amount. Eleven MFBs and 16 MFIs are operating in Pakistan. (*Microwatch: A Quarterly Update on Microfinance Outreach in Pakistan*, 2017)

³⁰⁹ A fruit of collaboration among Punjab Information Technology Board, Telenor Pakistan and Telenor Microfinance Bank.

³¹⁰ Pakistan Telecommunication Authority, undated. *PTA Annual Report, 2017*. Islamabad: PTA.

³¹¹ ProPakistani, 2018. Telenor Pakistan Launches Connected Agriculture Platform for Punjab <https://propakistani.pk/2018/03/12/telenor-pakistan-launches-connected-agriculture-program-for-punjab/> (accessed 6 May 2018)

³¹² *Microwatch: A Quarterly Update on Microfinance Outreach in Pakistan*. *ibid*.

³¹³ Mobilink's mobile-based agricultural service launched to for Farmers across Pakistan. *ibid*.

³¹⁴ Pakistan Telecommunication Authority, 2010. *PTA Annual Report, 2011*. Islamabad: PTA.

³¹⁵ *Multiple Indicator Cluster Survey 2014, Punjab Final Report*. *ibid*.

Multiple Indicator Cluster Survey 2014, Sindh Final Report. *ibid*.

The young generation gives a strong prospect in this field. It is well known that mobile phone ownership is higher worldwide among younger women (15–34 years old) than older women (35 and older).³¹⁶ In Punjab in 2014, 21 percent of young women aged 15–24 used a computer during the last 12 months and 14 percent of the same group during the previous month.³¹⁷ As for internet use, the rate was 12 percent during the last 12 months. At the district level, only 9 percent of young women in Dera Ghazi Khan used a computer during the previous year, compared with 32 percent of women in Lahore District,³¹⁸ where the capital of Punjab is located.

6.3.7: Traditional Media – Punjab and Sindh

In Punjab in 2014, more than one-third of Punjabi women did not have regular exposure to newspaper, radio or television.³¹⁹ It is likely that many rural Punjabi women fall in the last category. In Sindh, the situation was similar; 70 percent of women either watched television, read a newspaper or magazine or listened to the radio at least once a week.³²⁰

6.4. Water Supply and Sanitation – Punjab and Sindh

6.4.1: Water Supply – Punjab and Sindh

The vast majority of the households in the targeted districts rely solely on groundwater from wells³²¹ for all uses: drinking and washing for people and livestock, as well as for cooking. Water sources are usually located at a distance that can be reached in about half an hour on foot, but each one is shared by many households; the entire task takes one hour or more if we include the time waiting in line to access the source and pumping the water.³²² The norm for water collection is twice a day, but also as the need arises.³²³

It is the responsibility of women and girls to fetch water, and some women and girls complain of headaches caused by carrying a heavy load on the head.³²⁴ Men may be involved, if no other member in the household is available or an animal-driven cart is used for the job.³²⁵ Water is not treated before use, and some villagers have identified it as the cause of diarrhoea, *stomach* pain and fever during summer.³²⁶ In the entire Province of Sindh, 3 percent of households drink water contaminated by arsenic,³²⁷ while 39 percent of households drink water contaminated by *E. coli*.³²⁸

6.4.2: Sanitation – Punjab and Sindh

A quarter of the population in rural Punjab does not have access to toilet facilities,³²⁹ and about 35 percent of the total Sindh population are without access to improved sanitation facilities.³³⁰ Unimproved sanitation methods mostly use open pits, open field, and buckets. Open drains do not fare better with respect to hygiene, as they typically discharge into nearby land depressions, streets, or water bodies.

³¹⁶ *New Insights on Women's Mobile Phone Ownership. ibid.*

³¹⁷ *Multiple Indicator Cluster Survey 2014, Punjab Final Report. ibid.*

³¹⁸ *Multiple Indicator Cluster Survey 2014, Punjab Final Report. ibid.*

³¹⁹ *Multiple Indicator Cluster Survey, Punjab 2014, Final Report. ibid.*

³²⁰ *Multiple Indicator Cluster Survey, Sindh 2014, Final Report. ibid.*

³²¹ *Multiple Indicator Cluster Survey 2014, Punjab Final Report. ibid.*

Multiple Indicator Cluster Survey 2014, Sindh Final Report. ibid.

³²² Field consultation, February–March 2018.

³²³ Field consultation, February–March 2018.

³²⁴ Field consultation, February–March 2018.

³²⁵ Field consultation, February–March 2018.

³²⁶ The women reported that the problem is absent during winter.

³²⁷ According to WHO, “[l]ong-term exposure to arsenic from drinking-water and food can cause cancer and skin lesions. It has also been associated with cardiovascular disease and diabetes. In utero and early childhood exposure has been linked to negative impacts on cognitive development and increased deaths in young adults.” (Source: World Health Organization, 2017. Arsenic. <http://www.who.int/en/news-room/fact-sheets/detail/arsenic> - accessed 7 May 2018)

³²⁸ *Multiple Indicator Cluster Survey 2014, Sindh Final Report. ibid.*

³²⁹ *Multiple Indicator Cluster Survey 2014, Punjab Final Report. ibid.*

³³⁰ *Multiple Indicator Cluster Survey 2014, Sindh Final Report. ibid.*

Women who participated in consultation meetings³³¹ voluntarily voiced their concern on sanitation, asking for aid in latrine construction and lamenting the lack of consideration among villagers who choose to defecate close to the houses of others. While it is an issue that does not merit discussion for men, women have a good reason to be interested; without safe toilet facilities, they are likely to be harassed, humiliated and assaulted by men.³³²

6.5. Health – Punjab and Sindh

According to a recent study, 41 percent of the poorest rural women in Sindh are malnourished, compared to 19 percent of the Nigerian counterparts, while the figures for the richest urban groups in the two countries are comparable;³³³ the urban-rural gap is much more glaring for Sindhis in Pakistan than for Fulanis in Nigeria. Gender-disaggregated rates are not available, but they are most likely much higher for girls, due to food distribution being in favour of boys, and much more so for girls in rural areas, where traditional values persist.

Women suffer from: hand swelling, skin rash, and allergies from exposure to pesticides; and, finger cuts, body ache, hypertension and menstruation problems due to long hours of cotton-picking by hand without proper nutrition. In general, the employers provide no safety measures against chemicals; women wrap their scarves around their mouth to prevent excess inhalation.³³⁴ Long hours in the fields leave rural women in Punjab and Sindh³³⁵ little time for themselves and their children. It takes a toll on the women's health as well as on the children's,³³⁶ and many children are stunted from malnutrition.³³⁷ In Punjab, about one-third of children under five years of age were underweight and one-third were stunted (or short for their age) in 2014.³³⁸ In Sindh, 42 percent of the same age group were underweight, 17 percent severely underweight, nearly half stunted and 24 percent severely stunted.³³⁹ Approximately one-fifth of the same group in Punjab³⁴⁰ and 15 percent in Sindh were wasted (or thin for their height).³⁴¹ The data disaggregated by wealth in Punjab showed that nearly half of the children living in the households in the lowest quintile were stunted and nearly half were underweight, compared to 17 percent for stunting and underweight in the highest quintile.³⁴² Malnutrition is most evident physically, but is also deeply connected to the mental development of children. The villagers reported that the LHVs visit only for polio vaccination.³⁴³

The majority of rural Punjabi households used solid fuel in 2014: all of the lowest-quintile and 4 percent of the highest-quintile households.³⁴⁴ The situation is quite similar in Sindh: the quintile-based rates for Sindh were nearly 100 percent and 2 percent, respectively.³⁴⁵

6.6. Coping with Negative Shocks – Punjab and Sindh

Climate change prominently features in the minds of both male and female farmers, manifested as higher temperature, growing water scarcity, increasingly irregular and unfamiliar rain patterns, failure in cotton

³³¹ Field consultation, February-March 2018.

³³² Toilets keep women and girls healthy and safe. *ibid.*

³³³ *Turning Promises into Action: Gender Equality in the 2030 Agenda for Sustainable Development.* *ibid.*

³³⁴ Field Consultation, February – March 2018.

³³⁵ In Sindh, more than 500,000 farmers work in cotton picking, majority of which are women. (Source: Call for recognizing women's role in Sindh agriculture. *Dawn*, 17 December 2014. <https://www.dawn.com/news/1151239> - accessed 10 April 2018).

³³⁶ *Call for recognising women's role in Sindh agriculture.* *ibid.*

³³⁷ In Sindh, it is as high as 44% (Call for recognizing women's role in Sindh agriculture, 2014).

³³⁸ *Multiple Indicator Cluster Survey 2014, Punjab Final Report.* *ibid.*

³³⁹ *Multiple Indicator Cluster Survey 2014, Sindh Final Report.* *ibid.*

³⁴⁰ *Multiple Indicator Cluster Survey 2014, Punjab Final Report.* *ibid.*

³⁴¹ *Multiple Indicator Cluster Survey 2014, Sindh Final Report.* *ibid.*

³⁴² *Multiple Indicator Cluster Survey 2014, Punjab Final Report.* *ibid.*

³⁴³ Field consultation, February-March 2018.

³⁴⁴ *Multiple Indicator Cluster Survey 2014, Punjab Final Report.* *ibid.*

³⁴⁵ *Multiple Indicator Cluster Survey 2014, Sindh Final Report.* *ibid.*

ball formation, and increase of certain insects.³⁴⁶ The farmers have noticed an exacerbation of waterlogging and salinity, which had been serious problems even before the onset of climate change.³⁴⁷ Riverside villages are more prone to floods than before, but do not have any strategy than to flee to elevated grounds when they occur.³⁴⁸

Regional variation was reported in what constituted the major shocks in two years prior to 2012.³⁴⁹ Medical expenses were the most important in Punjab (43%), followed by wedding costs (10%) and cut-off or decrease in regular remittances (3%). Floods caused loss or damage of houses to less than 3 percent of households. In Sindh, flood related shocks were considerable; lost or damaged home due to a flood (28%), loss or destruction of consumption items due to a flood (19%), and significant loss of crops due to a flood (13%). Medical expenses were regarded major shocks by 16 percent of households, and weddings by only 1 percent. As described above, more than half of the poorest households did not have any strategy to cope with floods.

7. PROJECT FORMULATION AND IMPLEMENTATION PRINCIPLES

7.1. Risks and Opportunities for Farmers Facing Climate Change

Rural women constitute the most vulnerable segment of the Pakistani society; they have the least physical, human and social capital to cope with negative external shocks, such as climate change. As with any undesirable disturbance to society, climate change will widen the gap between the non-privileged and the privileged, most notably rural women and the rest, and push back any progress made with respect to human development and gender equality in the country, both of which are currently at unsatisfactory levels.

Climate change has already negatively affected water resources and agriculture and led to an increase in natural disasters that force people to evacuate in a short notice, such as floods. If the society as a whole is segregated, but the disaster shelters are not, disasters pose greater physical risks for women. If men, who tend to have more physical strength than women, are only interested in saving large livestock from floods but not the small animals owned by women, disasters pose greater financial risks for women. Empowerment of women would mitigate such risks.

As is often put, agriculture is the backbone of the national economy, and about half of the value-added in the sector is livestock derived. Nearly all of the responsibilities of livestock management fall on women, but they are without decision-making power. Simply from the production-efficiency point of view, allowing women to make decisions on livestock makes sense, as it does in terms of food and nutritional security since dairy and poultry products complement the grains. Moreover, livestock serves as assets and cash sources, smoothing the income fluctuations caused by crop-cycles and disasters, and thereby providing financial security to households. In sustainable agriculture, livestock management is more than often integrated with crop cultivation.

Vegetable cultivation is another task that is considered women's. If many more female farmers take up the practice, it will benefit the entire households' food and nutritional security. In general, women farmers are much more open than men to activities that are new and not linked to power; they provide a valuable and ready entry point for diversification, which is one of the key elements in climate-change resilience.

³⁴⁶ Field consultation, February-March 2018.

³⁴⁷ Field consultation, February-March 2018.

³⁴⁸ Field consultation, February-March 2018.

³⁴⁹ *Pakistan Rural Household Panel Survey 2012 (Round 1) - Household Characteristics. ibid.*

Women's social participation and networks are important in creating a women's voice that will be heard. The Women Open Schools under this project will not only serve as sources of agricultural information, but opportunities to meet other women and establish networks.

The cultural norm that appears accepted by many, including rural women, is that they refrain from mobile phone use. On the other hand, young women have higher rates of literacy and ownership of mobile phones than older women. By giving due attention to female youth, we would be able to transform them into catalysts of change and retain them in the rural areas for agriculture, on which the country heavily depends.

7.2. Principles of Project Formulation

7.2.1: Strengthening Female Technical Community

The number of female professionals is limited in disciplines that have traditionally been considered masculine, such as irrigation, land and water management, climatology, information technology, agriculture sciences, and animal and veterinary sciences. The project will engage female professionals wherever possible, and at the same time, train female university students majoring in the above subjects so that they are better prepared for their career development. The proportion of female students in these fields is increasing, providing an excellent opportunity to strengthen the female technical community in Pakistan.

7.2.2: Leveraging Gender-Differentiated Tasks and Interests

Women and men are largely engaged in different tasks, and women are more willing to take up new practices. They also have stronger interests in food and nutritional security. The project will leverage these differences to introduce new agricultural products for diversification and for food and nutritional security, both of which will boost resilience to climate change and improve the health of all household members. Most importantly, children's health and development, in which balanced nutrition plays a critical role, will be positively affected.

7.2.3: Women's Participation in Coping with Negative Shocks

The poorest households lack viable means to cope with shocks that climate change has brought about. The project's goal to increase their resilience to climate change is precisely endowing them with a long-term strategy to cope with the shocks. The project will help women acquire the capacity to increase food available to each household by means of kitchen gardens and livestock rearing and to minimise the risk of having to consume less expensive food items or to eat less altogether. If the products yield cash income, it would supplement finances required for the reconstruction and repair of damages caused by floods. In addition, endowing women with the ability to bring cash home is considered the surest way to empower them.

7.2.4: Sowing Seeds for Women's Networks

Rural women face a big challenge in obtaining information, financial assistance and other resources as well as opportunities. One of the important factors in this equation is the lack of social networks; they greatly facilitate access to many kinds of resources. The project will establish Women Open Schools not only for technical information, but also as a base for networks that connect women farmers.

7.2.5: Assisting Women in Initial Investment

The lack of access to financial resources by women poses a great obstacle to picking up climate resilient agriculture, which includes vegetable production and animal raising. The project will aid in lowering the barrier by providing seed packets, small ruminants and poultry through Women Open Schools where they learn how to grow vegetables and raise and care small animals. This assistance will free women, who

receive the material for starting a new venture, from the need to borrow from commercial lenders in the informal sector, at least in connection with the new activities; the association with them is often linked to perpetuating poverty.

7.2.6: Tackling the Value Chain

No agricultural product or method is of great economic value without a value chain that accommodates it; all stakeholders from policy makers, input suppliers to landowners and so on need to be involved for the successful introduction of new agricultural methodologies and products. In mainstreaming climate policy across all policy areas, the importance of gender- and age-disaggregated data will be stressed. Landowners and farm managers will be targeted for activities to raise awareness on gender and climate resilient agriculture. Training for financial-risk evaluation officers and any other conducted by the project will include gender awareness as a topic.

7.2.7: Improving Women's Access to Information

Women do not have good access to information and information technology, and despite the inclusion of the topic gender in various policies, new initiatives are launched without the consideration of gender, especially of rural women's strengths and constraints. The project will raise awareness among policy makers and community-support professionals on women's access to information: its importance and the need for its improvement. Radio broadcasting on climate resilient agriculture will consider rural women as an important audience and produce programs that specifically target them. The establishment of female farmers' networks would also contribute to improving women's access to information.

7.2.8: Creating a Niche for Young Women

Focusing on the considerable contribution of rural women to the livestock sector, the project will train young women on improving livestock management in Women Open Schools. The project will also focus on their higher literacy, conventional and technical, and build their capacity in assisting older female farmers in utilising mobile-phone based information services. This activity will strengthen the information access of female farmers of all ages.

7.2.9: Improving Health of Girls

The empowerment of women under this project will enhance the nutritional security of women and girls; the stunting of children that prevails in the region will be reduced, and girls will be equipped with better prospects for life.

7.3. Principles of Project Implementation

7.3.1: Practical aspects of Female Farmers' Lives

The project will pay attention to the practical aspects of female farmers' lives, such as their workload, restricted mobility, and vulnerability related to age. The training sessions will be organised during off season for cash crops and at the village of residence or fairly close by, especially for young women considering their high vulnerability. For older female farmers, the location will be chosen to be as close as possible to their residence, and in case they need to travel, a transportation fee will be provided for a male relative to accompany.

7.3.2: Effective Communication Methods

The vast majority of targeted women are illiterate and do not own mobile phones. Thus, the knowledge and skills will be transmitted through a female version of the Farmer Field School (Women Open School or WOS), which employs a participatory, adult learning methodology. Women from the villages not directly targeted by the project will be invited to visit nearby WOS sites for inspiration and learning by

observation and by chatting with fellow female farmers: WOS Open Days. The project will also invite female farmers, regardless of their involvement in WOS, to participate in Field Day activities, which will be organised around demonstration plots. Radio programmes (rather than television shows or podcasts) and videos (to be shown at the WOSs) will be used to raise their awareness.

7.3.3: Network Creation

Female extension workers – agriculture and livestock – will be involved whenever possible in activities for women farmers so as to create communication channels beyond their villages by utilising their mobility among villages and acting as messengers; the networks will eventually help in obtaining bargaining power in formal negotiations, pooling resources, and providing a base for bartering and information exchange.

7.3.4: Promotion of Mutual Understanding

The knowledge products produced for male farmers will be examined by female farmers and *vice versa* so that the two groups deepen their understanding of all activities in the field. The mutual understanding will avoid new activities of one group inconveniencing the other's and will raise overall productivity. It will provide a better understanding of pesticides, which is applied by men but whose toxic effects are felt mainly by women through prolonged exposure, for example, during cotton picking.

7.3.5: Monitoring and Evaluation

The monitoring and evaluation team will include a female gender and nutrition specialist who will ensure that the women farmers have the opportunity to report their own observations and frank opinions. The project will collect gender- and age-disaggregated data in connection with interventions for systematic use in analysis and reporting of project results.

7.4. Beneficiaries of the Project

Component 1 Establishment of Agriculture and Water Management Information Services for Resilience to Climate Change will directly benefit the government officials who are in charge of water resource management, agriculture and climate. Taking into account that there are next to no female government officials dealing with these issues, the project will train female university students, majoring in the related technical fields, on the systems to be developed and background science; we will initiate the long-term process of strengthening the presence and contribution of female professionals in the country.

Component 2 Building on-Farm Resilience to Climate Change will target female farmers through Women Open Schools and Climate and Business Field Schools, who will gain knowledge and skills in climate resilient agriculture, weather, soil characteristics plant development, costs and yield, farm management and marketing skills, numeracy and financial literacy. Seed packets, small ruminants and poultry will be distributed through the Schools; the project will shoulder the initial investment necessary for launching new economic activities. Women from villages not targeted by the project will be invited to visit the School farm sites for information dissemination by seeing-is-believing. Awareness raising on gender and climate resilient agriculture will be organised for landowners, farm managers, and financial-risk evaluation officers. The beneficiaries of these activities are female farmers in the rural areas, who will be empowered technically, economically and socially and will enjoy a social environment more tuned to their needs. Women empowerment will also allow true progress of the society and ultimately benefit men.

Under Component 3 Creating an Enabling Environment for Continued Transformation, young women will be the direct beneficiaries. They will be trained on assistance regarding mobile-phone based services, such as weather forecasts, early warning, and agriculture advice. The purpose of the training is to create agents who can relay the mobile information to older female farmers; the entire female farmer community will benefit. Another training targeting young women will be on livestock management, a major activity for rural women and for the national economy.

8. FIELD CONSULTATION: QUESTIONS AND PARTNERS

8.1. Consultation Questions

The questions in this Section were used to identify the key issues in the lives of female farmers. Then literature search was conducted to further assess these issues in detail; the results are summarized in Sections 5 and 6. The assessment led to identification of risks and opportunities for female farmers facing climate change, and contributed to project formulation, establishment of implementation modalities and specifying beneficiaries (see Section 7).

The closer the institutions were involved with the farmers on the ground, the more they were convinced out of experience that it was a must to involve female farmers and implement gender-responsive activities for a project to succeed. They did not seem to have a systematic approach for tackling the issue, however.

Female farmers were involved in tasks that do not require muscle power or use of machinery. They were mainly responsible for work that required time and dexterity. As for livestock, they were in charge of the bulk of work related to large animals which were considered men's possessions. They also took entire care of animals considered women's, such as poultry and small ruminants. Their wages were understood to be lower than men's accomplishing the same work; it was not possible to verify this claim as work is gender segregated. Women usually handed the cash that they earned to men and trusted that men made wise financial decisions that benefitted the whole family.

Women were aware of climate change impacts, such as higher temperature and growing scarcity of water. They were also more interested than men in health, water and sanitation issues, directing the discussion voluntarily in that direction. The male farmers consulted did not speak on similar topics, except for baby delivery in the poorest Hindu village.

Access to education was positively related to the income level of village, which in turn appeared linked to proximity to urban centres. In general, women had much less access to information than men, while some widows were empowered and had as much access as men.

8.1.1: Core Consultation Questions for Institutions

- How has climate change affected your work?
- What do you think about the gender issue in relation to your work?
- What are the actions taken to incentivise female farmer participation in training?
- What is the number of female professionals at your institution?
- Why is the number of female professionals at your institution low?
- How are female professionals encouraged to work for the institution?

8.1.2: Core Consultation Questions for Female Farmers

- What are the main crops grown and women's involvement in different stages of crop production
- What type of animals do you keep?
- Who owns which animals?
- How has the farming situation changed in the past few years?
- Which everyday tasks are performed by men? By women?
- Do children attend school? How far is the nearest school?
- How far is the drinking-water source? Whose responsibility is it to fetch water? How many times a day?
- How is the condition of drinking water? Has it affected health?

- Do you treat water before drinking?
- How far is the nearest health care facility?
- What is the situation of sanitation in the village?
- Who sells agricultural and livestock products?
- Who keeps the cash income?
- Who makes the decisions on spending?
- Are you engaged in vegetable cultivation?
- Do you have a mobile phone?

8.2. Consultation Partners

8.2.1 Farmer Consultations

2012 Farmer Consultations							
Date	Province	District	Union Council	Village	Consultation Type	Participants	
						Female	Male
12 October 2017	Punjab	Multan	Band Bosan	Sanbhal	Villagers, <i>not</i> segregated by gender	30	35
13 October 2017		Vehari	No. 10	Chak-206/E-B	Male members of Farmers' Integrated Development Association (local CBO)	0	32
					Female members of Farmers' Integrated Development Association	27	0
18 October 2017	Sindh	Hyderabad	Choudry Nizam Udin	Choudry Nizam Udin	Male villagers	30	0
					Female villagers	0	25
27 February 2018	Punjab	Lodran	49M	17MPR Tarbela Chak	Male villagers	0	40
				46M	Female villagers	30	0
			35M	26M	Villagers of a Christian minority village, <i>not</i> segregated by gender	26	32
28 February 2018		Muzaffargarh	Chak Farazi	Azizabad	Male villagers of Christian minority village	0	10
					Female villagers of Christian minority village	10	0
				Maqsoodpur	Male villagers of Shia minority village	12	0
					Female villagers of Shia minority village	0	12
1 March 2018		Dera Ghazi Khan	Peagah	Balouch Wala	Male villagers	0	20
				Basti Changwani	Female villagers	15	0
2 March 2018		Khanewal	98/10R	Chak 167/10R	Male villagers	0	42
					Female villagers	6	0
					Christian minority villagers	3	2
6 March 2018	Sindh	Sanghar	Pir Fakeer	Daim Thahim	Male villagers	0	18
					Female villagers	15	0
					Hindu minority female villagers with a male representative	20	1
7 March 2018		Umerkot	Walidad Pali	Walidad Pali	Male villagers	0	31
					Female villagers	48	0
					Hindu minority female villagers	24	0
8 March 2018		Badin	Qaziah Wah	Ibrahim Junego	Male villagers	0	24
					Female villagers	24	0
			Ado Kohli	Quazia Wah	Hindu minority male villagers	0	24
	Hindu minority female villagers				28	0	

8.2.2 Other Consultations

Date	Province	Institution		Persons Consulted
		Name	Description	
9 October 2017	Islamabad	International Food Policy Research Institute	International agricultural research centre	Stephen Davies (Senior Research Fellow), Abdul Wajid Rana (Program Leader)
		Pakistan Agricultural Research Council (PARC) and National Agricultural Research Council (NARC)	PARC – apex agriculture research organization at the national level. NARC – a research centre under PARC	Muhammad Azeem Khan (Director General, NARC), Anjum Ali Butt (Member, Crop Sciences, PARC)
11 October 2017	Punjab	Agriculture Extension Wing	Part of the Government of Punjab, Department of Agriculture	Zafaryab Haider (Director General)
		Department of On Farm Water Management	Part of the Government of Punjab	Malik Muhammad Akram (Director General)
		Irrigation Research Institute	Part of the Government of Punjab, Department of Irrigation	Ghulam Zakir Hassan Sial (Director)
		Classic Agro Farm	Private farm aiming for climate resilience	Muhammad Fiaz (Farmer)
		Chatta Farm	Private farm experimenting on direct planting of rice	Amjad Hussain Chattah (Farmer)
13 October 2017		Haveli Canal System, District of Multan	Part of the Government of Punjab, Department of Irrigation	Tahir Anjum Qureshi (Superintendent Engineer)
		Agriculture Extension Wing, District of Multan	Part of the Government of Punjab, Department of Agriculture	Rana Munir Ahmad (Director, Agriculture Extension)
17 October 2017	Sindh	Agriculture Extension Services	Part of the Government of Sindh, Department of Agriculture	Hidayatullah Chajro (Director General) Ghulam Mustafa Nangraj (Senior Communication Specialist) Touqeer Ahmad Sheikh (Senior Extension Specialist,)
		Department of Irrigation	Part of the Government of Sindh	Dhanomal (Chief Engineer)
27 February 2018	Punjab	Lodhran Pilot Project	Local NGO for poverty reduction in Lodhran District	Nadeem Abbas (Senior Manager), Nayab Gill (Communication Officer), Sadja Perveen (Social Organizer), Baqir Ali (Social Organizer), Ijaz Ul Haq (Social Organizer)

1 March 2018		Department of On Farm Water Management, District of Dera Ghazi Khan	Part of the Government of Punjab	Anwar-ul-Haq Shahzad (Director Agriculture, On Farm Water Management), Khadim Hussain (Deputy Director, On Farm Water Management), Saifur Rehamn (former Director, On Farm Water Management)
		Department of Livestock and Dairy Development, District of Dera Ghazi Khan	Part of the Government of Punjab	Nadeem Arshad (Assistant Director-HQ), Mohammad Arif Rizwan (Veterinary Officer), Amir Mehmood (Assistant Director, Technical).
		Agriculture Extension Wing, District of Dera Ghazi Khan	Part of the Government of Punjab, Department of Agriculture	Abid Hussain (Deputy Director, Agriculture Extension), Shahid Muneer (Agriculture Officer)
		Department of On Farm Water Management, District of Multan	Part of the Government of Punjab	Zaffar Ullah Sindhu (Director, Agriculture On-Farm Water Management)
		Agriculture Extension Wing, District of Multan	Part of the Government of Punjab, Department of Agriculture	Chodrey Niaz Ahmad (Deputy Director, Agriculture Extension)
		Environmental Protection Agency, District of Multan	Part of the Government of Punjab, Department of Environment Protection	Ishaq Ahmed (Inspector)
3 March 2018		World Wildlife Fund Lodhran Pilot Project, Farmers' Development Organization, Al-Mustafa Development Organization, Concern Worldwide	International and local NGOs	Muhammad Ifran (CRCP Project Coordinator, WWF), Habib Ahmed (Director of Implementation, Lodhran Pilot Project), Ali Azhar (M&E Coordinator, Farmers' Development Organization), Gurtiaz Naqni (President, Al-Mustafa Development Organization), Khan Zada (Livelihood Consultant, Concern Worldwide)
5 March 2018	Sindh	Sindh Forest Department	Part of the Government of Sindh	Abdul Sattar Kahtri (Conservator), Abid Hussain Rind (Divisional Forest Officer)
7 March 2018		UNDP Small Grants Programme		Masood Ahmed Lohar (National Programme Manager), Sajida Sultana (PhD Candidate & Research

				Assistant, University of Waterloo)
12 March 2018	Islamabad	Stakeholder meeting with Potohar Organization for Development Advocacy (PODA), National Agriculture Research Council (NARC), Ministry of Climate Change (MOCC), International Union for Conservation of Nature (IUCN), National Rural Support Program (NRSP), International Labour Organization (ILO), Hashoo Foundation Pakistan Poverty Alleviation Fund (PPAF)	Ministries, international NGOs, national NGOs for poverty reduction, UN agencies	Aftab Alam (Board Member, PODA), Noshaba Arif (PODA), Beenish Ibrahim (PODA), Yousuf Riaz (Principal Scientific Officer, NARC), Ghuulam Akbar (NARC) Mohammad Ibrahim Khan (REDD+ Officer, MOCC) Rizwan Arshad (Deputy Director, MOCC), Fauzia Malik (Manager of Islamabad Office, IUCN), Salma Khalid (Project Manager – Gender, NRSP), Naseem Khalid (Project Officer, ILO), Umama Binte Azhar (Deputy Manager-Environment & Climate Change, Hashoo Foundation), Sania Liaqat (PPAF)

9. GENDER ACTION PLAN

The day-to-day implementation of the Gender Action Plan for the project, *Transforming the Indus Basin with Climate Resilient Agriculture and Water Management*, will be led by two full-time project-recruited Gender and Nutrition Specialists. These individuals will work in the Provincial Project Implementation Units (PPIUs), and thus will work under the direct supervision of the Provincial Project Coordinators. Although the Gender and Nutrition Specialists will lead the implementation of the Gender Action Plan, they will do so in close collaboration with other project-recruited staff who will lead day-to-day delivery of project activities at the federal, provincial and districts levels. In this context, the Gender and Nutrition Specialists will work with (inter alia): project-recruited staff in the Project Management Unit (PMU) including the National Project Coordinator and other specialists working at the federal level; project-recruited staff in the two PPIUs, including the Provincial Coordinators and other technical specialists; and project-recruited staff in the eight District Project Implementation Units (DPIUs), including the District Training Teams (each of which will include two Women Open Schools (WOS) supervisors, who will play a key role in delivering support for WOS – a key element of the gender-responsive support provided by the project). The Gender and Nutrition Specialists will also work collaboratively with the Responsible Entities (which play a key role in this project, as outlined in Section C.7 of the Funding Proposal and Sections 5 and 7 of the Feasibility Study) to ensure gender-differentiated needs are adequately integrated into the complementary support they provide in collaboration with this GCF project.

Expected Result ³⁵⁰	Indicators and Targets	Timeline	Responsibilities	Budget
<i>Fund-level impacts</i>				
<i>GCF core indicator</i>	Number of direct and indirect beneficiaries. <u>Direct:</u> <i>Baseline: 0</i> <i>Target: 1.3 million (636,000 women)</i> <u>Indirect:</u> <i>Baseline: 0</i> <i>Target: 16 million (7.9 million women)</i>	By end of Project Year 6	FAO (as Executing Entity), particularly: - National Monitoring Specialist.	Included in regular budget.
	Number of direct beneficiaries relative to total population (in the targeted districts). <u>Direct:</u> <i>Baseline: 0%</i> <i>Target: 8% (4% women)</i> <u>Indirect:</u> <i>Baseline: 0%</i> <i>Target: 100% (49% women)</i>	By end of Project Year 6	FAO (as Executing Entity), particularly: - National Monitoring Specialist.	Included in regular budget.

³⁵⁰ **Note:** All rows in the Gender Action Plan that are shaded in green include indicators and targets that are included in the overall project logframe. These constitute the higher-level results to which the actions in the Gender Action Plan will contribute. Progress in achieving these results will be assessed by the Project Monitoring Specialist. Rows that are not shaded in green include indicators and targets that are specific to the Gender Action Plan. The Gender and Nutrition Specialists will bear overall responsibility for delivering the Gender Action Plan, and as such they will bear overall responsibility for: (i) working with other project-recruited staff and partners to ensure gender considerations and support are integrated into project support in a manner that enables achievement of the targets included in this plan; and (ii) monitoring progress against these targets and reporting to the PMU (and National Monitoring Specialist in particular).

A1.0 Increased resilience and enhanced livelihoods of the most vulnerable people, communities and regions	Number of males and females benefiting from the adoption of climate-resilient livelihood options. <i>Baseline: TBD (based on baseline survey)</i> <i>Target: 1.3 million people benefiting from the adoption and use of CRA and OFWM practices (636,000 females)</i>	By end of Project Year 6	FAO (as Executing Entity), particularly: - National Monitoring Specialist.	Included in regular budget.
A2.0 Increased resilience of health and well-being, and food and water security	Number of food secure people in beneficiary households. <i>Baseline: TBD (based on baseline survey)</i> <i>Target: 200,000</i>	By end of Project Year 6	FAO (as Executing Entity), particularly: - National Monitoring Specialist.	Included in regular budget.
Project-level outcomes				
A8.1 Strengthened awareness of climate change threats and risk reduction processes	Number of males and females made aware of climate threats and related appropriate responses. (A8.1). <i>Baseline: 0</i> <i>Target: 10 million (4.9 million females)</i>	By end of Project Year 6	FAO (as Executing Entity), led by: - National Monitoring Specialist.	Included in regular budget.
Activities	Indicators and Targets	Timeline	Responsibilities	Budget
Component 1: Agriculture and Water Management Information Services for Resilience to Climate Change				USD 48,000 + regular budget
Activity 1.1.1: Develop and establish a water accounting system, including the equipment needed to operate this system in two canals.	Proportion of female technicians among technical positions proposed, including training. <i>Baseline: 0%</i> <i>Target: 10%</i>	By end of Project year 6	FAO (as Executing Entity), led by: - Gender and Nutrition Specialists.	Included in regular budget
Activity 1.1.2: Conduct risk-based assessments of aquifer vulnerability, and procure and install automatic groundwater level sensors to enable continued monitoring.	Gender mainstreaming in training material, including curriculum for universities. <i>Baseline: 0%</i> <i>Target: women's perspectives and activities taken into account in 100% of training material developed.</i>	By end of Project year 2		Included in regular budget
Activity 1.1.3: Support the development of local aquifer management plans and participatory aquifer management at field level.				
Activity 1.2.1: Develop and deploy an ET monitoring system.	Proportion of female technicians among technical positions proposed, including training. <i>Baseline: 0%</i> <i>Target: 10%</i>	By end of Project year 2	FAO (as Executing Entity), led by: - Gender and Nutrition Specialists.	Included in regular budget
Activity 1.2.2: Design, develop and build capacity to use ET-based water management software applications/tools	Gender mainstreaming in	By end of		Included in regular

to guide planning at policy and field levels.	evapotranspiration system management training <i>Baseline: 0%</i> <i>Target: 20% of training time devoted to what kind of management could improve women’s lives and why.</i>	Project year 2		budget
Activity 1.2.3: Strengthen the network of agrometeorological stations in the Project Area by installing and upgrading stations.				
Activity 1.3.1: Train Professional Beneficiaries in the water and agriculture sectors to use IT tools to inform planning and decision-making related to climate change, agriculture and water.	Proportion of female technicians among technical positions proposed, including training and Interdisciplinary Technical Working Groups for MOSAICC and Aquacrop. <i>Baseline: 0%</i> <i>Target: 10%</i>	By end of Project year 6	FAO (as Executing Entity), led by: Gender and Nutrition Specialists.	Included in regular budget
Activity 1.3.2: Development of the Agri-Climate-Water (ACWA) Information Portal.	Number of female technicians and university students trained on background science and systems developed by project. <i>Baseline: 0%</i> <i>Target: 100 female technicians and university students</i>	By end of Project year 6		USD 48,000
Activity 1.3.3: Develop a consortium for information management and the ACWA Portal.				
Component 2. Building on-farm resilience to climate change				USD 8 393 987 + regular budget
Activity 2.1.1: Develop and improve training materials to support adoption of CRA and OFWM practices.	Proportion of female technicians among technical positions proposed, including training. <i>Baseline: 0%</i> <i>Target: 10%</i>	By end of Project year 6	FAO (as Executing Entity), led by: Gender and Nutrition Specialists.	Included in regular budget
Activity 2.1.2: Set up project demonstration plots and support adaptive research to underpin delivery of climate-informed extension services.	Gender mainstreaming in extension materials, including training <i>Baseline: 0%</i> <i>Target: gender mainstreamed in all materials and 20% of training time devoted to what kind of extension could improve women’s lives and why.</i>	By end of Project year 3		Included in regular budget
Activity 2.1.3: Develop a CRA and OFWM practice repository – the Pakistan Climate Agriculture Information System (PCAIS).	Women Open School (WOS) knowledge products elaborated. <i>Baseline: 0</i> <i>Target: 3</i>	By end of Project year 2		USD 18,000
	WOS knowledge products printed <i>Baseline: 0%</i> <i>Target: 50% of budget allocated for printing used for WOS products.</i>	By end of Project year 3		USD 10,000

	Project demonstration plots and adaptive research for kitchen gardens and livestock. <i>Baseline: 0%</i> <i>Target: 50% of budget allocated for setting up project demonstration plots and adaptive research used for women's activities.</i>	By end of Project year 6		USD 172,800
	Farmer Field and Women Open School knowledge products shared with both men and women for their feedback <i>Baseline: 0.</i> <i>Target: sharing of all knowledge products produced.</i>	By end of Project year 6		Included in regular budget
	Revision of Farmer Field and Women Open School knowledge products based on feedback from men and women. <i>Baseline: No revisions.</i> <i>Target: All knowledge products revised to account for feedback (to the extent required).</i>	By end of Project year 6		Included in regular budget
Activity 2.2.1: Train the core facilitators/staff who will lead climate-informed extension service delivery in each of the eight project districts.	Extension workers, partner field staff and farmer facilitators are effectively training farmers through demo-plots, WOS and CBFS. <i>Baseline: 0</i> <i>Target: 320 WOS facilitators</i>	By end of Project year 6	FAO (as Executing Entity), led by: Gender and Nutrition Specialists.	Included in regular budget
Activity 2.2.2: Training of Trainers (ToT) on CRA and OFWM Practices.	Number of female international consultant contracted and engaged in work as Women Open School Master Trainer. <i>Baseline: 0</i> <i>Target:1</i>	By end of Project year 2		USD 30 000
	Number of female Women Open School Facilitators contracted and trained <i>Baseline: 0</i> <i>Target: 2 per district (total 16)</i>	By end of Project year 2		Included in regular budget
	Number of female Women Open School trainers/extension workers contracted and trained <i>Baseline: 0</i> <i>Target: 320</i>	By end of Project year 6		Included in regular budget
	Number of government extension workers trained. <i>Baseline: 0</i> <i>Target: 720 (# of women TBD during inception</i>	By end of Project year 6		Included in regular budget

	<i>phase, including based on baseline survey)</i>			
	Number of partner & private sector field staff trained. <i>Baseline: 0</i> <i>Target: 650 ((# of women TBD during inception phase, including based on baseline survey)</i>	By end of Project year 6		Included in regular budget
Activity 2.3.1: Train and support Farmer Beneficiaries to adopt CRA and OFWM through Climate and Business Field Schools (CBFS).	Proportion of female technicians among technical positions proposed, excluding Gender and Nutrition Specialist below, but including training. <i>Baseline: 0%</i> <i>Target: 10%</i>	By end of Project year 6	FAO (as Executing Entity), led by: Gender and Nutrition Specialists.	Included in regular budget
Activity 2.3.2: Train and support Women Farmer Beneficiaries to adopt CRA and OFWM through Women Open Schools (WOS).	Number of female Gender and Nutrition Specialists contracted and engaged in work. <i>Baseline: 0</i> <i>Target: 2 per year</i>	By end of each Project years 1-6		USD 651 187
Activity 2.3.3: Training of Farmer Beneficiaries on CRA and OFWM organized by partners on their demonstration plots.	Training days for women organized at demonstration plots <i>Baseline: 0%</i> <i>Target: 100% of demo plots</i>	By end of Project years 6		Included in regular budget
Activity 2.3.4: Organize field days for additional farmers to visit CBFSS, WOSs and demonstration plots to gain exposure to CRA and OFWM practices ("Field Day Farmer Participants").	Women Open Schools (whose activities include livestock) established and operated <i>Baseline 1: 0</i> <i>Target 1: 960 WOSs</i> <i>Baseline 2: 0</i> <i>Target 2: 24 000 female farmers trained in WOSs</i> <i>Baseline 3: 0%</i> <i>Target 3: 30% of trainees are youth (age 15-30)</i>	By end of Project year 6		USD 4 152 000 (includes provision of inputs for Schools and training of trainers in climate resilient agriculture and on-farm water management)
	Provision of backyard poultry to women <i>Baseline: 0</i> <i>Target: 960 poultry distributed to WOSs.</i>	By end of Project year 6		USD 484 800
	Provision of small ruminants to women <i>Baseline: 0</i> <i>Target: 960 small ruminants distributed to WOSs</i>	By end of Project year 6		USD 969 600

	Awareness raising of landowners and farm managers on gender issues. <i>Baseline 1: 0%</i> <i>Target 1: 100% attendance of invited trainees</i>	By end of Project year 2		USD 24 000
	<i>Baseline 2: 0%</i> <i>Target 2: 50% of male participants show change in gender perception, measured through before and after questionnaire.</i>			
	Farmer Facilitator led Women Open Schools established and operated <i>Baseline 1: 0</i> <i>Target 1: 240 WOSs</i> <i>Baseline 2: 0</i> <i>Target 2: 6 000 female farmers trained in WOSs</i> <i>Baseline 3: 0%</i> <i>Target 3: 30% of trainees are youth (age 15-30)</i>	By end of Project year 6		USD 1 881 600
	Women Open School Open Days and Field Days. <i>Baseline: 0</i> <i>Target: 75 000 women farmers participate in Field Days</i>	By end of Project year 6		Included in regular budget (including costs for male chaperons)
Component 3. Creation of an enabling environment for continued transformation				USD 154 000 + regular budget
Activity 3.1.1: Organize and launch a multimedia information and awareness raising campaign on climate change, CRA and OFWM.	Farmers reached through radio, text and voice information services / received CC information. <i>Baseline: 0</i> <i>Target: 10 million (# of women TBD during inception phase, including based on baseline survey)</i>	By end of Project year 6	FAO (as Executing Entity), led by: Gender and Nutrition Specialists.	Included in regular budget
	Proportion of female professionals among communication specialists for the activity. <i>Baseline: 0%</i> <i>Target: 50%</i>	By end of Project year 6		Included in regular budget
	Gender mainstreaming in national radio programme. <i>Baseline: 0%</i> <i>Target: 40% of programmes feature female farmer protagonist empowered through climate</i>	By end of Project year 1		Included in regular budget

	<i>change adaptation.</i>			
	Gender mainstreaming in provincial radio programme. <i>Baseline: 0%</i> <i>Target: 40% of programmes per Province feature female farmer protagonist empowered through climate change adaptation.</i>	By end of Project year 4		Included in regular budget
	Radio programme broadcast during the time of the day when women are typically at home <i>Baseline: 0%</i> <i>Target: 90% of broadcasts</i>	By end of Project year 4		Included in regular budget
	Analysis of existing farmer advisory services on gender aspects <i>Baseline: 0%</i> <i>Target: 80% of existing services analysed and recommendations made with respect to women farmers</i>	By end of Project year 1		Included in regular budget
	SMS/Voice mass broadcasting on climate resilient agriculture for women <i>Baseline: 0%</i> <i>Target: 30% of broadcasting targets women.</i>	By end of Project year 4		Included in regular budget
	Provision of ICT equipment for WOSs <i>Baseline: 0%</i> <i>Target: 100% of WOSs established are equipped with a tablet and a projector.</i>	By end of Project year 6		USD 74 000
	Location-based/interactive/on-demand SMS/voice messages. <i>Baseline: 0%</i> <i>Target: 30% of broadcasting targets women.</i>	By end of Project year 6		Included in regular budget
	Climate change additions to and gender mainstreaming in existing Department of Agriculture smartphone applications. <i>Baseline: 0%</i> <i>Target: 30% of broadcasting targets women.</i>	By end of Project year 4		Included in regular budget
Activity 3.2.1: Increasing Collaboration between Institutions through Knowledge Sharing for Evidence-based Policymaking.	Proportion of female technicians among technical positions proposed, including training. <i>Baseline: 0%</i> <i>Target: 20%</i>	By end of Project year 6	FAO (as Executing Entity), led by: Gender and Nutrition Specialists.	Included in regular budget
Activity 3.2.2: Mainstreaming Climate Resilient Agriculture and Water Management across All Policy Areas.	Gender mainstreaming in provincial level interdepartmental workshops.	By end of Project year 4		Included in regular budget

	<p><i>Baseline: 0%</i> <i>Target: 20% of training time devoted to what kind of agriculture could improve women's lives and why.</i></p>			
	<p>Gender mainstreaming in district level meetings, intra- and inter-departmental meetings. <i>Baseline: 0%</i> <i>Target: 20% of meeting time devoted to what kind of agriculture could improve women's lives and why.</i></p>	By end of Project year 6		Included in regular budget
	<p>Gender mainstreaming in national meetings. <i>Baseline: 0%</i> <i>Target: 20% of meeting time devoted to what kind of agriculture could improve women's lives and why</i></p>	By end of Project 6		Included in regular budget
	<p>Gender mainstreaming in provincial training for policy makers on using data. <i>Baseline: 0%</i> <i>Target: 20% of training time devoted to what kind of data utilisation could improve women's lives and why.</i></p>	By end of Project 5		Included in regular budget
	<p>Gender mainstreaming in provincial multi-stakeholder committee meetings for policy drafting. <i>Baseline: 0%</i> <i>Target: women farmer's perspectives integrated in the main topics.</i></p>	By end of Project 5		Included in regular budget
	<p>Gender mainstreaming in background studies with policy briefs. <i>Baseline: No gender specialist engaged.</i> <i>Target: One gender specialist engaged for gender aspects of all three background studies.</i></p>	By end of Project 5		Included in regular budget
	<p>Gender mainstreaming in public discussion workshops on policy proposals. <i>Baseline: N/A</i> <i>Target: Suggestions and recommendations by women integrated into revised policy.</i></p>	By end of Project 4		Included in regular budget
	<p>Awareness raising on women's access to information.</p>	By end of Project 6		USD 30,000

	<i>Baseline 1: 0%</i> <i>Target1: 100% attendance of invited trainees</i> <i>Baseline 2: 0%</i> <i>Target 2: 50% of male participants show change in gender perception through before and after questionnaire.</i>			
	Gender mainstreaming in annual climate forum <i>Baseline: 0%</i> <i>Target: 20% of forum time devoted to what kind of management could improve women's lives and why.</i>	By end of Project 5		Included in regular budget
	Gender mainstreaming in climate change adaptation study <i>Baseline: 0%</i> <i>Target: a gender specialist engaged for gender aspects of study.</i>	By end of Project 6		Included in regular budget
Activity 3.3.1: Develop a searchable online database (and associated application and map) of locally available financial and value chain services to support adoption and sustained use of CRA and OFWM practices.	Proportion of female technicians among technical positions proposed, including training. <i>Baseline: 0%</i> <i>Target: 20%</i>	By end Project year 6	FAO (as Executing Entity), led by: Gender and Nutrition Specialists.	Included in regular budget
Activity 3.3.2: Support financial service providers to access and apply climate information and knowledge of CRA and OFWM to inform credit and insurance products.	Gender mainstreaming in training organised for financial-risk evaluation officers. <i>Baseline 1: 0%</i> <i>Target1: 100 % attendance of invited participants</i> <i>Baseline 2: 0%</i> <i>Target 2: 30% of training time devoted to what kind of financial services could improve women's lives and why.</i> <i>Baseline 3: 0%</i> <i>Target 3: 50% of male participants show change in gender perception through before and after questionnaire.</i>	By end of Project year 5		Included in regular budget
Activity 3.3.3: Train and support local companies, young people and women to deliver services to farmers to facilitate adaptation to climate change.	Gender mainstreaming in national training organised on financial-services. <i>Baseline: 0%</i>	By end Project year 6		Included in regular budget

	<i>Target: 20% of training time devoted to what kind of service could improve women's lives and why.</i>			
	Gender mainstreaming in awareness raising workshops on adaptation-services for managers. <i>Baseline: 0%</i> <i>Target: 30% of training time devoted to what kind of service could improve women's lives and why</i>	By end Project year 5		Included in regular budget
	Gender mainstreaming in training of company staff on use of Portal developed by project. <i>Baseline: 0%</i> <i>Target: 30% of training time devoted to what kind of Portal use could improve women's lives and why.</i>	By end Project year 5		Included in regular budget
	Gender mainstreaming in training for Farmer Experts. <i>Baseline: 0%</i> <i>Target: 30% of training time devoted to what kind of agriculture could improve women's lives and why</i>	By end Project year 5		Included in regular budget
	Number of female youth (age 15-30) trained on assistance related to e-agriculture services <i>Baseline: 0</i> <i>Target: 200 per year through Project years 2-6</i>	By end of each Project years 2-6		USD 50 000 (including expenses for male chaperons)
			Total Budget	USD 8 595 987 + regular budget