Food and Agriculture Organization
of the United Nations

Pakistan

Environmental and Social Management Framework

Transforming the Indus Basin with Climate Resilient Agriculture and Water Management

PREFACE

This Environmental and Social Management Framework (ESMF) for the Government of Pakistan will be applied to all activities financed by the Green Climate Fund (GCF) for technical and/or financial support for the project, "Transforming the Indus Basin with Climate Resilient Agriculture and Water Management".

The Project Management Unit (PMU) of the project, hosted within the FAO Islamabad Office at the request of the Nationally Designated Authority (NDA), is responsible for overall coordination of the project activities, with safeguards led by the Lead Safeguards Specialist (based in the Provincial Project Implementation Unit (PPIU) in Multan, Punjab). The respective PPIUs and District Implementation Units (DIUs) are responsible for day-to-day implementation of specific subcomponents and for ensuring compliance with the ESMF, Gender Action Plan, and related safeguard documents, including keeping proper documentation in the project file for possible review by the GCF.

This document is considered a living document and could be modified and changed in line with the changing situation or scope of the activities. Close consultation with the GCF and clearance of the revised ESMF will be necessary.

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ABBREVIATIONS

ACRONYM	MEANING
ACWA	Agri-Climate Water Information Portal
ASIS	Agricultural Stress Index System
AWPB	Annual work plan and budget
CBFS	Climate and Business Farmer Schools
CPIU	Central Project Implementation Unit
DFID	Department for International Development
DOI	Department of Irrigation
EE	Executing Entity
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Safeguards
ET	Evapotranspiration
FAO	Food and Agriculture Organization of the United Nations
FFS	Farmer Field Schools
GCISC	Global Change Impact Studies Centre
GIEWS	Global Information Early Warning System
HHP	Highly Hazardous Pesticides
ICT	Information Communication Technologies
ILO	International Labour Organization
IPR	Indigenous Peoples' Rights
IRSA	Indus River System Authority
IT	Information Technologies
IWMI	International Water Management Institute
LOA	Letters of Agreement
MOCC	Ministry of Climate Change
NDA	National Designated Authority
NGO	Non-Governmental Organization
OFWM	On Farm Water Management
PCAIS	Pakistan Climate Agricultural Information System
PCRWR	Pakistan Council of Research in Water Resources
PIU	Project Implementation Unit
PMD	Pakistan Meteorological Department
SMART	Strengthening Markets for Agriculture and Rural Transformation
SWSIP	Sindh Water Sector Improvement Project
UNWomen	UN Women
USD	United States Dollars
WOS	Women's Open Schools

EXECUTIVE SUMMARY

1. Modeling of climate change scenarios for Pakistan show 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 future livelihoods of farmers and to the Pakistani agricultural sector overall by 2050. 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 stated 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 in adaptation. To do this the project will develop the country's capacity to get and use the information it needs to cope with the impact 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, it will create a wider enabling environment for continuous adaptation and expanded uptake of climate-resilient approaches (Component 3). The project will be implemented in 8 districts in Punjab and Sindh Provinces over a 6-year period at a total cost of USD 49.7 million. The Ministry for 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 in training and other services to agricultural producers. About 1.3 million rural people will be direct project beneficiaries. The project will have an economic rate of return of about 15.6% and costs per beneficiary of about USD 38. At the request of Pakistan's National Designated Authority, the Ministry of Climate Change, FAO will function as both the Accredited Entity and the Executing Entity for the project.

2. As the finer details of proposed activities (e.g. specific location, etc.) under the project have not yet been determined, a framework approach has been adopted. Under this approach, the present Environmental and Social Management Framework (ESMF) has been prepared by FAO to (i) identify all the potential but generic negative environmental and social impacts; (ii) propose mitigation measures; (iii) provide basic screening criteria for selecting sub-activities; (iv) list the type of instruments to be developed for individual sub-activities during implementation; and (v) provide institutional arrangements, grievance redress mechanisms (GRM) and monitoring, reporting and documentation measures for environmental and social safeguards compliance. The ESMF covers all physical works and activities as well as feasibility and other studies to be carried out under the project.

3. 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 an Agri-Climate Water Information Portal (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.

4. The Project has been classified as moderate risk (Category "B") and it is expected that the project activities will trigger the following Environmental and Social Safeguard Policies: ESS3, ESS5, ESS7, and ESS9. 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. To comply with these policies, given that not all the sub-activities can be identified during appraisal, specific safeguard instruments have been identified as follows:

Safeguard Policies	Triggered	Safeguard Instruments & Mitigation Measures
ESS 1 – Natural Resources Management	NO	Non-Eligible activities (Annex 1)
ESS2 – Biodiversity, Ecosystems, and Natural Habitats	NO	Non-Eligible activities (Annex 1)
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	NO	Non-Eligible activities (Annex 1)
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)). A tentative Pest Management Plan (PMP) is provided in Annex 3.
ESS6 – Involuntary Resettlement and Displacement	NO	Non-Eligible activities (Annex 1)
ESS7 – Decent Work	YES	ESMF/ESMP; Training for farmers and sensitization sessions for government will be held on decent rural employment, age-appropriate works, and Occupational Health and Safety, and the project will utilize the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries, and Forests
ESS8 – Gender Equality	NO	The Project already 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 (Annex 4)

5. Potential negative impacts are forecast only for the early implementation stages, are minor, and can be mitigated. 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 also 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 that there is a potential risk of changes in tenant relationships with landlords due 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 (VGGT). Sensitization 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 instance, waste 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, localized, and temporary.

1. INTRODUCTION

6. **Pakistan ranks 7th on the 2018 Global Long-Term Climate Risk Index published by German Watch and is expected to be severely impacted by the negative effects of climate change.** Much of the country's vulnerability is linked to its dominant arid to semi-arid climate, high dependency on a single river system, and snow and glacial meltwater for the supply of water for agriculture. Agriculture accounts for roughly 90 percent of total water withdrawal, 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 these circumstances, the nexus between water and agriculture is hugely important for Pakistan as a country.

7. **About 94 percent of the agriculture in Pakistan is irrigated agriculture, and about 90 percent of the country's agriculture 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 hectares. 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, monsoonal rainfall, melting of seasonal snowfall and glacial ice, with the release of water from snowmelt and the more than 5 000 glaciers providing 60 – 75 percent of the total flow[1]. 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 expanding irrigation command area, the arid nature of the region (with average precipitation around 150 – 250 mm/year), and the snow and ice meltwater-dominated water source define both the Indus Basin's exposure and sensitivity to climate change.

8. **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. Temperatures in the basin have already increased 0.5 C over the past 30-years, and are projected to increase a further 1.4 – 3.7 C by 2060, 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. Rainfall pattern will become more unpredictable. 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 for this project. Seven of these impacts can be considered to be especially important determinant factors, and are summarized below:

    (a) Change in the portion of precipitation occurring as snow versus rainfall: the portion of precipitation falling as rain is expected to increase from 58% (1971-2000) to between 66% and 75% in 2071-2100.[2] This shift is particularly concerning given the basin's reliance on snowmelt for the slow replenishment of river flow during the agricultural season.

    (b) Change in snow and glacial melting pattern, which will start earlier and continue later each year, augmenting streamflow in the early spring and autumn; increasing, but out of sync with the agricultural calendar.

    (c) Significant reduction of glacial extent (2071-2100), which will reduce the contribution of glacial melt and therefore total water availability in the basin.

    (d) Temporal and spatial changes in water availability within the basin, with the upstream sub-basins of Hunza, Shigar and Shyok increasing, and lower altitude sub-basins decreasing, with more acute decreases from spring through to the mid-summer.[3]

[1] *Parry et al, 2017; Yu et al, 2013.*
[2] *Palazzi et al, 2014; Lutz et al, 2016*
[3] *Ali et al., 2015; Lutz et al., 2016*

(e) Increase of basin-wide crop water requirements due to increased evapotranspiration. 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% by 2025 and 12-15% by 2050.[4] This translates into increased demand of more than 10 Billion Cubic Meter (BCM) of additional water required to sustain crops by 2050.

(f) Decline in crop yields from between 6-12% for cereal crops, and 5-13% for vegetables and tropical fruits by 2050, and will begin crossing critical thresholds in crop tolerance to high temperatures. Precarious conditions in Pakistan's rural areas will be further undermined by extreme weather events such as floods[5] and droughts[6], as these are expected to increase.

(g) 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, though FAO's analysis of historical weather data suggests a higher frequency of such events.

9. **Yields of the four major crops in the Indus Basin - cotton, wheat, rice and sugarcane, will be significantly impacted.** If yields of those four crops decline by just 4% over the next 20 years the most vulnerable farmers in the Basin would lose roughly USD 500 million in income over the same period. Such declines across the Basin as a whole would lead to a decline in the importance of the agriculture sector and its contribution to the economy as a whole, lowering GDP and making the country more reliant on agriculture imports.

10. **The threat of climate change to agriculture and the Indus Basin would likely also have serious socio-economic implications for the 158 million people** that belong to households in the Indus Basin. Approximately 43 percent of farmers are smallholders, predominantly tenant farmers (around 70% are women), 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 access to information, new technologies, finance and government services through which they can undertake adaptive actions. It is also expected that repeated shocks will aggravate existing social inequalities and the access to resources that will, in turn, intensify social frictions leading to instability, conflict, displacement of people and changes in migration patterns.

11. **In recognition of the climate change threats to the Pakistani economy, the Pakistan Framework for Economic Growth was developed in 2011** by the Ministry of Planning, Development and Reforms and explicitly proposes to 'climate-proof economic growth from the impacts of climate change, paying particular attention to the agricultural, water and energy sectors'. In line with this intent, in 2012 the government issued a National Climate Change Policy (NCCP) with an emphasis on agricultural development. At the 22nd Session of the Conference of the Parties (COP-22) 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.

12. **In response to these climate change threats several measures need to be taken in order to sustain agricultural production and enable sustainable growth** of the sector that is needed to reduce poverty, increase resilience and achieve food security. First, and most importantly, in order for Pakistan to

[4] *Amir and Habib, 2015*

[5] *Economic losses from floods in 2010 were estimated to be higher than USD 10 billion (ADB and World Bank, 2010), with more than 20 million people affected. The country also recorded floods in 2003, 2005, 2008, 2011 and 2013.*

[6] *Two droughts that occurred between 1999-2000 and 2000-2001 stretched existing systems to the limits of their coping abilities and have placed the country on the brink of a catastrophe. In areas where drought has overstressed Pakistan's rangelands, human and livestock populations are shifting away from their original locations and moving towards riverine areas and mountainous regions.*

rationally manage its water resources it must expand and strengthen the capacity to continually measure, monitor and model its hydrologic systems. The country's agriculture is extremely dependent on surface water systems predominantly fed by snow/glacial sources. These systems are in turn highly vulnerability 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 carryout long-term water use planning affecting the future of the entire nation. The principal water users within the Indus basin must also begin to shift towards the use of water conserving technologies and practices, as they also adopt crop varieties capable of withstanding higher temperature regimes. To support this transition, climate change awareness among the various stakeholders within the agricultural sector must be improved, and information needed to make important decisions must become readily available in appropriate forms.

13. **However, 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. A barrier is posed by the fact that responsibilities for hydrologic information collection, monitoring and communication are spread across different ministries, water management entities, and research institutions. The lack of coordination across institutions hampers the effective and efficient management of the country's most critical natural resource. Agricultural water consumption at the farm level, is difficult to regulate due to outdated policies and the limited integration of water monitoring efforts and subsequent enforcement. Another barrier is posed by the fact that, at the provincial level, agricultural extension is lacking and the understanding of climate change threats and responsive practices and technologies is low. Extension service providers lack policy-to-practice guidelines for mainstreaming and disseminating climate change information that they do have.

14. **Private sector operators, including input suppliers, traders and financial service providers are increasingly aware of growing threats and constraints and show signs that they are able to respond.** But 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 they 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 the light of the climate information that is available to them in terms of direct experience or from other stakeholders.

15. **Transforming the Indus Basin with Climate Resilient Agriculture and Water Management** (hereafter referred to as "The Project") has the following project objective: to increase the resilience to climate change among the most vulnerable farmers in the Indus Basin and strengthen the government's capacity to plan and support farming communities against future climate changes. This will be realized though achievement of the following major project outcomes: (i) strengthened institutional and regulatory systems for climate-responsive planning and development; (ii) increased generation and use of climate information in decision making; (iii) strengthened adaptive capacity and reduced exposure to climate threats on-farm; (iv) improved participation and coordination among key stakeholders to support farmers' adoptions against climate change; and (v) strengthened awareness of climate change threats and risk reduction processes.[7]

16. The project would focus on: (i) geographical areas within the Indus Basin that are most vulnerable to climate change; (ii) the farmers and core farming systems (e.g. cotton, sugarcane, wheat, rice) within those areas; (iii) promotion of climate resilient agricultural (CRA) technologies and water management to enhance food and nutritional security; and (iv) building on and developing synergies between government departments, public and private stakeholders, and other government/donor programs to

[7] *These outcomes are directly aligned with the core adaptation outcomes 5.0, 6.0, 7.0 and 8.0 that GCF is seeking from the use of its resources, as shown in its Performance Measurement Framework, GCF/B.08/45.*

facilitate an environment supportive to the uptake of CRA and water management. The Project has an estimated budget of USD 49.7 million, including government co-financing of USD 12.7 million and GCF financing of USD 37.0 million. It will be implemented within five districts in the province of Punjab (Dera Gazi Khan, Muzaffargharh, Multan, Lodhran, and Khanewal) and three districts in the province of Sindh (Sanghar, Badin, and Umerkot). The Project implementation schedule is within six years (2019-2024). The Project is comprised of four components:

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

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

Component 3: Creating an Enabling Environment for Continued Transformation.

Component 4: Project Management

17. **The Project has been classified as a moderate risk (Category B) by the Food and Agriculture Organization of the United Nations (FAO) based on the FAO's safeguards policy.** The project's risk assessment was conducted using FAO's Environmental and Social Screening Form (see Annex 5), which identifies areas of risk and, based on the risk screening responses, resulted in the moderate-risk categorization. Due diligence for addressing identified risks is carried out through the Environmental and Social Management Framework (ESMF, this document) which guides project implementing agencies and stakeholders on environmental and social assessment, mitigation of impacts, and monitoring and reporting procedures during project implementation. The ESMF will be adopted by NDA, Executing Entity, and any sub-contractors (e.g. those working through Letters of Agreement (LOA)). LOAs with any subcontractors will include reference to this ESMF and the need to abide by the protocols and actions listed herein. Partners involved under LOAs will be provided with required Environmental and Social Safeguards (ESS) training prior to undertaking project-related activities.

18. **The overall objective of the ESMF is to ensure compliance to environmental and social safeguards.** It will guide the implementing agencies including FAO and any subcontracted entities to adequately screen and address environmental and social impacts of sub-activities[8], thereby determining the appropriate environmental and social risk category. The ESMF sets out the obligations of the Executing Entity (EE) and host country in identifying and addressing environmental and social risks and impacts that may require particular attention. The Environmental and Social Safeguard (ESS) standards establish objectives and requirements to avoid, minimize, reduce and mitigate risks and impacts. Specifically, the objectives of this ESMF are to:
    - Assess the potential environmental and social impacts of the proposed project, whether positive or negative, and propose mitigation measures which will effectively address these impacts;
    - Establish clear procedures for the environmental and social planning, review, approval, and implementation of sub-activities (i.e. activities grouped together based on similarity and/or geographical proximity) to be financed under the project;
    - Specify appropriate roles and responsibilities, and outline the necessary reporting procedures, for managing and monitoring environmental and social concerns related to sub-activities;
    - Consider different alternatives, options, and relevant mitigation measures during project preparation and implementation;
    - Determine the training, capacity building and technical assistance needed to successfully implement the provisions of the ESMF;
    - Address mechanisms for public consultation and disclosure of project documents as well as redress of possible grievances; and

[8] *"Sub-activity" refers to activities that have been grouped together for screening purposes due to either similarity of content (i.e. similar activities) of geographical proximity.*

- Establish the project funding required to implement the ESMF requirements and to provide practical resources for implementing the ESMF.

2. PROJECT DESCRIPTION

19. This project is designed to increase the resilience to climate change of agricultural producers in Pakistan's Indus River Basin and it will directly benefit an estimated 1.34 million rural people in 200 000 rural households. The project will achieve this by putting state of the art technologies in the hands of Pakistan's top-level institutions responsible for monitoring weather and climate change, who will be brought together in a consortium to pool data, information and knowledge resources. It will institutionalize routine processes to analyze and communicate the knowledge acquired through the use of those technologies to authorities responsible for agriculture and water management in the Indus River Basin. It will give 200 000 rural households in eight of the most vulnerable districts of the Indus River Basin provinces of Punjab and Sindh field level on-farm training in how to adapt their agricultural practices to changing climate. The project will make the knowledge conveyed through such training available to an additional 10 million people through information and communications technology applications designed specifically to reach and meet the needs of the most vulnerable producers. Through partnerships with the private sector agri-business and financial service providers with networks in the two provinces, the project will improve their delivery of private sector services and help them to tailor their credit and insurance products to respond to the challenges faced by vulnerable farmers due to climate change factors. The economic internal rate of return for the project is estimated at 15.6% with costs per beneficiary estimated at approximately USD 37.

20. **Project Costs and Financing**: The proposed Project would have a total cost of USD 47.69 million and would be supported by the GCF through a grant of approximately USD 34.99 million. Government co-financing will amount to approximately USD 12.7 million. The table below shows the total project costs, indicated GCF grant financing, and identified government co-financing.

Table 1: Project Cost and Financing (USD million)

Project Components	Project Cost	GCF Financing	Punjab Financing	Sindh Financing
1. Enhancing Information Services for Climate Change Adaptation in the Water and Agriculture Sectors	14.77	13.52	0.71	0.53
2. Building on-Farm Resilience to Climate Change	24.99	14.95	6.65	3.39
3. Creating an Enabling Environment for Continued Transformation	5.77	5.22	0.2	0.34
4. Project Management	2.16	1.30	0.43	0.43
Total	47.69	34.99	8.0	4.7

2.1 Project Objective

21. **The Project Objective** is to increase the resilience to climate change among the most vulnerable farmers in the Indus Basin and to strengthen the government's capacity to plan and support farming communities against future climate changes.

2.2 Project Components

22. The Project is comprised of the following four components: (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; and (4) Project Management.

23. **Component 1: Enhancing Information Services for Climate Change Adaptation in the Water and Agriculture Sectors**. The purpose of this component is to develop national capacity to use state-of-the-art technology that will allow Pakistan to accurately monitor, analyze, disseminate and utilize the data and

information needed to manage adaptation to climate change in the agricultural sector. 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 the 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 overall e-agriculture approach of the project to put them at the service of adaptation to climate change in natural resource management. The component will be comprised of three sub-components.

24. **(1.1): Developing a Water Accounting System.** 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 compliant to international standards and based on satellite technology and ground measurement. Activities include:

- 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 entire Indus Basin carried out in collaboration with the Ministry of Water Resources and Indus River System Authority, (IRSA). Four water accounting assessments will be undertaken, two in each province, at province and at canal command level using the methodology defined as a part of FAO's work financed through a TCP project. In Punjab, the Department of Irrigation, and in Sindh the Department of Irrigation and the Sindh Irrigation and Drainage Authority will carry out provincial water accounting at lower resolution (250-500 m images) with support from the Pakistan Council for Research in Water Resources, (PCRWR). This will include installation of acoustic water level sensors in two canal commands to assess discharges entering canals and connected with operational telemetry systems displaying data in IRSA and in 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 Portal (ACWA), described below in sub-component 1.3.

- 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 canal supply and aquifer management a set of risk-based assessments of aquifer vulnerability to depletion and salinization in the project area based on hydro-geological mapping, improved monitoring and modelling of the anticipated impacts of climate change. The project will install twenty automatic groundwater level sensors in four districts, two per provinces, connected with already operational telemetry system managed and operated by PCRWR and IRSA. It will also train thirty national experts in concerned institutions 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/ground water assessments will be used to develop local aquifer management plans in the four districts of Khanewal and Dera Gazi Khan in Punjab and Umer Kot and Sanghar for Sindh where assessments will have been carried out. The project will 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. 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.

25. **(1.2): Establishing an Evapotranspiration (ET) based Water Management System**. The outcome of this sub-component is that the Punjab Irrigation Department, Sindh Irrigation Department, and the Sindh Irrigation and Drainage Authority will have the capacity to implement and use a robust high-resolution

evapotranspiration (ET)-based system for monitoring of actual water consumption in agriculture. This will permit these departments to rationalize 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 support generation of actual ET information at Basin scale using low resolution remote sensing images (250m to 1000m). The project will further roll use of higher resolution sensing images (30 or 10 meters) of actual ET in two selected canal command areas, one in each province, . This activity will entail data collection, calibration of software used for ET assessment, and installation of some hardware, particularly at canal command level, to improve accuracy of data used to calibrate software and validate results. The model will use freely available satellite imagery from NASA, ESA or other space agencies. It will also use data from flux instruments and automatic weather stations to be installed by the project in the command areas of selected canals in the two provinces.

- 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 system is fully validated, the project will finance technical assistance and training to the Department of Irrigation in Punjab, the Department of Irrigation in Sindh and the Sindh Irrigation Drainage Authority to collaborate 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. ET data will be used to: (i) determine near real-time crop water requirements; (ii) plan crop pattern adjustments for increasing water productivity and efficiency; (iii) optimize 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, but also especially to upgrade the existing early warning systems for floods and droughts, the project will finance the installation of six new agrometeorological stations and upgrade two existing weather stations to serve the project districts and improve the currently scant coverage for the Basin overall. These agrometeorological stations will be connected to the already existing network of weather and hydro-met stations in the country, mostly operated by the Pakistan Meteorological Department (PMD). The information generated by these stations will be shared with stakeholders working on early warning, such as PMD, and irrigation advisory services. The system will be linked to FAO's Global Information Early Warning System and will facilitate the use of the associated use Agricultural Stress Index System developed by FAO.

26. (1.3): Improving Availability and Use of Information Services. 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 (policy-makers, irrigation scheme managers, farmers, etc.).

- 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 tools that FAO will bring will be especially useful for professionals working in Pakistan on climate, agriculture and water issues will include: (i) Agriculture Stress Index System, (ASIS) an earth-based observation system designed to enhance early warning systems with global near-real-time

information on developing agricultural drought; (ii) Collect Earth and Collect Mobile a technology that can be used to produce the assessment of land use, changes of land use over time through the monitoring of sample plots; (iii) Earth Map (EM) an FAO tool created with Google that can generate spatially-explicit climate risk assessments based on past weather and satellite observation data using environmental and climate parameters present in the Google Earth Engine platform combined with other data; and (iv) Modelling System for Agriculture Impacts of Climate Change (MOSAICC) an interdisciplinary modelling system developed by FAO to allow 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.

- 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 Agri-Climate-Water Information Portal (ACWA Portal). It will provide a gateway to access to the abovementioned technologies, and display data and results prepared by the project through a user-friendly dashboard. The portal also will 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 the capacity to analyze 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 data collection and curation. This will take the form of a Consortium of national and provincial level stakeholders. Training activities and other knowledge sharing events 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.

27. Component 2 – Building On-Farm Resilience to Climate Change. The purpose of this component is to build farmers' on-farm resilience to climate change by supporting farmers to acquire skills, adopt technologies and engage with stakeholders that provide services relevant to climate change adaptation on agriculture. The component is aligned with GCF outcome A 7.0 '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 the experiences and lessons learned from on-going activities and previous FAO and government initiatives in Pakistan and the region.

28. This component will have an area focus and be directed toward the five districts in Punjab and three districts in Sindh that comprise the project area: Khanewal, Lodhran, Multan, Muzaffargarh and Dera Gazi Khan in Punjab and Badin, Sanghar and Umer Kot in Sindh. It will utilize the full range of both innovative and traditional outreach extension mechanisms to do build on farm resilience. These will include experience-based face-to-face extension approaches including demonstration plots, field schools, and field days that allow farmers to see, to touch, and to experiment as methods for acquiring the adaptive capacity required to be resilient. 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 organizations, non-governmental organizations and private sector stakeholders working in the project area to implement extension activities using project-developed curriculum. This approach will allow the project to tap the expertise, existing networks and infrastructure of the partners. In addition, a number of *e-agriculture* activities 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 subcomponents:

29. (2.1): Improving Practices for Climate Resilience. The outcome of this sub-component will be widespread availability of up-to-date information and learning materials for climate resilience agriculture (CRA) and on-farm water management (OFWM) practices that will increase resilience amongst producers in the Indus Basin. These will be for several different media and uses by project staff, implementation partners, other stakeholders, and producers. Tested practices 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. 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. These will also be combined with other practices to improve resilience and water use efficiency such as heat, drought and salt tolerant varieties, laser leveling, mulching, and integrated pest management (IPM), among others. Details on the compendium of practices that have been identified during project design are found in Appendix 7 Climate Resilient Agricultural Practices of the Feasibility Study, found in Section: I Supporting Documents for Funding Proposal.

- 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, for a final review and refining of the identified practices for the specific sites and agro-ecosystems where extension sites will be established. Subsequently, in collaboration with provincial staff of the Department of Agriculture and the Department of Irrigation, the project will develop training curricula and compile, revise and update materials, in parallel to the establishment of demonstration sites, which will also be used as the training sites for the project training staff. 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 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 material 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 technical committee 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 to display the key technologies on CRA and OFWM to public. During the first year, the project will develop around 16 demonstration plots -- two per districts: one for CBFS; the other for WOS. In order to sustain the demonstration plots and ensure the circumstances are close to real farming conditions, the project will prepare and maintain them with farmers. The demonstration plots will be used for training of extension workers. 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. The project will also develop an agreement with one or more research institutions to carry out adaptive research at the demonstration plots so that 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 as well as data and analysis gathered through adaptive research will be made available through the ACWA Portal. 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 the Pakistan Climate Agricultural Information System (PCAIS),[9] which will constitute a unit of the ACWA.

30. (2.2): Training of Trainers on CRA and OFWM. The outcome of this sub-component will be skilled professionals working in the project area who 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. These facilitators will conduct Training of Trainers (ToT) to develop capacity of about 1 600 extension workers, or 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. The core facilitator team at each district will be composed of: (i) two Climate Business Field School (CBFS) facilitators; (ii) two Women Open School (WOS) facilitators; and (iii) two Partnership Facilitators. They 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 five selected practices as well as facilitation skills, farmer training curriculum, 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.

- 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 organizations (entities) that are interested in collaborating with the project and using CRA and OFWM practices in their own extension activities. Such organizations 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 extension workers who will serve as the ToT facilitators. The extension workers from partner organizations 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, and the WWF Better Cotton Initiative specifically for cotton.

31. (2.3): Development of Farmers' Capacity to Transform Agriculture Practices with CRA and OFWM. The outcome of this sub-component will be that farmers are skilled in using CRA and OFWM practices suited to their agro-ecosystems. The project will develop farmers' coping and adaptation capacity through: (i) CBFSs; (ii) WOSs; and (iii) Farmer training by Partner Organizations (POs). A total of 101 600 farmers will directly benefit from these structured extension activities. In addition, around 150 000 farmers will be exposed to these practices through occasional visits to these CBFS and WOS sites and demonstration plots through field days. A total of about 250 000 farmers, of whom at least 48 000 are women, will benefit from these three capacity building activities. Trained farmers will be included in partner networks for

[9] *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.*

dissemination of agriculture advisory services and early warning system alerts through mobile phone network. 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 for 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 providing services that enable adaptation and 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 supervision of project staff. Approximately, 15,600 farmers will be trained through the Schools.

- 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 Women Open Schools 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 organizations to develop home gardening among participating women. Using this approach the project will directly train approximately 40 000 women in practices relevant to adaptation in their agricultural activities, with a strong focus on improving resilience by raising income and family health throughs animal husbandry, vegetable production, fruit trees. The project will support one home gardens per WOS, providing initial inputs including seeds, equipment and small livestock such as chickens and goats. In addition, the project will use awareness raising campaign under Component 3 to promote home gardening. Approximately, additional 24 000 women will benefit from visiting and eventually adopting home gardening.

- 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 partner extension workers who are trained by the project's partnership facilitators. This activity is open to any organizations, including government extension department, NGOs, RSPs, private sector companies, universities, research institutions, Farmer Organizations that wish to form a partnership with the project. Partners will be given training on CRA and OFWM, demonstration establishment costs, and field days costs. Partners will be expected to conduct regular, e.g. weekly, training sessions on their plots. Prior to engaging in activities, the project and partner organizations will sign an agreement outlining the curriculum to follow, training frequency, target numbers and reporting obligations. Extension activities by partner organizations will be monitored by Partnership Facilitators who will also play a role of backstopping. Approximately 62 000 producers 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. Information on the extension activities will be included in the mass media and mobile phone based campaigns under sub-components 3.1 as part of the projects' *e-agriculture* strategy. Through these channels, the project will reach out beyond the farmers following regular training and will invite farmers in the vicinity to visit the CBFS and WOS open days or to visit partner demonstration plots that are most relevant to their cropping system. It is estimated that another 150,000 farmers will be reached through such occasional visits.

32. Component 3 – Creating an Enabling Environment for Continued Transformation. 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. The component is aligned with GCF outcomes A 8.0 'Strengthened awareness of climate change threats and risk reduction process', and outcome A 5.0 'Strengthened institutional and regulatory systems for climate-responsive planning and development'. To create and enabling environment for producers to adapt to climate change, it will create awareness among policy makers, the private sector and the farming community. It will support evidenced-based policy making. And, it will support private and public service providers to offer the necessary services to farmers. It will be comprised of three subcomponents:

33. (3.1) Improving Information and Awareness Raising Campaigns. 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 expand the project outreach to all potentially interested producers in the Indus Basin and re-inforce the message for those farmers reached under component 2. This subcomponent will thus contribute directly to outcome A8.0 Strengthened awareness of climate threats and risk reduction processes.

34. To be effective in awareness campaign, the project will work with mobile phone network companies to identify the right segment of the population in the target districts and combine with radio programme. For example, the project will send SMS and/or voice messages in the target areas to announce the project radio program. The radio programme, which can provide substantial information, will make it live and known the telephone number that the farmers can get more information directly from the project. Those farmers who responded 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. 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 and SMS and voice and audio dramas on key themes. These will be coupled with SMS and voice messages for knowledge retention. Based on gamification concept, the content of the radio and mobile phone campaigns will be coupled with interactive and incentivized 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 will send SMS and/or voice messages in the target areas 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 for face-to-face sessions. SMS and/or voice messages, as well as radio programme are also used to lead farmers to other social medias 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 display 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 flex 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 mobilized, 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.

35. **(3.2) Supporting Policy Implementation by Federal and Provincial Governments**. This sub-component will support policy makers to use projects results and data contained in the Agri-Climate Water (ACWA) portal for evidence-based decision making to support the transition of the agriculture sector in the Indus basin to become more climate resilient. This sub-component will also facilitate the strengthening of institutional arrangements needed to: (a) upscale beyond the project areas; (b) mainstream climate change resilience across relevant policies; and (c) sustain project benefits in the long term. This sub-component will contribute to the realization of GCF outcomes A 5.0 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 Department of Agriculture and Department of Irrigation in each province, including support to them both in matters of joint responsibilities, knowledge sharing, work planning and harmonizing 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 harmonization 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 province Departments of Agriculture. The project will connect the relevant government departments with organizations 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.

  The project will support evidence-based policymaking for climate change adaptation and assist policy makers to use the elements of the Agri-Climate Water Information Portal developed under Component 1. The project will include activities to share analytical findings with fellow projects working on climate issues such as the Scaling-up of Glacial Lake Outburst Flood Risk Reduction, Phase II project financed by GCF and with the World Bank and WWF projects present in Sindh and

Punjab. 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. The project will support the various line ministries in integrating climate risks and impacts into investment design and implementation in a manner that is responsive to community needs and government priorities. Activities will also include; (i) development of 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; (ii) establishment of an annual climate policy forum, carefully timed to feed directly into existing budgeting and/or reform processes; and (iii) alignment with other development partners to leverage their resources towards climate resilient agriculture and water governance, such as the World Bank.

36. (3.3) Development of Services that Enable Farmers to Adopt Climate Resilient Practices. 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 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 target districts and to avoid providing services itself. The project will undertake a mapping of financial and value-chain services per district and at tehsil/taluka level and even specific at Union Council level for those locations where Component 2 is providing extension services. 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 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 adaption and risk management strategy.

- 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. 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. This will help financial institutions to better evaluate risk and, possibly to 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.

- 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 fostering development of new production related services to facilitate adaptation. In this connection the project 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 train rural youth to become handymen who offer services for climate resilient land preparation and irrigation practices. Similarly, farm management consultants will be trained on climate resilient practices. The project will establish a database of these handymen and consultants and link it with other materials and outputs to the ACWA Portal.

37. Project Management. The purpose of this support is to ensure the smooth implementation of all of the investments and activities that will be undertaken in Components 1-3, described above. The outcome will be that funds will have been used effectively and efficiently to have produced the outputs and outcomes for which they were intended. To achieve this, a central Project Management Unit will be set up in Islamabad. Provincial Project Implementation Units will be set up in each Province and District Project Implementation Units in each District. The main activities of these units will include: planning and budgeting; procurement; monitoring and evaluation 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 Semi-Annual and Annual Performance Reports, including financial management reports that FAO will provide to GCF by FAO as the AE for the project. The PMU procurement activities will include procurement of staff, consultancy services, equipment and materials required for project implementation. It will also include procurement of any goods and services to be provided to directly to beneficiaries by the project. The PMU will set up and implement a project monitoring and evaluation system to monitor and evaluate planned outputs, outcomes and objectives based on the project's Logic Framework. A computerized Management Information System (MIS) will be created under this component for use by the PMU, PIUs, and DIUs to track and compile information on project implementation, physical and financial progress, and outcomes.

3. ENVIRONMENTAL AND SOCIAL BASELINE

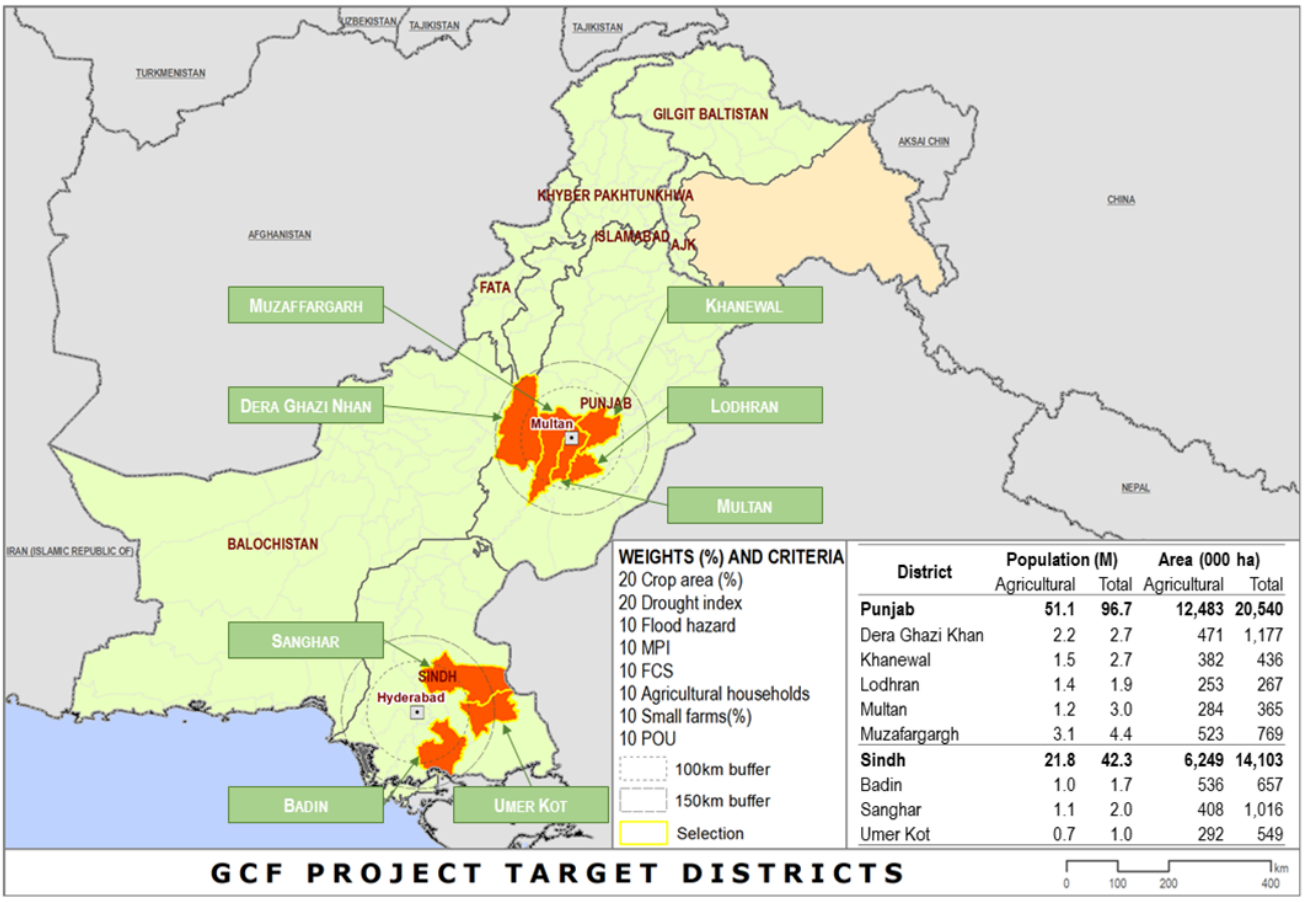
38. Information from this baseline draws heavily from (and is consistent with) the appendices of the Full Project Funding Proposal. The appendices should be consulted if additional details are required for any of the following: (i) overview of major crops; (ii) climate change in the Indus Basin; (iii) water availability, uses and challenges; (iv) climate impacts on the agriculture sector; (v) geospatial analysis for target district selection; (vi) socio-economic conditions; (vii) project design considerations; (viii) policy alignment; and (ix) greenhouse gas appraisal. Also available are appendices with detailed information for components (e.g. details are available on evapotranspiration monitoring and management; development of national capacity to monitor, analyze and disseminate agriculture/climate/water data and information). For the purposes of the environmental and social baseline as it pertains to safeguards, only safeguard-relevant information has been included. Moreover, additional information is provided (when necessary) to cover aspects not already addressed within the appendices; specifically: information on (i) eco-regions; (ii) biodiversity and forests; (iii) natural habitats and protected areas; (iv) biosphere reserves; and (v) ethnic and religious minorities.

3.1 Geographical Location and Topography

39. Pakistan is divided into seven geographic areas, including the: (i) northern highlands; (ii) Indus River plain; (iii) Desert areas; (iv) Pothohar Plateau; (v) Balochistan Plateau; (vi) Salt Range; and (vii) Sistan Basin. In the north, northeast, and north-west of Pakistan there are three mountain ranges, namely the: Karakoram, Himalayas and Hindu Kush. The Himalayas stretch continuously for about 2500 km from east to west, bounded on the north-west by the Hindu Kush mountain range, and by the Karakoram to the north. All the rivers of Pakistan (i.e. Sindh, Ravi, Chenab, Jhelum, and Sutlej) originate from the Himalayas mountain range. Elevation extremes include the lowest point at sea level, and the highest point at 8611m (the summit of K2: Mount Godwin-Austen).

40. For the purposes of this project, five districts in Southern Punjab (Lodhran, Dera Ghazi Khan, Muzarffagarh, Multan, and Khanewal) and three districts in Southern Sindh (Badin, Sanghar, and Umerkot) have been selected based on climate vulnerability scoring. The project map can be seen in Figure 1. An overview of the total district area is provided in Table 2.

Figure 1. Map of Project Area (Based on Vulnerability Scoring)



District	Population (M)		Area (000 ha)	
	Agricultural	Total	Agricultural	Total
Punjab	**51.1**	**96.7**	**12,483**	**20,540**
Dera Ghazi Khan	2.2	2.7	471	1,177
Khanewal	1.5	2.7	382	436
Lodhran	1.4	1.9	253	267
Multan	1.2	3.0	284	365
Muzafargargh	3.1	4.4	523	769
Sindh	**21.8**	**42.3**	**6,249**	**14,103**
Badin	1.0	1.7	536	657
Sanghar	1.1	2.0	408	1,016
Umer Kot	0.7	1.0	292	549

Table 2: District Area and Population

PROVINCES AND DISTRICTS	AGRICULTURAL POPULATION (MILLIONS)	TOTAL POPULATION (MILLIONS)	TOTAL DISTRICT AREA (KM^2)
Punjab Total	**51.1**	**96.7**	**205,403**
Dera Ghazi Khan (rainfed)	2.2	2.7	11,766
Khanewal	1.5	2.7	4,356
Lodhran	1.4	1.9	2,666
Multan	1.2	3.0	3,648
Muzafargargh	3.1	4.4	7,688
Sindh Total	**21.8**	**42.3**	**141,029**
Badin	1.0	1.7	6,575
Sanghar	1.1	2.0	10,158
Umer Kot (rainfed)	0.7	1.0	5,490

41. The complete selection methodology and criteria for the project districts is explained in detail within appendix 5 of the full project funding proposal, *"Project Area"*. On the basis of the physical environment and geology, the proposed project area falls in the Indus Basin, which is briefly described below:

42. **The Indus Plain** forms the western extension of Indo-Gangetic Plain, and has been made up of the silt brought by the Indus and its numerous tributaries on the east (or "left") bank (i.e. Jhelum, Chenab, Ravi and Sutlej) and west (or "right") bank (i.e. Kabul, Kurram, Tochi). The Indus Plain has historically been known for its agricultural fertility and cultural development.

43. The left bank tributaries of the Indus River all meet at Panjnad and flow as one large stream for 75 km before joining the Indus just south of Mithankot. From there, the Indus flows almost alone up to the Arabian Sea without receiving any noticeable tributary. The average annual discharge of the Indus River is

92 million acre feet at Attock Khurd, and is much higher than the combined discharge of its tributaries. There is great fluctuation in seasonal discharge, especially during the hot summer and rainy season. The primary water source for the Indus River and almost all of its tributaries is the snow and glaciated areas of Himalayan, Karakuram and Hindukush mountain ranges.

44. On the basis of hydrology and land form, the Indus Plain can be divided into the upper and lower Indus Plains. The two plains are separated by a narrow corridor near Mithankot, where the Sulaiman range approaches the Indus River. The upper Indus Plain differs from the Lower Indus Plain primarily because the major tributaries (Jhelum, Chenab, Ravi, and Sutlej) of the Upper Indus divide the land surface into several interfluves or "doabs".

45. **Subdivisions of the Upper Indus Plain** include four interfluves, the Bahawalpur plain, and the Sulaiman piedmont. The major interfluves are as given below:

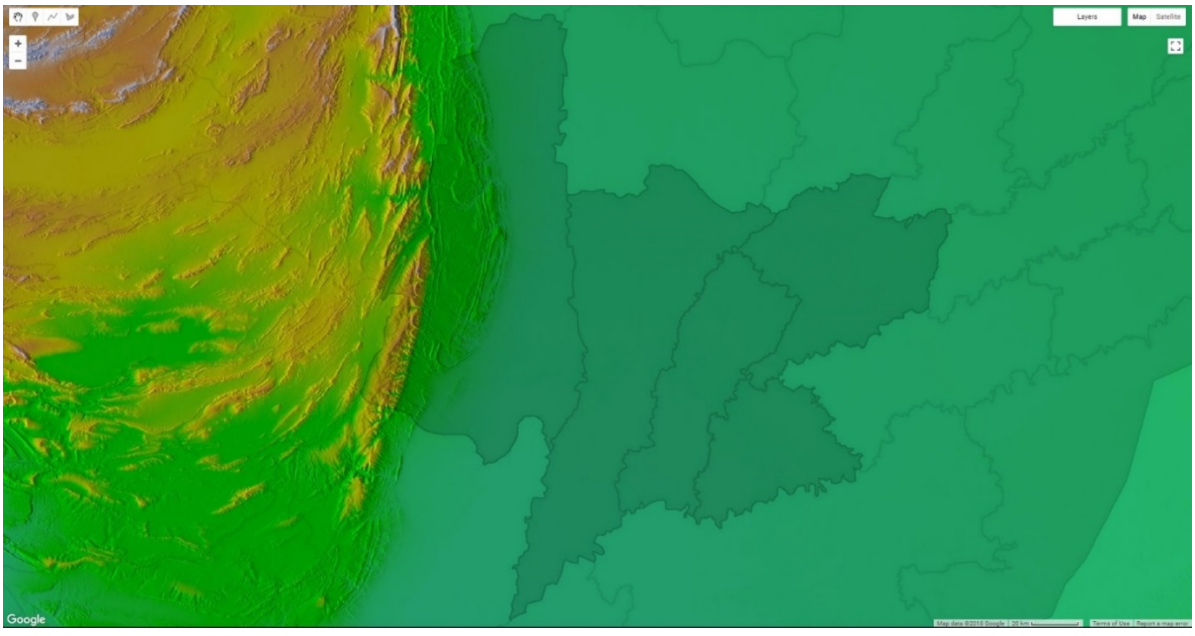
- **The Sindh Sagar Doab or Thal**, between Jhelum and Indus rivers;
- **The Chaj Doab**, between Jhelum and Chenab rivers;
- **The Rachna Doab**, between Ravi and Chenab rivers;
- **The Bari Doab**, between Ravi and Sutlej rivers.

Topography & Geology of Punjab:

46. The prevailing geologic conditions in Punjab are the result of extensive inundation, deposition, coastal movements, and erosions over a long period of time. The topography of Punjab is closely related to the formation process of Himalayan ranges, which resulted in intense topographical deformation with complex folding, high angle strike-slip faults, and crust-thickening expressed in a series of thrust faults. The important tectonic changes which have had so much influence in the region are barely visible within the Indus Plain and it is only by considering geology on a broader regional scale, as well as in site specific detail that the effects, can be appreciated. The topography of the project area in Punjab is almost flat with no noticeable variation in the surface elevation, with the exception of DG Khan.

47. The orography of Punjab is visible in Figure 2. All districts share a generally flat orography and low elevations with the exception of Dera Ghazi Khan.

Figure 2: Orography of Selected Punjab Districts



Topography & Geology of Sindh:

48. Sindh can be divided into four distinct parts topographically: (i) the Kirthar range on the west; (ii) a central alluvial plain, bisected by the Indus River, in the middle; (iii) a desert belt in the east; and (iv) the Indus Delta in the south.

a) **Kirthar Range:** consisting of three parallel tiers of ridges which run in a north-south direction and vary in width from 20-50 kilometres. The ridges in the Kirthar range ascend from east to west, reaching an approximate height of 4000-5000m, and with hills descending in altitude from north to south. The Kirthar range has little soil and is mostly dry and barren.

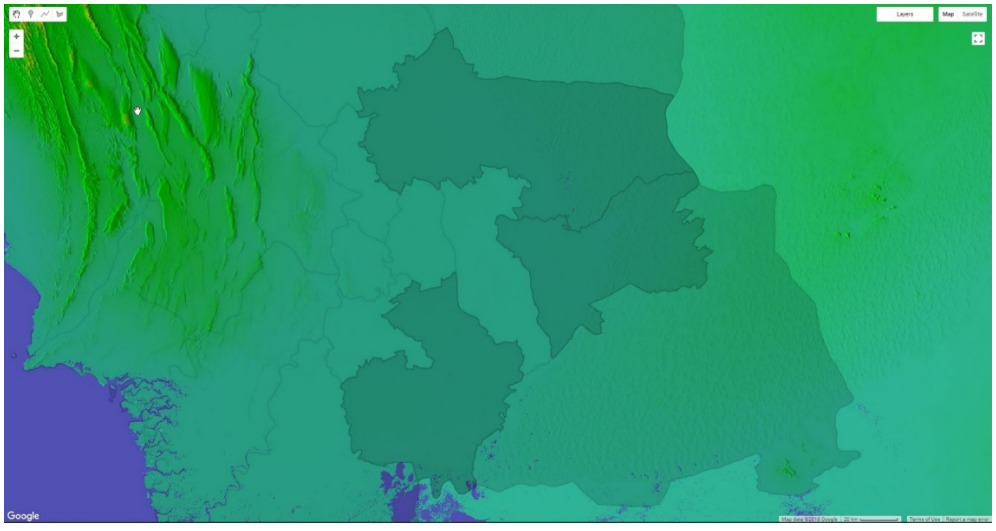
b) **Central Alluvial Plain:** consisting of the valley of the Indus River. This plain is about 580 kilometres long and about 51 800 square kilometres in area and gradually slopes downward from north to south. It is a vast plain, around 100 meters high above sea level. According to tradition, it has been divided into three distinct zones: (i) Lar or Southern Sindh, comprising the areas south of Hyderabad; (ii) Wichalo or Central Sindh, the area lying immediately around Hyderabad; and (iii) Siro, or Northern Sindh, comprising the area beyond Naushahero Feroze and Sehwan.

c) **Eastern Desert Belt:** including low dunes and flats in the north, the Achro Thar (white sand desert) to the south, and the Thar Desert in the south-east. There is also small hilly tract known as the Karunjhar hills (famous for Nagarparkar granite). The Aravalli series belongs to Archaen system which constitutes the oldest rocks of the earth crust.

d) **Indus Delta:** consisting of the distributaries of the Indus River which starts spreading out near Thatta across the deltaic flood plain in the sea. The even surface is marked by a network of flowing and abandoned channels. A coastal strip, which ranges in width from 10-40km, floods at high tide and contains some mangrove swamps. Rocks exposed in this area below to upper cretaceous and pre-cretaceous periods. Rocks are predominantly of sedimentary origin (both clastic and non-clastic in nature), belonging to marine, partly-marine, and fluviatile depositional environments.

49. Sindh lies in the lower Indus Basin and its main tectonic features are the platform and foredeep areas. Thick sequences of Pab sandstone of Upper Cretaceous, Ranikot Group (Khadro, Bara, Lakhra) of Paleocene, Laki, Tiyon, and Kirthar of Eocene age, Nari Formation of Oligocene, Gaj Formation of Lower to Middle Miocene, Manchar of Upper Miocene to Pliocene, Dada Conglomerate of Pleistocene are present in various areas of Sindh. Limestone and sandstone are the most dominant sedimentary rocks in the area. The orography of project districts in Sindh can be seen in Figure 3, and it is visibly flat.

Figure 3: Orography of Selected Sindh Districts



3.2 Environmental Features of Proposed Project Area

3.2.1 Climate and Meteorology

50. In depth analysis of Pakistan's climate and meteorology can be found in Appendices on *"Climate Change in the Indus Basin"* and "*Geospatial Analysis for Target Districts"*) of the Full Project Funding Proposal and Feasibility Study. Wherever possible, information at project district level is provided.

51. Pakistan is located on a great landmass north of the Tropic of Cancer (between latitudes 25° and 36° N). It has a continental type of climate characterized by extreme variations of temperature, both seasonally and daily. Its climate is influenced by three major weather systems:[10] (i) the sub-Mediterranean regime of winter, westerly storms; (ii) Indian summer monsoon originating in the Bay of Bengal; and (iii) Tibetan anticyclone; otherwise, continental air prevails for rest of the year. The Hindu Kush-Karakoram-Himalaya (HKH) region, which sit in the northern part of the country provides physical influences over the flow of the air mass. The climate of the snow-covered northern mountains is cold, while the climate of Balochistan Plateau which locates on the western side of the country is characterised as an arid and hyper-arid region, and the temperature is higher compared with other parts of the country. Along the coastal strip, the climate is modified by sea breezes. The rest of the country, temperatures reach great heights in the summer; the mean temperature during June is 38 °F (3 °C) in the plains, the highest temperatures can exceed 47 °C (117 °F).

52. Pakistan experiences all the three types of rainfall: orographic, frontal and convective depending upon the location and season of the year. Pakistan's total annual precipitation ranges between 500mm and 800 mm with northern half receiving the higher share from both winter and summer. Southern parts of Pakistan (Balochistan and Sindh) receives 50 percent of the northern. Sindh adjoining the coastal belt covering the Indus Delta receives better rainfall than upper Sindh.

53. Pakistan is classified as an arid country. Table 3[11] reflects the extent of dry areas, showing that around 11% of the area has annual rainfall of 250-500mm, one half has rainfall ranging from 150-250mm, and about one third has less than 150mm of annual rainfall.

Table 3: Extent of Dry Areas Based on Aridity Index in Pakistan

AREA	RAINFALL REGIME	MILLION HECTARES	% OF TOTAL
Total Area	<150-> 1,000 mm	79.61	100
Semi-Arid	200-500 mm Aridity Index 16-31	8.76	11
Arid	150-250 mm Aridity Index 8-16	38.21	48
Hyper Arid	<150 mm Aridity Index <8	26.27	33

Source: Muhammad Mohsin Iqbal et al. (2009)

*Note: Aridity Index =∑1.65 (Precipitation/Temperature + 12.2)*0.9*

54. An overview of the mean temperature trends in Pakistan from 1951-2000 is provided in Table 4.

[10] *T.G. Huntington, (2006). Evidence for intensification of the global water cycle: review and synthesis. Journal of Hydrology, 319(1): 83-95.*

[11] *Muhammad Mohsin Iqbal, M. Arif Goheer, Arshad M. Khan, Climate-Change Aspersions on Food Security of Pakistan, Science Vision, Vol.15, No.1, (January to June 2009).*

The Global Change Impact Studies Centre (GCISC), based with Pakistan's Ministry of Climate Change, summarized the country's temperature trends as follows: "(i) the mean annual temperature has been increasing in most parts of Pakistan; only the Sub-Montane and Western Highlands and Lower Indus Plains show a decreasing trend, (ii) all of the zones show an increasing trend for the pre-monsoon summer months (Apr-May), (iii) all of the zones, except Zone V (Balochistan Plateau), show a decreasing trend for the monsoon period, (iv) the Greater Himalayan region shows an increasing trend throughout December to May, and (v) the Balochistan Plateau (Zones V) is getting warmer in all of the seasons".[12]

Table 4: Mean Temperature Trends in Pakistan, 1951-2000

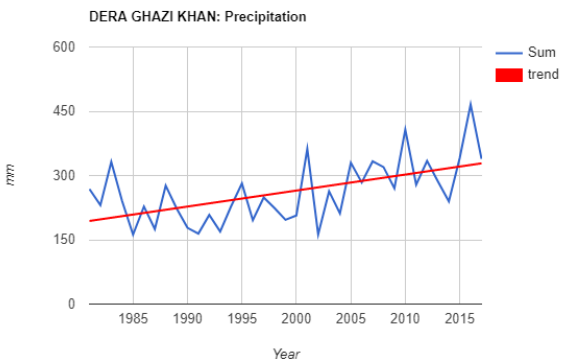
Climatic Regions	Annual	Jun–Sep	Dec–Mar	Apr–May	Oct–Nov
I (a): Greater Himalaya	0.04	-0.8	0.32	1.09	-0.06
I (b): Submountain	-0.19	-0.57	0	0.13	0.12
II: Western Highlands	-0.72	-1.48	-0.65	0.17	-0.47
III: Central and Southern Punjab	0.11	-0.25	0.03	0.83	0.31
IV: Lower Indus Plains	-0.08	-0.55	-0.07	0.35	0.15
V (a) Balochistan Plateau (East)	0.11	0.46	0.63	0.79	0.5
V (b) Balochistan Plateau (West)	1.17	1.3	0.43	2.17	1.8
VI: Coastal areas	0	-0.18	0.05	0.03	0.3

Source: Global Change Impact Studies Centre (2005) Final Technical Report APN CAPaBLE Project

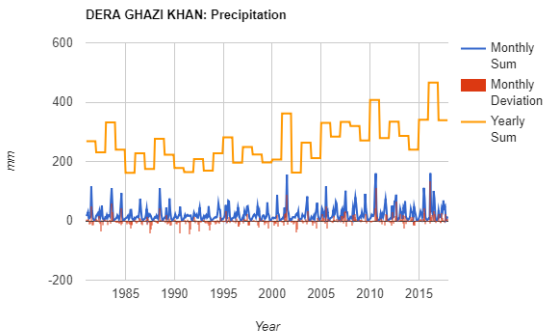
55. An overview of precipitation and maximum/minimum temperature trends for each project district is provided in following graphs. Graphs first refer to yearly trends, then to monthly trends.

Punjab Province:

56. **Dera Ghazi Khan:**

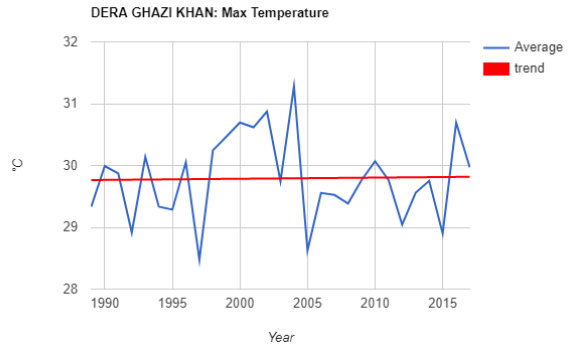


(Yearly trend)

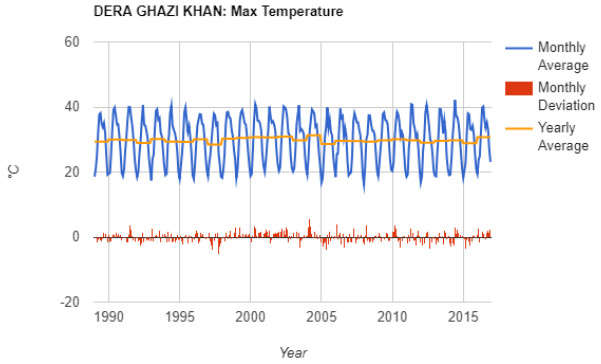


(Monthly trend)

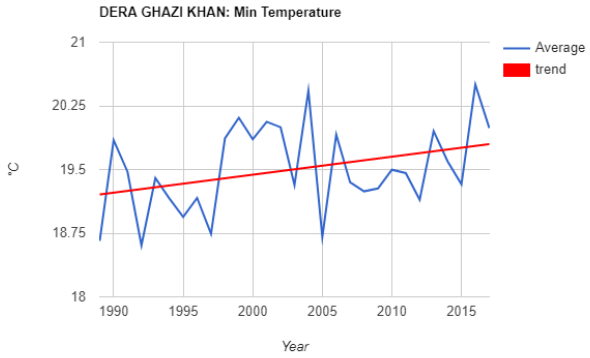
[12] *Global Change Impact Studies Centre (2005) Final Technical Report APN CAPaBLE Project*



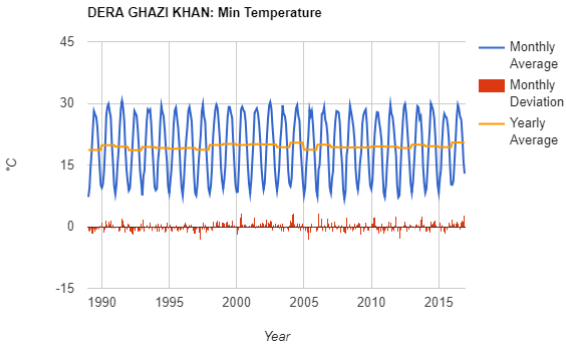
(Yearly trend)



(Monthly trend)



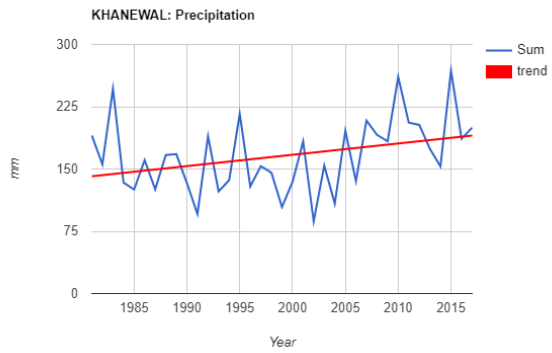
(Yearly trend)



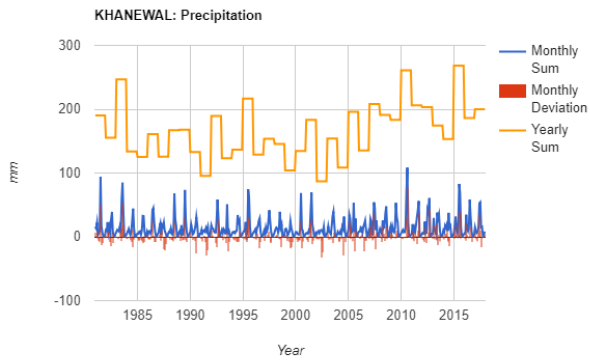
(Monthly trend)

57. The maximum temperatures in DG Khan raised by only 0.1 degrees while minimum temperatures rose by about 0.6 degrees. The monthly data show in which periods such positive trend was more relevant. The precipitation charts show an overall increment of about 130 mm, while the monthly precipitation data allows for a more detailed analysis of the positive monthly deviations from the monthly average.

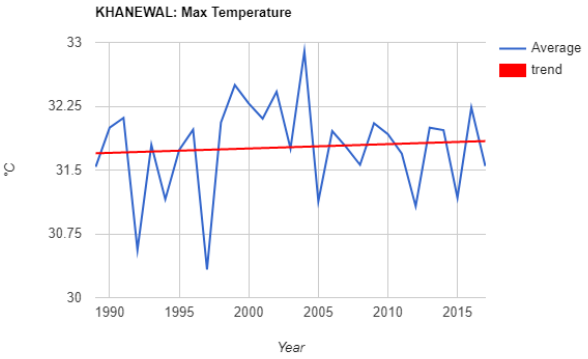
58. **Khanewal:**



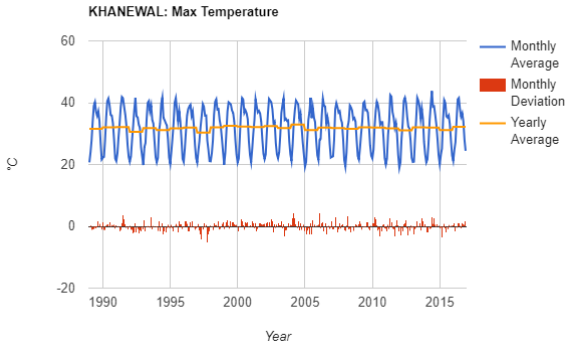
(Yearly trend)



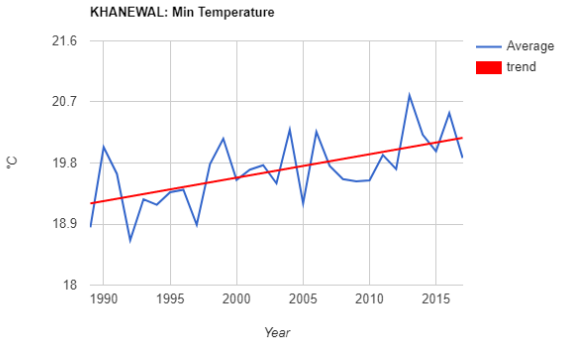
(Monthly trend)



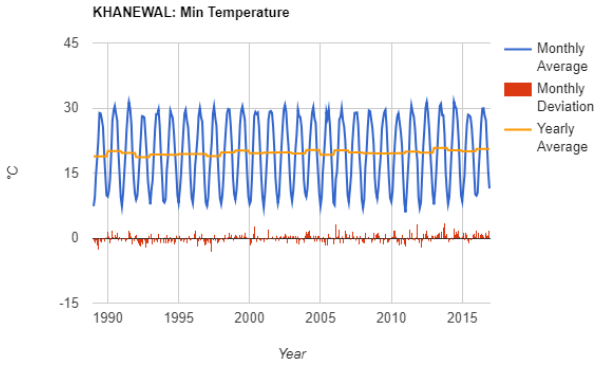
(Yearly trend)



(Monthly trend)



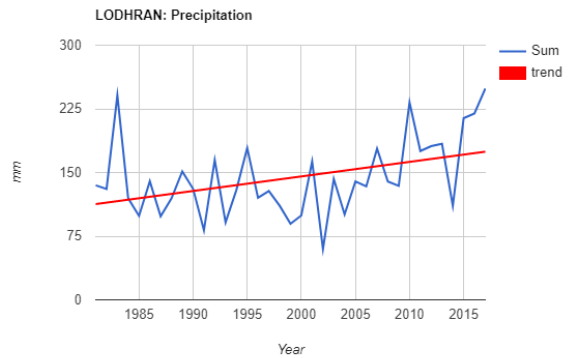
(Yearly trend)



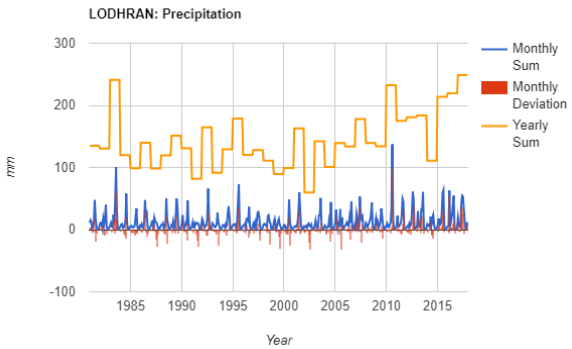
(Monthly trend)

59. Maximum temperatures raised by only 0.1 degrees while minimum temperatures rose by about 1 degree with the highest monthly deviations from the monthly average occurring mostly after 2012. The precipitation chart reflects an increment of about 50 mm.

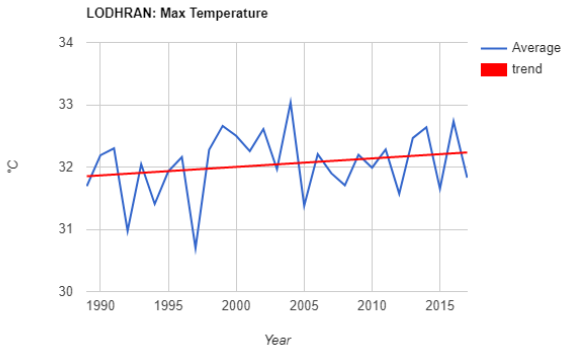
60. **Lodhran:**



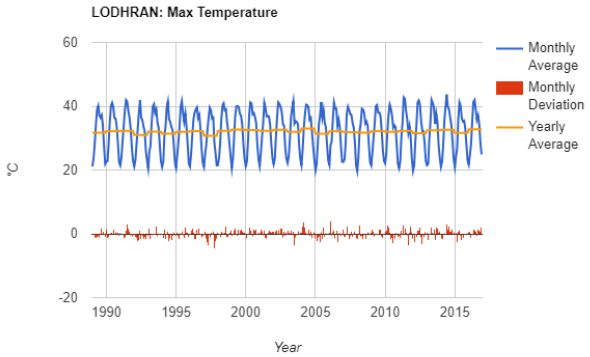
(Yearly trend)



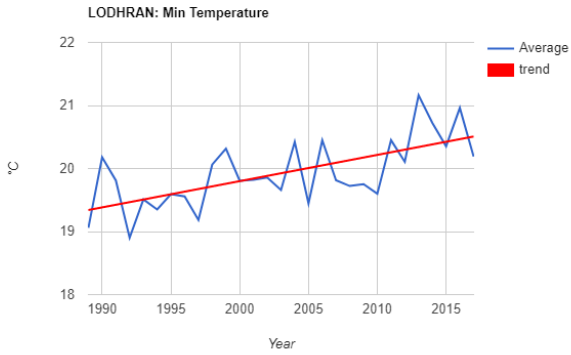
(Monthly trend)



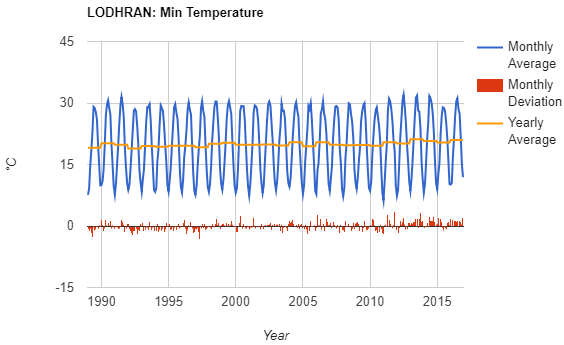
(Yearly trend)



(Monthly trend)



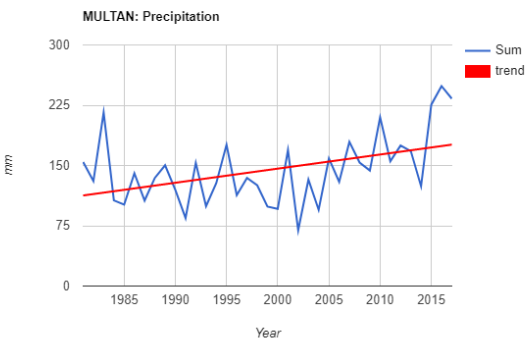
(Yearly trend)



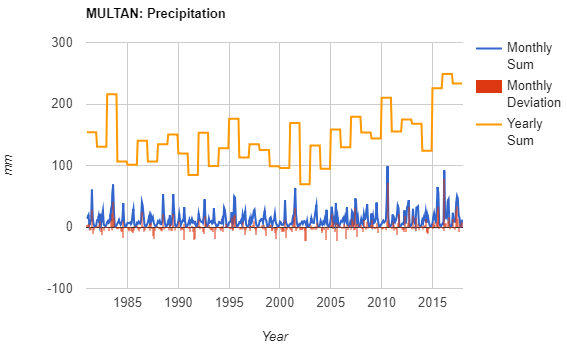
(Monthly trend)

61. The maximum temperatures raised by only 0.4 degrees while minimum temperatures rose by about 1.2 degrees. Both trends showed higher positive deviations in the years after 2011. The precipitation chart shows an increment of about 60 mm with higher monthly deviations since 2011.

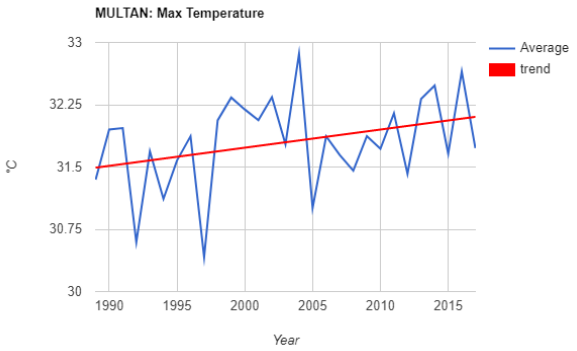
62. **Multan:**



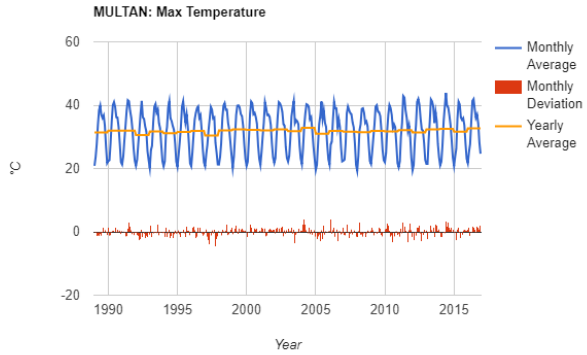
(Yearly trend)



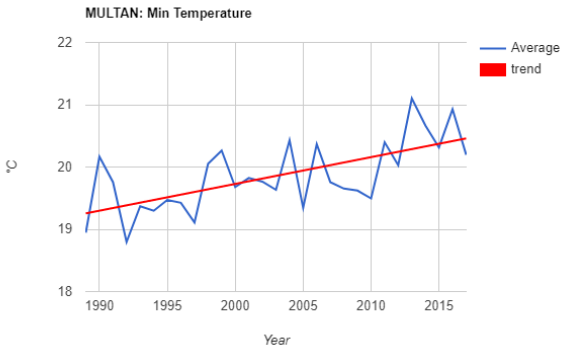
(Monthly trend)



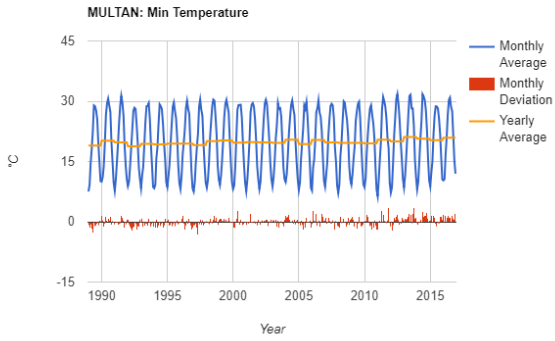
(Yearly trend)



(Monthly trend)



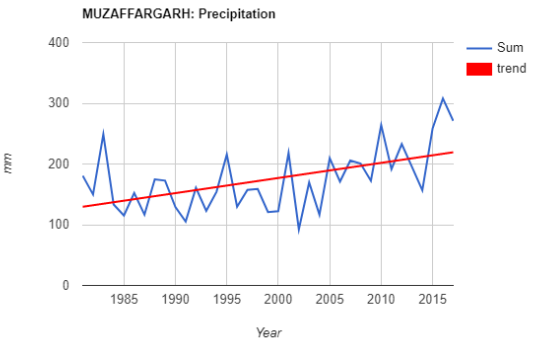
(Yearly trend)



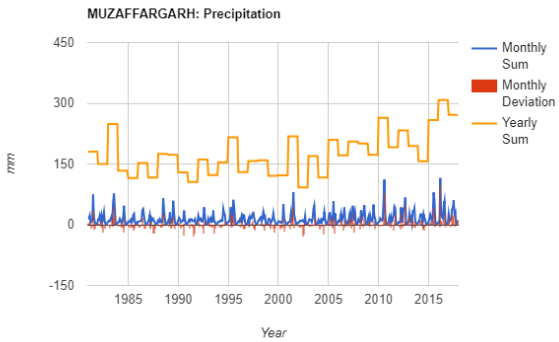
(Monthly trend)

63. The maximum temperatures raised by only 0.6 degrees while minimum temperatures rose by about 1.2 degrees with more frequent and high extremes after 2005. The precipitation chart shows an increment of about 62 mm with higher yearly sum since 2015.

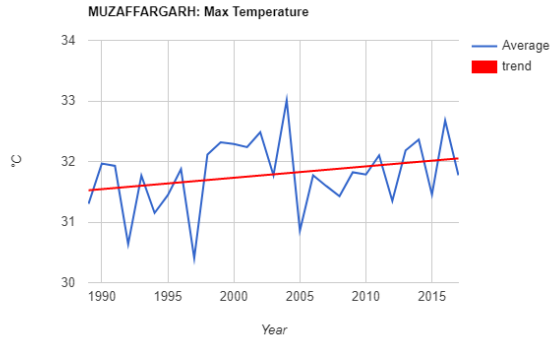
64. **Muzaffargarh:**



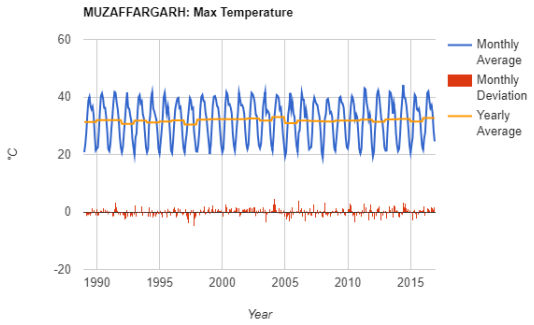
(Yearly trend)



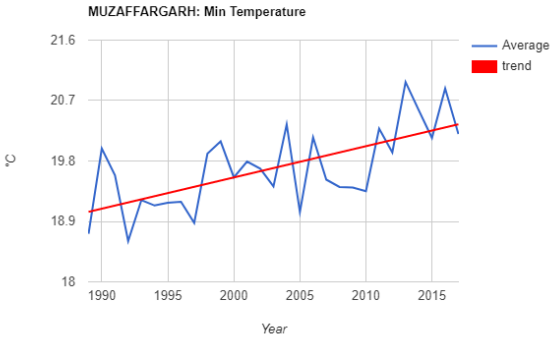
(Monthly trend)



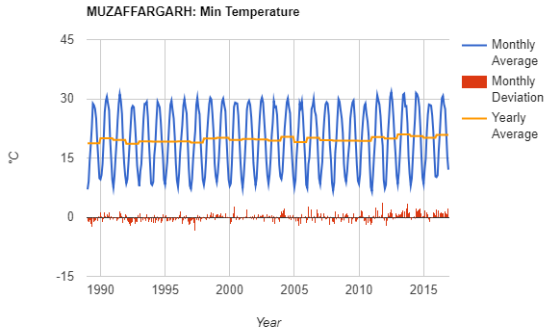
(Yearly trend)



(Monthly trend)



(Yearly trend)

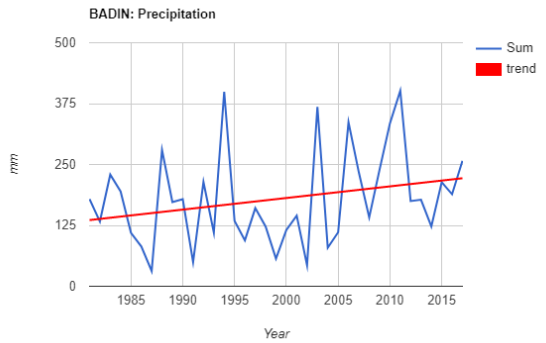


(Monthly trend)

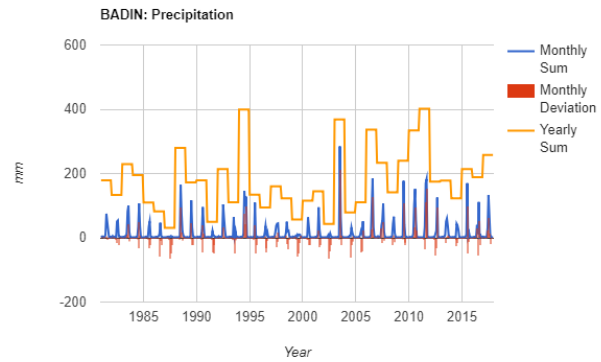
65. The maximum temperatures raised by only 0.5 degrees while minimum temperatures rose by about 1.3 degrees. Higher monthly deviations and only positive are registered in the years after 2012. The precipitation chart shows an increment of about 90 mm with a higher trend in the years after 2005.

Sindh Province:

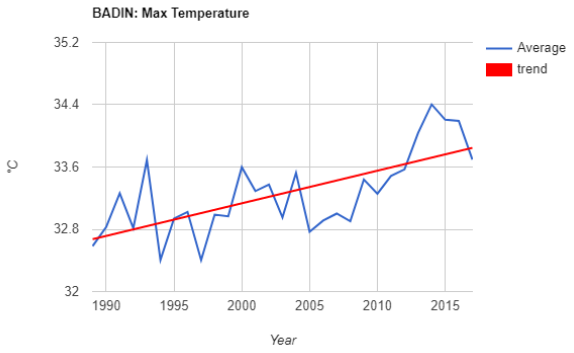
66. **Badin:**



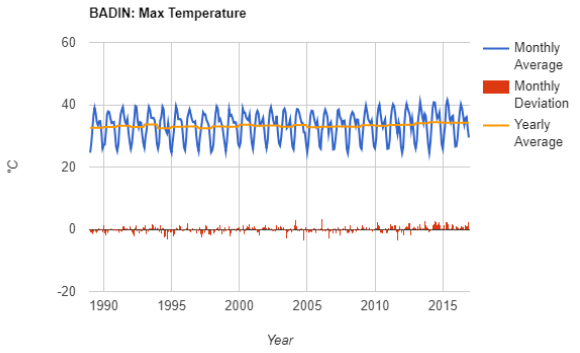
(Yearly trend)



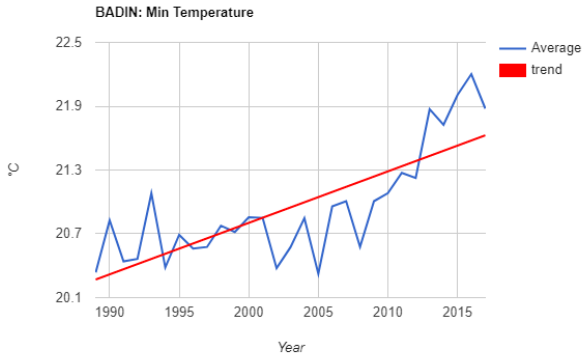
(Monthly trend)



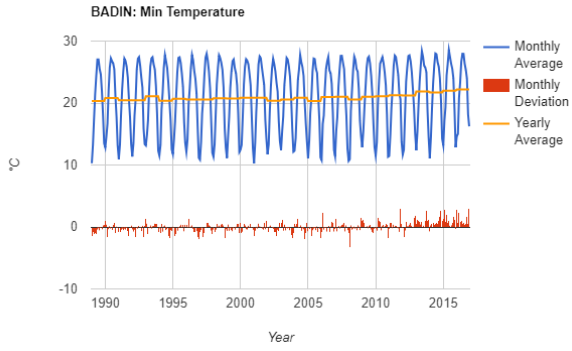
(Yearly trend)



(Monthly trend)



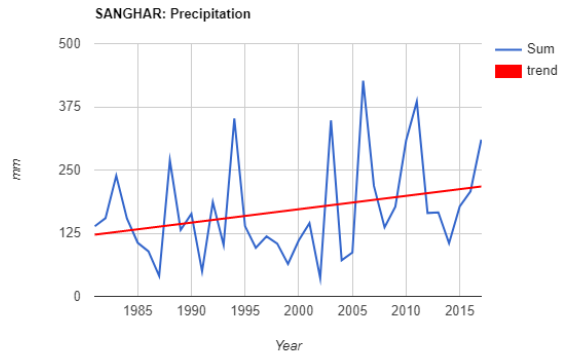
(Yearly trend)



(Monthly trend)

67. The maximum temperatures raised by 1.1 degrees and the minimum temperatures by about 1.3 degrees, with higher and only positive increases since 2012. The precipitation chart shows an increment of about 85 mm and higher monthly deviations after 2005.

68. **Sanghar:**



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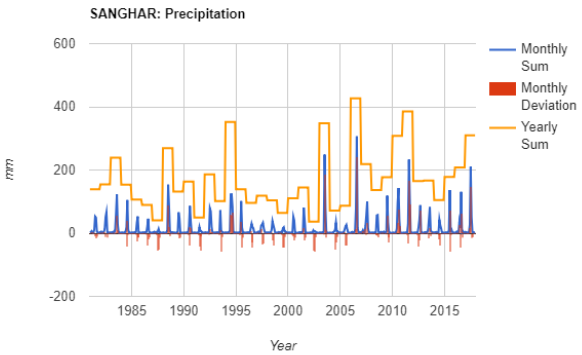
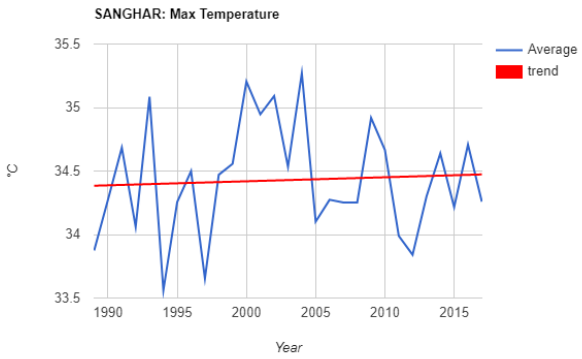


(Monthly trend)



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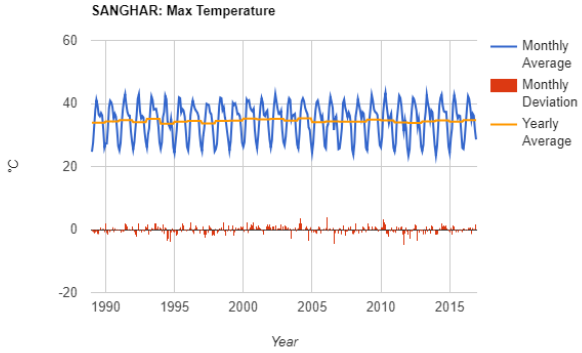
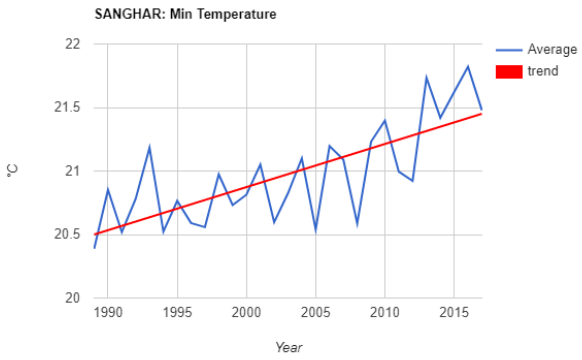
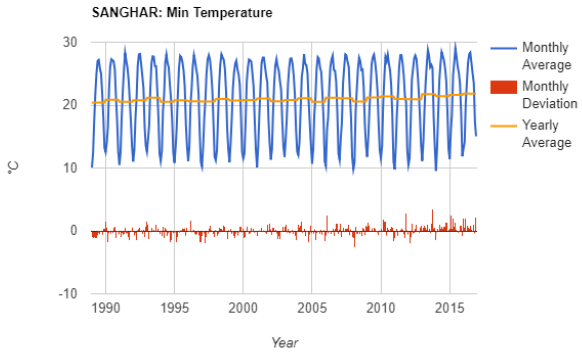


(Monthly trend)



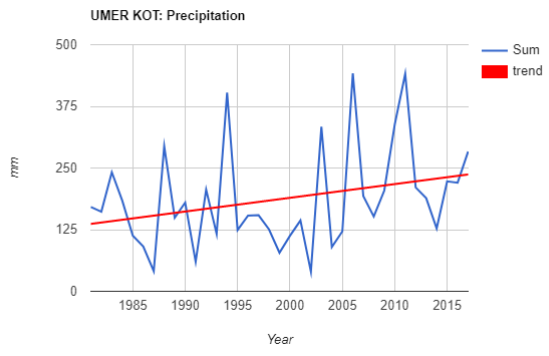
(Yearly trend)



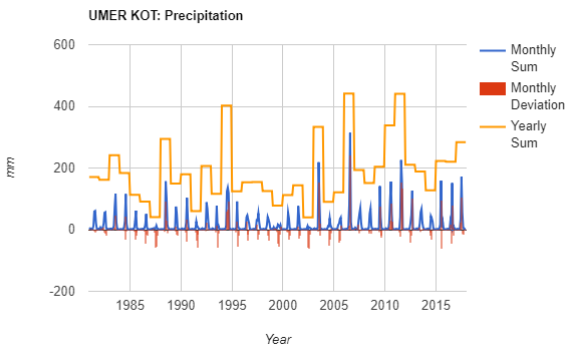
(Monthly trend)

69. The maximum temperatures raised by only 0.1 degrees, while minimum temperatures rose by about 0.9 degrees with an increasing frequency of positive anomalies since 2009. The precipitation chart shows an increase of about 95 mm of precipitation, with higher deviations from the monthly sum since 2005.

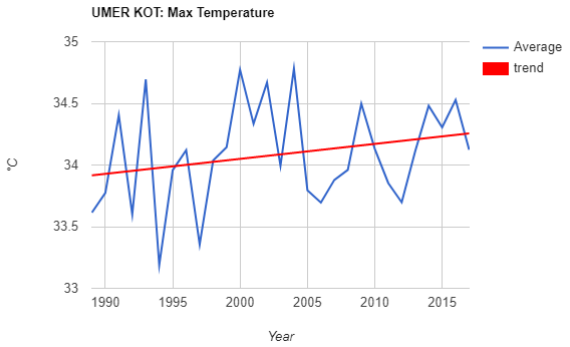
70. **Umerkot:**



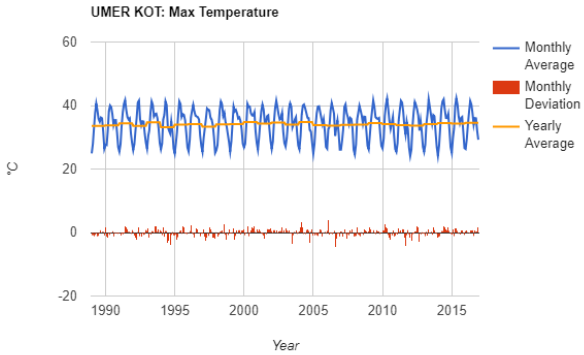
(Yearly trend)



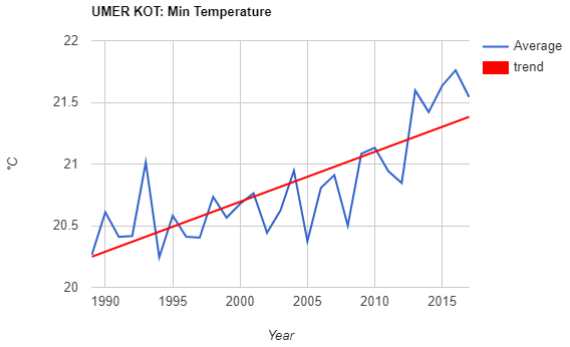
(Monthly trend)



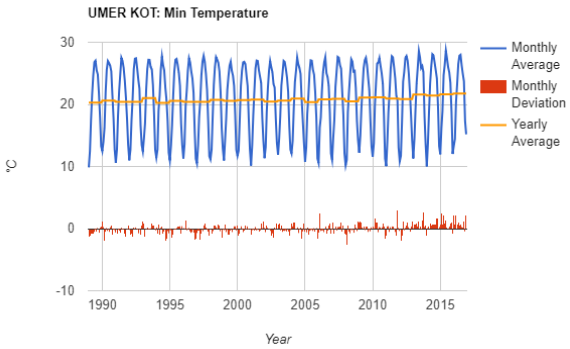
(Yearly trend)



(Monthly trend)



(Yearly trend)



(Monthly trend)

71. The maximum temperatures raised by only 0.3 degrees, while minimum temperatures rose by about 1.1 degrees with higher and more frequent positive deviations in the years after 2008. The precipitation chart shows an increment of about 100 mm with higher peaks and deviations in the years after 2005.

3.2.2 Soil Quality

Punjab Province:

72. The *Soil Fertility Atlas of Pakistan: The Punjab Province*[13] provides an in-depth assessment of soils within each district of Punjab Province. Just as with Sindh province, district profiles developed by FAO and the Fauji Fertilizer Company Limited (FFCL) have been provided from the Atlas, along with an overview of key soil-fertility issues experience by farmers pertaining to each district. Further details, as required, can be found by consulting the atlas directly.[14] Unlike the *Soil Fertility Atlas of Pakistan: The Sindh Province*, there is no map available to quickly highlight soil types/parent soil materials by district, however detailed information on the soil classifications can be obtained by visiting *Annexure VI* of the atlas.[15]

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[13] *FAO (Food and Agriculture Organization of the United Nations). 2017. Soil Fertility Atlas of Pakistan: The Punjab Province. W. Ahmad, Y. Niino, M.H. Zia, K. Mahmood, A. Ashraf, N. Ahmad, M. Salim and M.A. Shakir (Eds.), ISBN 978-969-8304-08-9. Islamabad, Pakistan, p 115.*

[14] *The Soil Fertility Atlas of Pakistan: The Punjab Province can be found at the following URL: http://fatima-group.com/updata/files/files/145_20171215085151.pdf*

[15] *Annexure VI: Dominant Soil Series, Classification, and Areas of Their Occurrence can be found at the following URL: http://www.ffc.com.pk/wp-content/uploads/SFAP-Punjab-Annexure.pdf*

73. Dera Ghazi Khan (DG Khan) District Soil Profile:

DERA GHAZI KHAN

Dera Ghazi Khan district is located at the foot hills of Suleiman Mountain Range. The climate is hot and dry during the summer and moderately cold in the winter. Occasional heavy rainfall causes flooding in the region. Hill-torrent irrigation is practiced in the western part of the district. It also includes a hill station, Fort Munro located at a height of 1,972 meters above sea level. The district headquarter is located at Dera Ghazi Khan.

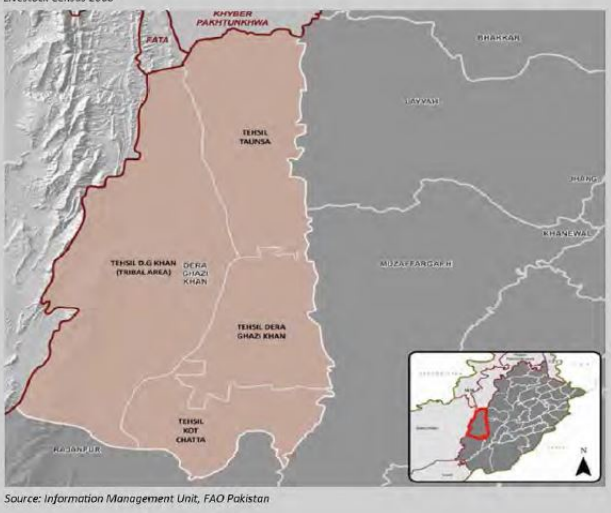
AGRICULTURAL INFORMATION

Total Area Sown (hectares)	356,036
Total Uncultivated Area (hectares)	225,316
Total Area under Irrigation (hectares)	323,731
Major Rabi Crop(s)	Wheat
Major Kharif Crop(s)	Cotton, Rice, Sugarcane
Total Livestock Population	3,313,927

Source: Crop Reporting Services, Punjab; Economic Wing, Ministry of National Food Security &Research (2014-15); Livestock Census 2006

SOIL ATTRIBUTES

Parent Material	Mixed calcareous alluvium of piedmont plain
Dominant Soil Series	Shahdara, Jhatpat, Kandhkot, Kahror, Kashmore
pH	7.3 – 10.8 (Average 8.31)
Electrical Conductivity (dSm^{-1})	0.026 – 36 (Average 0.92)
Organic Matter (%)	0.1 – 2.19 (Average 0.54)
Available Phosphorus (ppm)	1 – 52 (Average 5.20)
Extractable Potassium (ppm)	26 – 400 (Average 174)
Farmers availing soil test facility (%)	18
Farmers availing water test facility (%)	18



Source: Information Management Unit, FAO Pakistan

Source:
District Soil Survey Reports, Soil Survey of Pakistan
Farm Advisory Service Centers, Fauji Fertilizer Company Limited (FFCL)
Rapid Fertilizer Use Assessment, FAO (2015)
Land Cover Atlas of Punjab (FAO, SUPARCO and Government of the Punjab)

74. Khanewal District Soil Profile:

KHANEWAL

Khanewal was given the status of district in 1985 by combining two tehsils of Multan district. Climate of the district comprises of hot summers and cold winters. The main crops include wheat, cotton, sugarcane, vegetables and fruits. The district has the second largest railway station in the country, known as the Khanewal Junction. There are four tehsils in the district: Khanewal, Jahanian, Kabirwala and Mian Channu. The district headquarter is situated at Khanewal city.

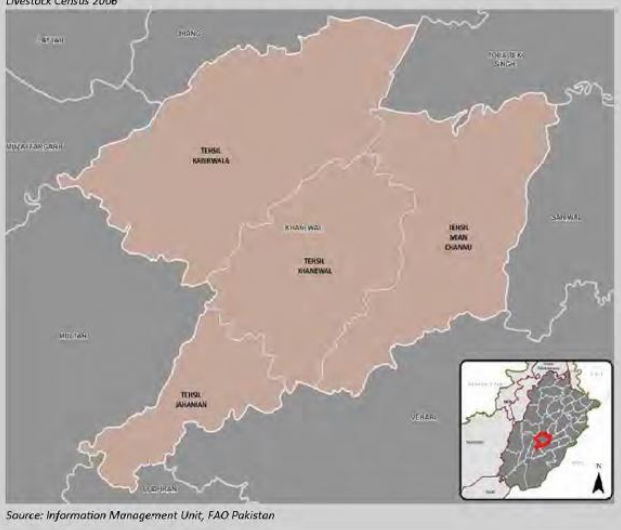
AGRICULTURAL INFORMATION

Total Area Sown (hectares)	572,853
Total Uncultivated Area (hectares)	60,439
Total Area under Irrigation (hectares)	570,545
Major Rabi Crop(s)	Wheat
Major Kharif Crop(s)	Cotton, Sugarcane
Total Livestock Population	2,714,703

Source: Crop Reporting Services, Punjab; Economic Wing, Ministry of National Food Security & Research (2014-15); Livestock Census 2006

SOIL ATTRIBUTES

Parent Material	Mixed loamy and clayey material
Dominant Soil Series	Shahdara, Bhalike, Pacca, Gajiana, Rustam
pH	7.4 – 10.7 (Average 8.41)
Electrical Conductivity (dSm^{-1})	0.1 – 19.5 (Average 0.62)
Organic Matter (%)	0.1 – 2.8 (Average 0.75)
Available Phosphorus (ppm)	1 – 44 (Average 5.92)
Extractable Potassium (ppm)	28 – 400 (Average 155)
Farmers availing soil test facility (%)	45%
Farmers availing water test facility (%)	24%



Source: Information Management Unit, FAO Pakistan

Source:
District Soil Survey Reports, Soil Survey of Pakistan
Farm Advisory Services Centers, Fauji Fertilizer Company Limited (FFCL)
Rapid Fertilizer Use Assessment, FAO (2015)
Land Cover Atlas of Punjab (FAO, SUPARCO and Government of the Punjab)

75. Lodhran District Soil Profile:

LODHRAN

Lodhran district is situated on the northern side of river Sutlej. The entire district is a smooth plain. Hot and dry weather prevails during summer and cold during the winter. Major crops of the district include wheat and cotton while minor crops include rice, sunflower, sugarcane and tobacco. The groundwater in Dunyapur area is predominantly brackish, while that in Kahror Pacca and Lodhran is sweet. There are three tehsils in the district: Lodhran, Kahror Pacca and Dunyapur. The district headquarter is located at Lodhran city.

SOIL ATTRIBUTES

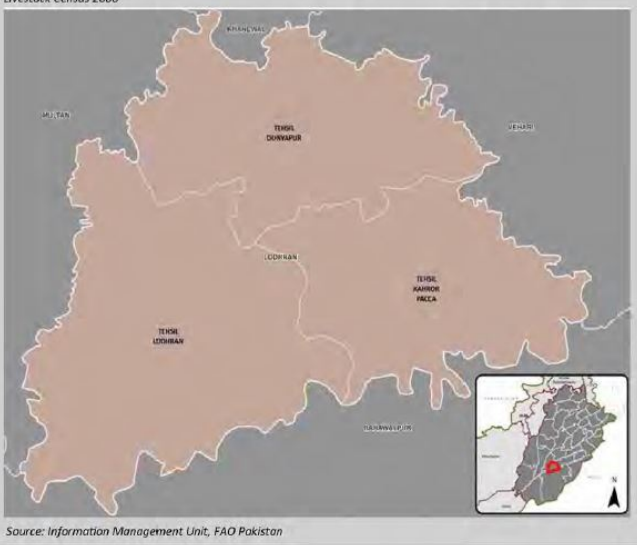
Parent Material	Mixed calcareous alluvium
Dominant Soil Series	Shahdara, Bhalike, Pacca, Gajiana, Nabipur
pH	7.6 – 10.3 (Average 8.27)
Electrical Conductivity (dSm^{-1})	0.1 – 7.9 (Average 1.18)
Organic Matter (%)	0.1 – 1.6 (Average 0.71)
Available Phosphorus (ppm)	1 – 25 (Average 6.26)
Extractable Potassium (ppm)	26 – 380 (Average 153)
Farmers availing soil test facility (%)	50
Farmers availing water test facility (%)	4

Source:
District Soil Survey Reports, Soil Survey of Pakistan
Farm Advisory Service Centers, Fauji Fertilizer Company Limited (FFCL)
Rapid Fertilizer Use Assessment, FAO (2015)
Land Cover Atlas of Punjab (FAO, SUPARCO and Government of the Punjab)

AGRICULTURAL INFORMATION

Total Area Sown (hectares)	446,689
Total Uncultivated Area (hectares)	36,695
Total Area under Irrigation (hectares)	446,689
Major Rabi Crop(s)	Wheat
Major Kharif Crop(s)	Cotton, Rice
Total Livestock Population	1,573,118

Source: Crop Reporting Services, Punjab; Economic Wing, Ministry of National Food Security & Research (2014-15); Livestock Census 2006



Source: Information Management Unit, FAO Pakistan

76. Multan District Soil Profile:

MULTAN

The land of Multan district is plain and very fertile with Chenab river passing on its western side. Hot and dry weather prevails during summer and cold during the winter. The main crops include wheat, cotton, sugarcane, vegetables and fruits (e.g. mango). There are four tehsils in the district: Multan City, Multan Saddar, Shujabad and Jalalpur Pirwala. The district headquarter is located at Multan which is known to be one of the oldest cities in the Southeast Asia.

SOIL ATTRIBUTES

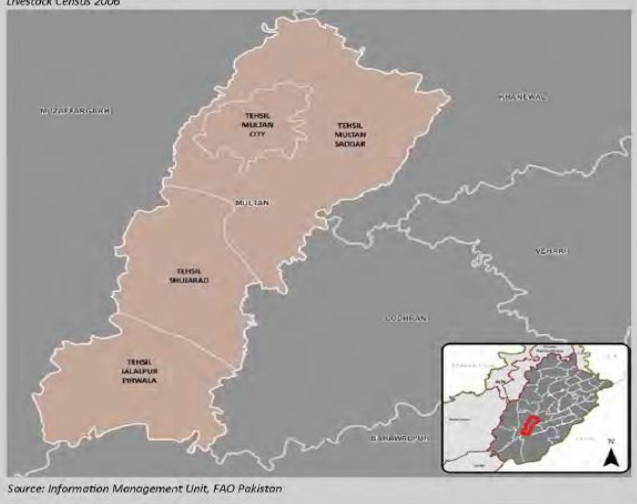
Parent Material	Mixed calcareous alluvium
Dominant Soil Series	Rustam, Shahdara, Bhalike, Pacca, Gajiana
pH	7.3 – 10 (Average 7.91)
Electrical Conductivity (dSm^{-1})	0.04 – 37 (Average 0.37)
Organic Matter (%)	0.1 – 3.0 (Average 0.76)
Available Phosphorus (ppm)	1 – 50 (Average 4.89)
Extractable Potassium (ppm)	26 – 400 (Average 148)
Farmers availing soil test facility (%)	14
Farmers availing water test facility (%)	3

Source:
District Soil Survey Reports, Soil Survey of Pakistan
Farm Advisory Service Centers, Fauji Fertilizer Company Limited (FFCL)
Rapid Fertilizer Use Assessment, FAO (2015)
Land Cover Atlas of Punjab (FAO, SUPARCO and Government of the Punjab)

AGRICULTURAL INFORMATION

Total Area Sown (hectares)	477,797
Total Uncultivated Area (hectares)	70,638
Total Area under Irrigation (hectares)	471,308
Major Rabi Crop(s)	Wheat
Major Kharif Crop(s)	Cotton, Sugarcane
Total Livestock Population	2,342,891

Source: Crop Reporting Services, Punjab; Economic Wing, Ministry of National Food Security & Research (2014-15); Livestock Census 2006



Source: Information Management Unit, FAO Pakistan

77. Muzaffargarh District Soil Profile:

MUZAFFARGARH

Muzaffargarh was founded by the Mughal governor of Multan, Nawab Muzaffar Khan in 1794. The district lies between Indus river in the west and Chenab river in the east. Hot and dry weather prevails during summer and cold during the winter. The main crops are cotton, wheat, sugarcane and fruit orchards (mainly citrus and mango). The land of this district close to the Chenab river is usually flooded in the monsoon season. There are four tehsils in the district: Muzaffargarh, Alipur, Jatoi and Kot Addu. The district headquarter is at Muzaffargarh.

SOIL ATTRIBUTES

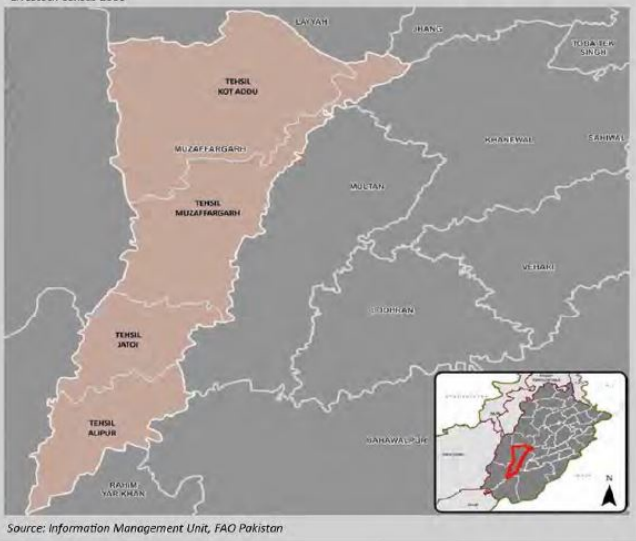
Parent Material	Mixed calcareous alluvium
Dominant Soil Series	Shahdara, Thal Rangpur, Matli, Sultanpur, Jhakkar
pH	7.3 – 10 (Average 7.91)
Electrical Conductivity (dSm^{-1})	0.1 – 9.9 (Average 0.37)
Organic Matter (%)	0.1 – 1.5 (Average 0.76)
Available Phosphorus (ppm)	1 – 16 (Average 4.89)
Extractable Potassium (ppm)	25 – 392 (Average 148)
Farmers availing soil test facility (%)	16
Farmers availing water test facility (%)	3

Source:
District Soil Survey Reports, Soil Survey of Pakistan
Farm Advisory Service Centers, Fauji Fertilizer Company Limited (FFCL)
Rapid Fertilizer Use Assessment, FAO (2015)
Land Cover Atlas of Punjab (FAO, SUPARCO and Government of the Punjab)

AGRICULTURAL INFORMATION

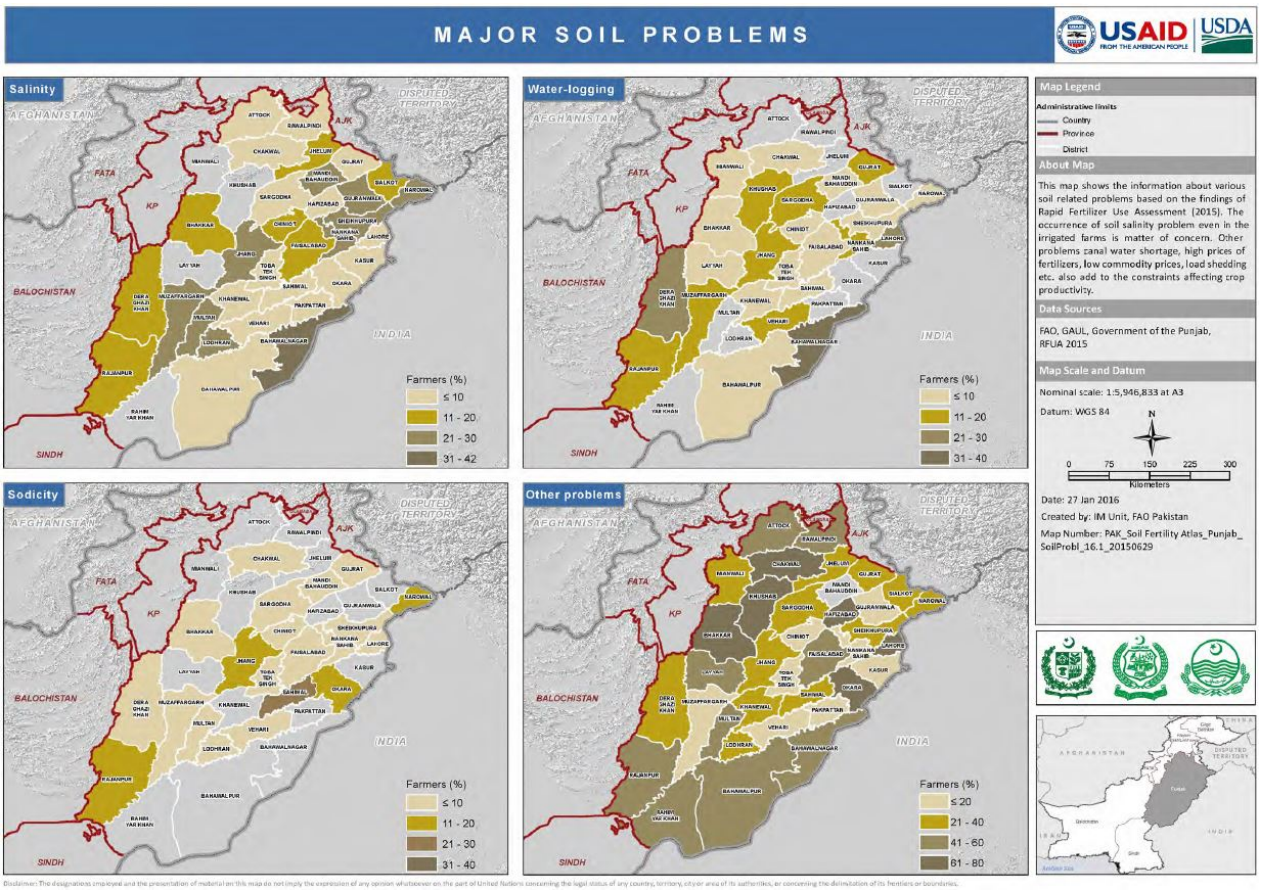
Total Area Sown (hectares)	679,637
Total Uncultivated Area (hectares)	403,752
Total Area under Irrigation (hectares)	658,818
Major Rabi Crop(s)	Wheat
Major Kharif Crop(s)	Cotton, Sugarcane
Total Livestock Population	4,829,961

Source: Crop Reporting Services, Punjab; Economic Wing, Ministry of National Food Security & Research (2014-15); Livestock Census 2006



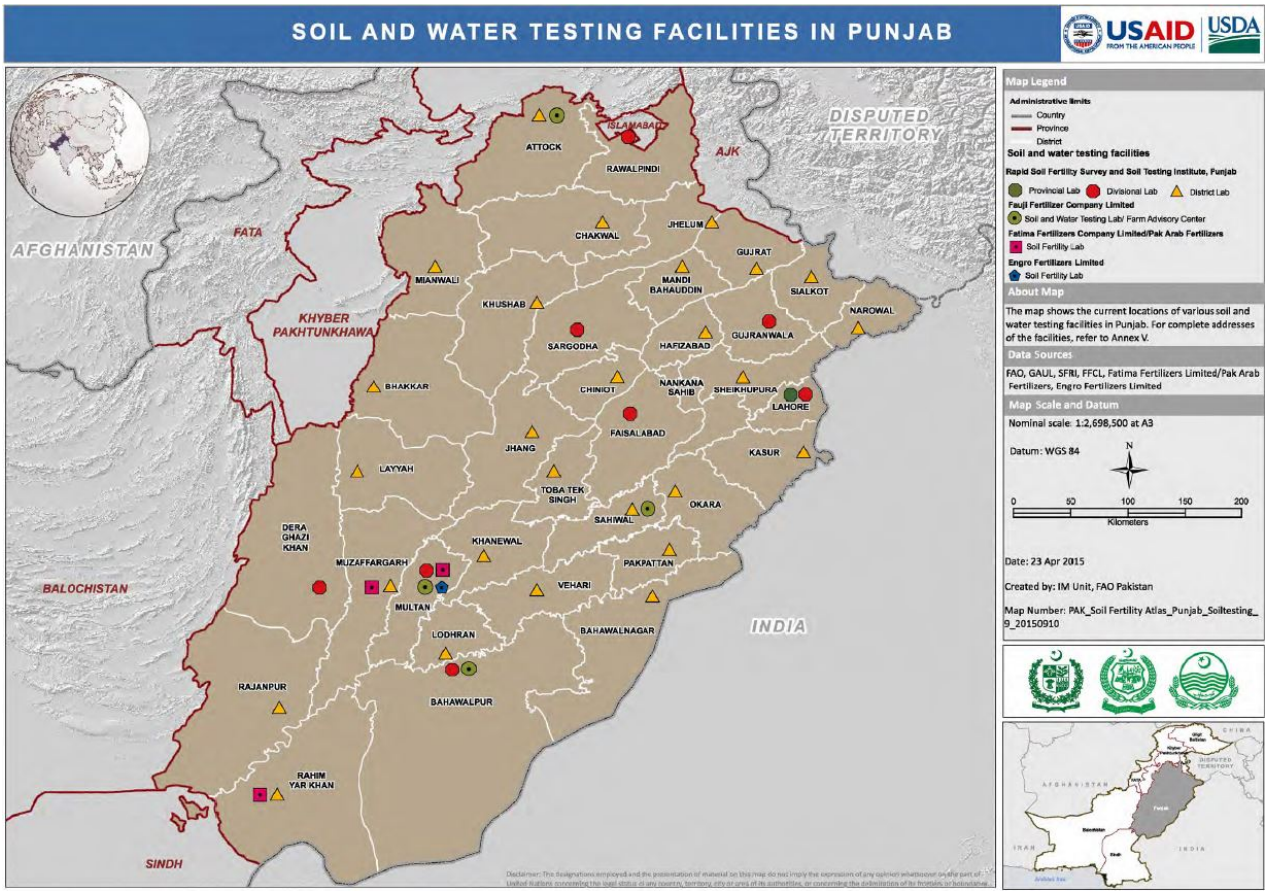
Source: Information Management Unit, FAO Pakistan

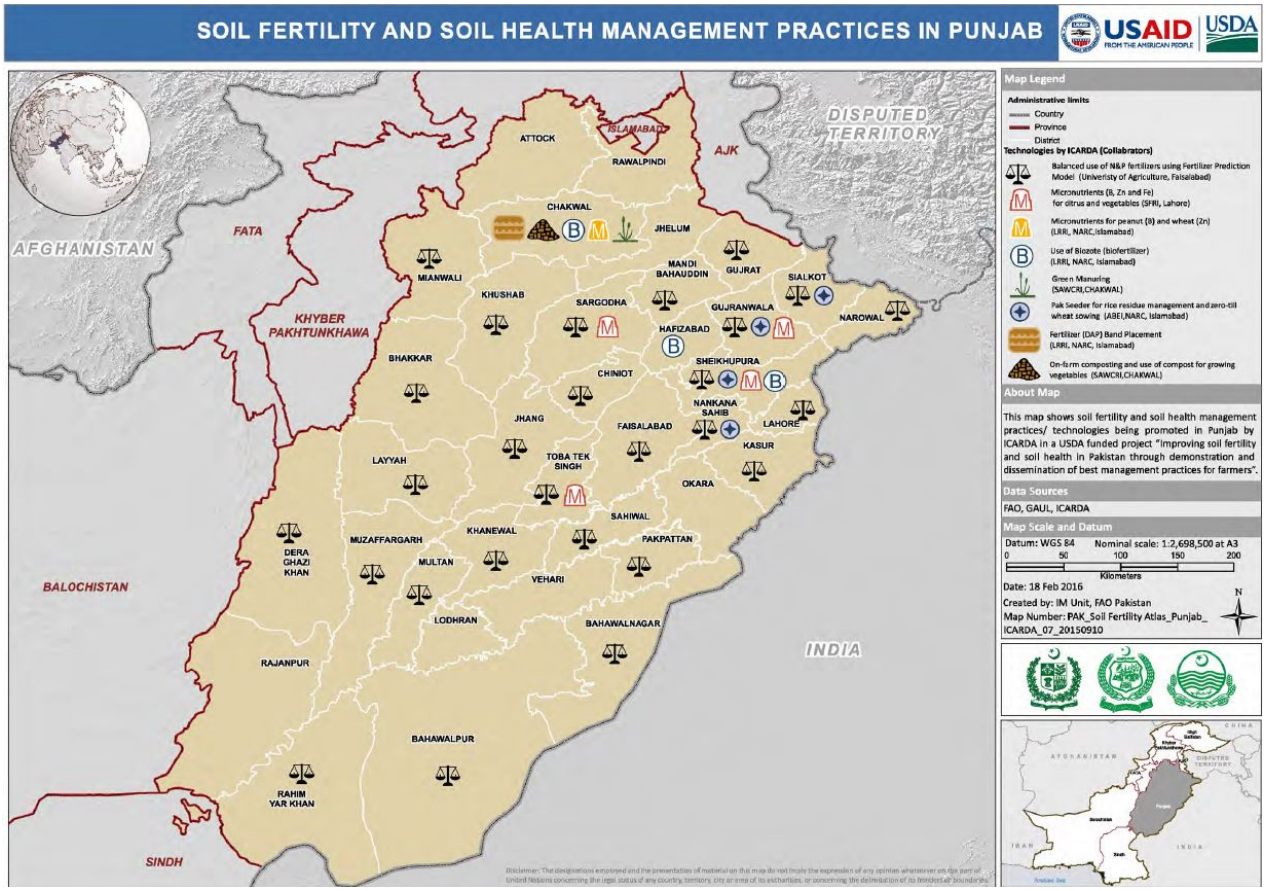
78. Key Soil Fertility Issues:



79. As evident in the map on major soil problems in Punjab, sodicity is not a major problem for farmers within the project districts (data for Khanewal was unknown, while the rest had fewer than 10% of their farmers experiencing sodicity). Overall, Khanewal consistently has fewer than 10% of its farmers experiencing salinity and water logging. In contrast, Lodhran, Multan, and Muzaffargarh all had between 21-30% of farmers experiencing soil salinity, while 11-20% of farmers in DG Khan had issues with salinity. Percentage of farmers experiencing water logging was found to be highest in DG Khan (20-30%), with Muzaffargarh following at 11-20% (data was unknown for Lodhran and Multan). The most prevalent issue consistently affecting soils across the project districts was found to be "other problems" (canal water shortage, high price fertilizers, low commodity prices, etc.).

80. **Existing Facilities and Management:** Each of the five project districts is host to a Rapid Soil Fertility Survey and Soil Testing Institute, either at the district-level (Khanewal, Lodhran, and Muzaffargarh) or divisional level (DG Khan, Multan). With respect to existing soil-health management practices, all project districts in Punjab – with the exception of Lodhran – have been introduced to balanced use of nitrogen and phosphorous fertilizers utilizing a Fertilizer Prediction Model developed at the University of Agriculture, Faisalabad, and promoted by ICARDA within the districts.





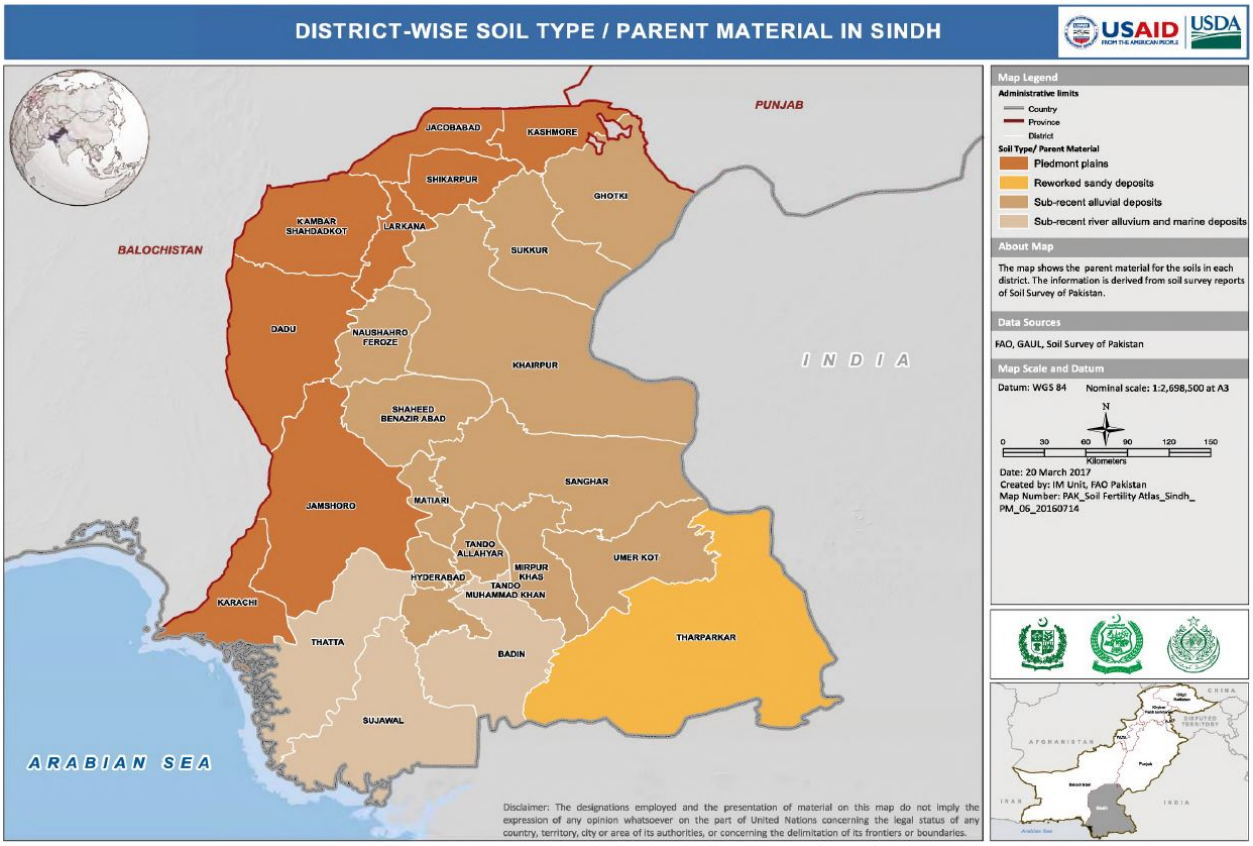
Sindh Province:

81. The *Soil Fertility Atlas of Pakistan: The Sindh Province*[16] provides an in-depth assessment of soils within each district of Sindh Province. For the purposes of this ESMF, district profiles developed by FAO and the Fauji Fertilizer Company Limited (FFCL) have been provided from the Atlas, along with an overview of key soil-fertility issues experience by farmers pertaining to each district. Further details, as required, can be found by consulting the atlas directly.[17] Overall, the soil type/parent material within Badin is sub-recent river alluvium and marine deposits, whilst Sanghar, and Umerkot soils are based on sub-recent alluvial deposits (Figure 4).

[16] *FAO (Food and Agriculture Organization of the United Nations). 2017. Soil Fertility Atlas of Pakistan: The Sindh Province. W. Ahmad, Y. Niino, M.H. Zia, K. Mahmood, A. Ashraf, K.S. Memon, Z.H. Shah, M. Aslam, N. Ahmad, M. Salim and M.A. Shakir (Eds.), ISBN 978-969-8304-09-6. Islamabad, Pakistan, p 105.*

[17] *The Soil Fertility Atlas of Pakistan: The Sindh Province can be found at the following URL: http://www.ffc.com.pk/wp-content/uploads/SFAP-sindh.pdf*

Figure 4: District-Wise Soil Type/Parent Material in Sindh



82. Badin District Soil Profile:

BADIN

Badin district is situated along the coast in the east of the Indus River. Numerous shrines of Sufi saints are located in Badin including Saman Shah. The climate is generally hot and humid in summer, and mild in winter. The region is damp and fertile for growing rice. Main crops of the district are rice, wheat, sugarcane, oilseeds and seasonal vegetables. There are five tehsils in the district: Badin, Matli, Shaheed Fazil Rahu, Talhar and Tando Bago. The district headquarter is situated at Badin.

AGRICULTURAL INFORMATION

Total Cultivated Area (hectares)	281,067
Total Non-cultivated Area (hectares)	170,692
Total Area under Irrigation (hectares)	273,119
Major Rabi Crop(s)	Wheat, Fodders
Major Kharif Crop(s)	Rice, Sugarcane
Total Livestock Population	2,256,070

Source: Crop Reporting Services, Sindh; Agriculture Census 2010; Livestock Census 2006

SOIL ATTRIBUTES

Parent Material	Calcareous material of deltaic and tidal plains
Dominant Soil Series	Dhand, Golarchi, Gujo, Matli, Nabipur
pH	7.4 – 10.5 (Average 8.22)
Electrical Conductivity (dSm^{-1})	0.1 – 47.2 (Average 3.65)
Organic Matter (%)	0.1 – 2.13 (Average 0.84)
Available Phosphorus (ppm)	1 – 32 (Average 3.42)
Extractable Potassium (ppm)	38 – 400 (Average 211)
Farmers availing soil-test facility (%)	7
Farmers availing water-test facility (%)	0

Source:
District Soil Survey Reports, Soil Survey of Pakistan
Farm Advisory Centers, Fauji Fertilizer Company Limited (FFCL)
Rapid Fertilizer Use Assessment, FAO (2015)
Land Cover Atlas of Sindh (FAO, SUPARCO and Government of Sindh)

Map source: Information Management Unit, FAO Pakistan

83. Sanghar District Soil Profile:

SANGHAR

Sanghar district is situated in the western part of Sindh province. The climate is that of a desert with hot summers and mild winters. Main crops of the district include cotton, sugarcane, oilseeds, fruits and vegetables. There are six tehsils in the district: Jam Nawaz Ali, Khipro, Sanghar, Shahdadpur, Sinjhoro and Tando Adam. The district headquarter is located at Sanghar.

AGRICULTURAL INFORMATION

Total Cultivated Area (hectares)	298,364
Total Non-cultivated Area (hectares)	71,081
Total Area under Irrigation (hectares)	283,612
Major Rabi Crop(s)	Wheat, Fodders, Orchard
Major Kharif Crop(s)	Sugarcane, Cotton, Millet
Total Livestock Population	1,966,097

Source: Crop Reporting Services, Sindh; Agriculture Census 2010; Livestock Census 2006

SOIL ATTRIBUTES

Parent Material	River alluvium and rolling sand ridges
Dominant Soil Series	Bagh, Jarwar, Nabipur, Pacca, Sultanpur
pH	7.1 – 10.5 (Average 8.21)
Electrical Conductivity (dSm^{-1})	0.11 – 49 (Average 2.05)
Organic Matter (%)	0.1 – 2.19 (Average 0.79)
Available Phosphorus (ppm)	1 – 39 (Average 3.78)
Extractable Potassium (ppm)	26 – 400 (Average 190)
Farmers availing soil-test facility (%)	48
Farmers availing water-test facility (%)	8

Map source: Information Management Unit, FAO Pakistan

Source:
District Soil Survey Reports, Soil Survey of Pakistan
Farm Advisory Centers, Fauji Fertilizer Company Limited (FFCL)
Rapid Fertilizer Use Assessment, FAO (2015)
Land Cover Atlas of Sindh (FAO, SUPARCO and Government of Sindh)

84. Umerkot District Soil Profile:

UMER KOT

Umer Kot district was previously known as Amarkot, which was the capital of Greater Sindh Province. It also included some parts of present Rajasthan state of India. The Mughal king Akbar was born in Umer kot. The climate is that of a desert with hot summers and mild winters. Main crops include red chili, wheat, cotton and fodders. There are four tehsils in the district; Umer Kot, Samaro, Pithoro and Kunri. The district headquarter is situated at Umer Kot, which is famous for historical fort and museum.

AGRICULTURAL INFORMATION

Total Cultivated Area (hectares)	136,590
Total Non-cultivated Area (hectares)	171,224
Total Area under Irrigation (hectares)	131,990
Major Rabi Crop(s)	Wheat, Chili
Major Kharif Crop(s)	Cotton, Fodder
Total Livestock Population	1,196,131

Source: Crop Reporting Services, Sindh; Agriculture Census 2010; Livestock Census 2006

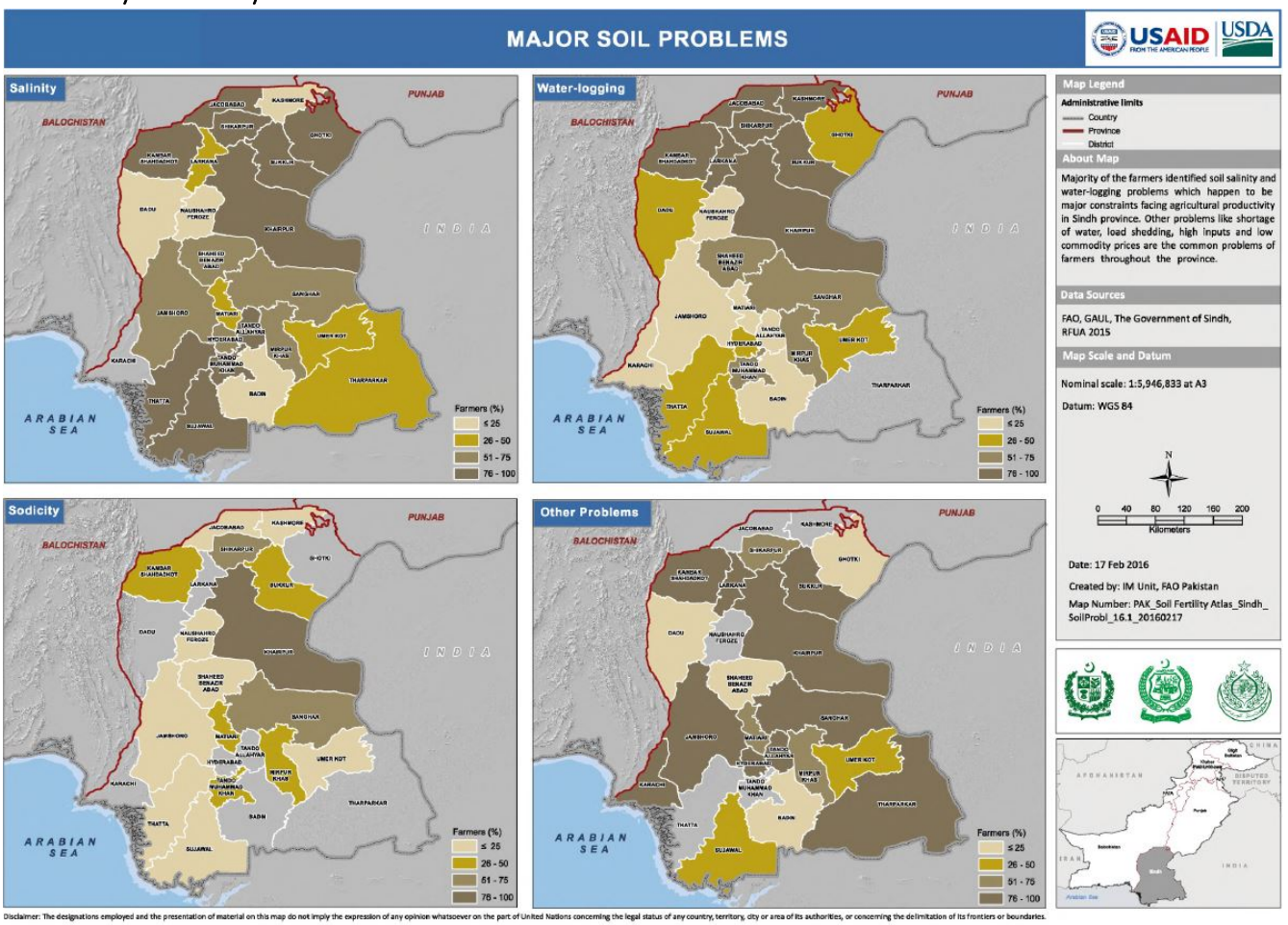
SOIL ATTRIBUTES

Parent Material	Reworked old sandy deposits
Dominant Soil Series	Bhambro, Dungi, Bijnot, Hyderabad, Jhakkar
pH	7.5 – 10.6 (Average 8.20)
Electrical Conductivity (dSm^{-1})	0.12 – 48.6 (Average 3.74)
Organic Matter (%)	0.1 – 2.14 (Average 0.77)
Available Phosphorus (ppm)	1 – 28 (Average 4.17)
Extractable Potassium (ppm)	26 – 400 (Average 190)
Farmers availing soil-test facility (%)	7
Farmers availing water-test facility (%)	3

Map source: Information Management Unit, FAO Pakistan

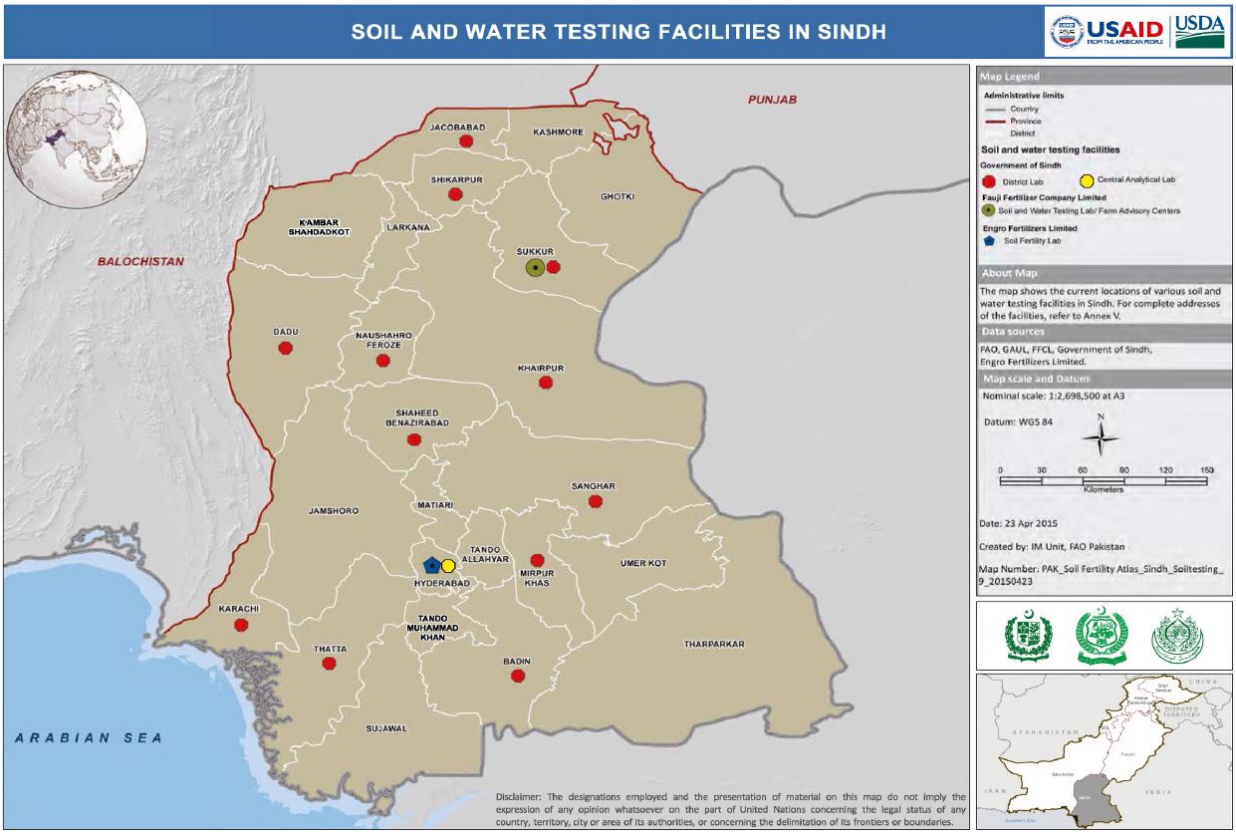
Source:
District Soil Survey Reports, Soil Survey of Pakistan
Farm Advisory Services Centers, Fauji Fertilizer Company Limited (FFCL)
Rapid Fertilizer Use Assessment, FAO (2015)
Land Cover Atlas of Sindh (FAO, SUPARCO and Government of Sindh)

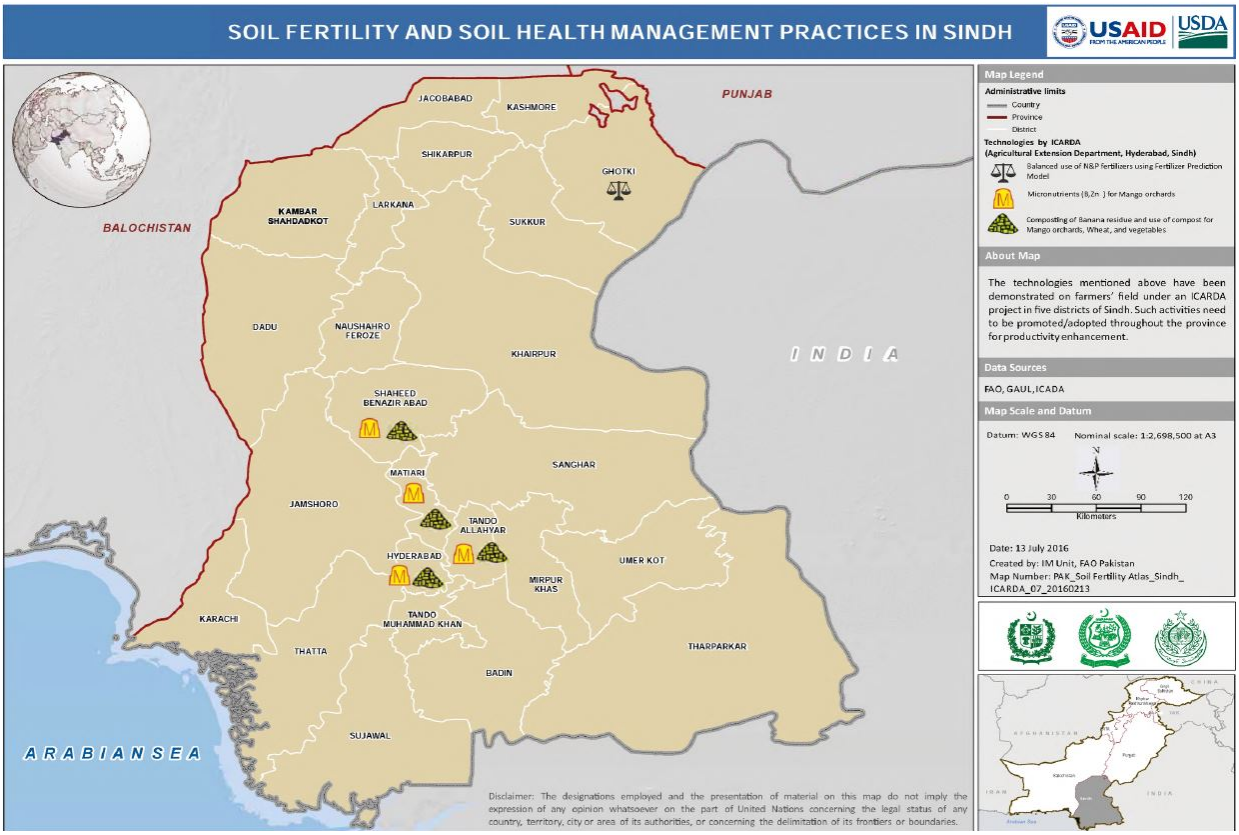
85. **Key Soil Fertility Issues:**



86. As visible in the map, the top three soil problems faced within Sindh are salinity, water-logging, and sodicity. Between 51-75% of farmers in Sanghar suffer from all three of those issues. In Umerkot, 26-50% of farmers suffer from salinity and water-logging, whilst less than 25% suffer from sodicity. In contrast, Badin has fewer than 25% of its farmers suffering from salinity and water-logging, and data on sodicity was unavailable. "Other problems", which included "shortage of water, load shedding, high inputs and low commodity prices" were, likewise, less prevalent in Badin (<25% farmers experiencing other problems); somewhat prevalent in Umerkot (between 26-50% farmers); and highly prevalent in Sanghar (76-100% of farmers).

87. **Existing Facilities and Management:** District-level soil and water testing labs are available in Sanghar and Badin, but not in Umerkot. Hyderabad, the location of the Provincial Project Implementation Unit, hosts the province's Central Analytical Lab. Soil health management practices were introduced by ICARDA in five provinces of Sindh, however these do not overlap with the project area.



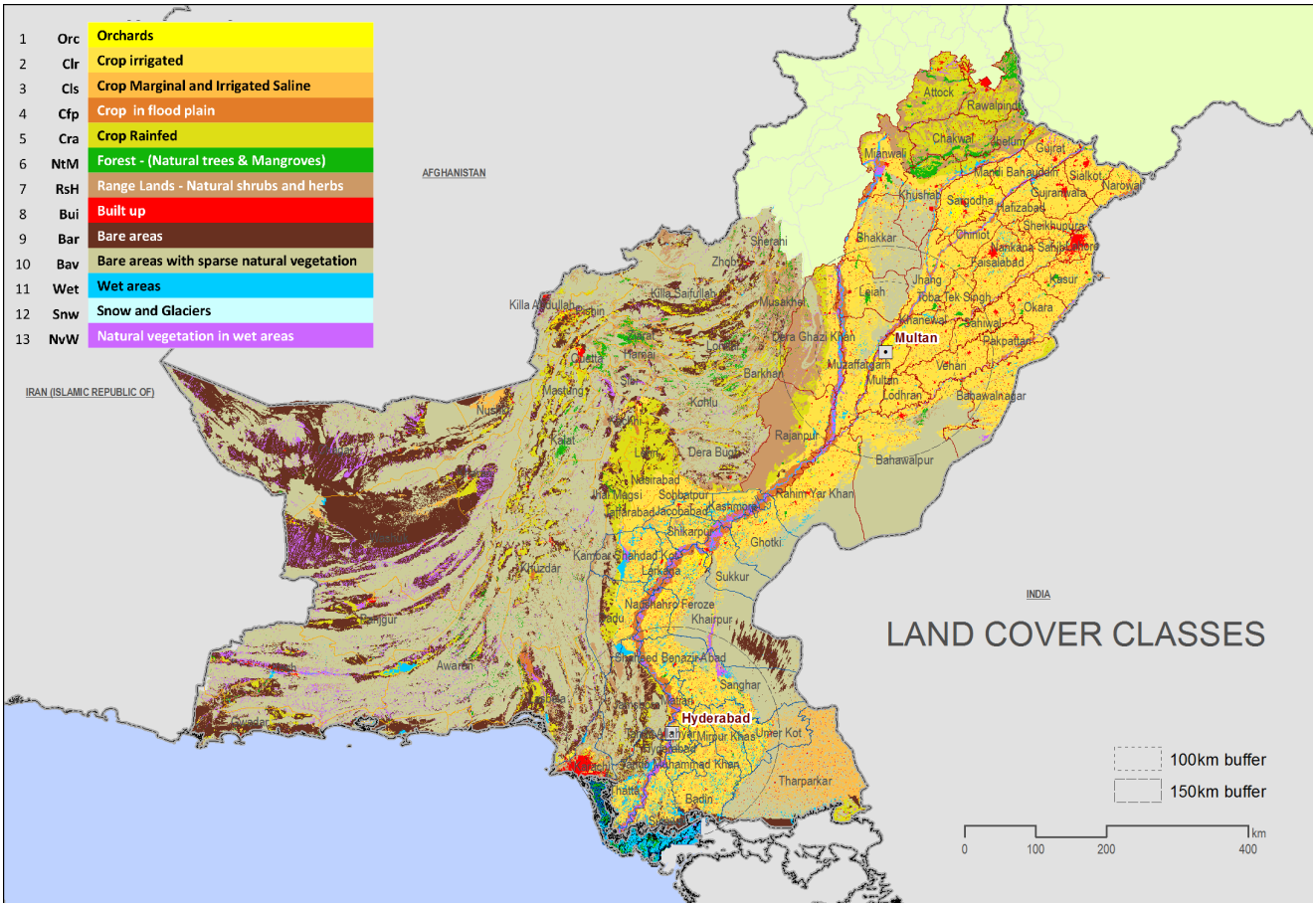


3.2.3 Land Use

88. FAO land cover data was produced in 2013 through visual interpretation of SPOT-5 images from 2010 at 5 m spatial resolution. The legend for land cover mapping was created by FAO in consultation with

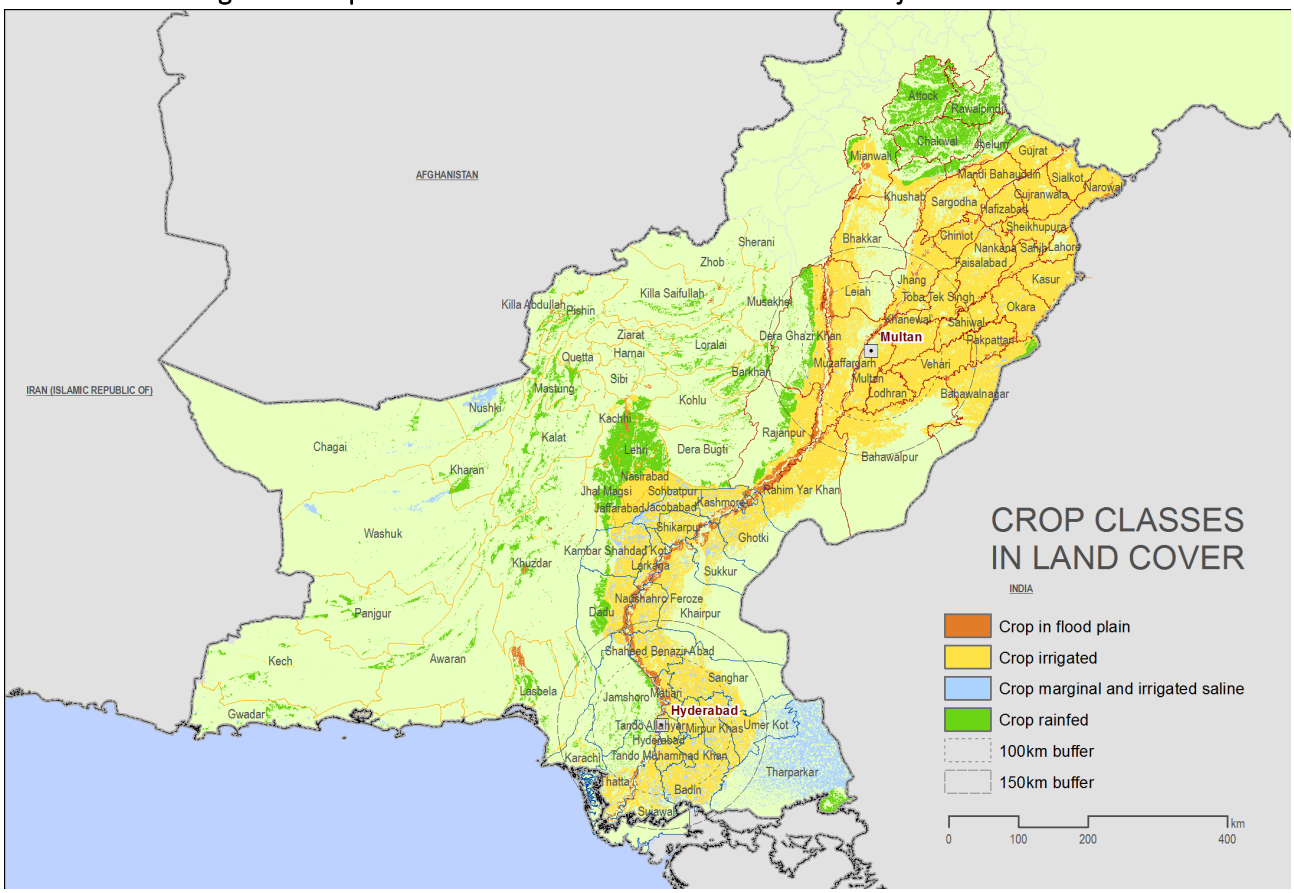
SUPARCO and representatives of the Crop Reporting Services. The classification was available at full level with 36 different classes and at aggregated level with 13 classes as per Figure 5.

Figure 5. Land Cover Classes



89. Among the 13 classes above, four of them were crop-related: Crop irrigated, Crop Marginal and Irrigated Saline, Crop in flood plain and Crop Rainfed. The crop-related classes were extracted to produce the agricultural mask of the land cover as per Figure 6.

Figure 6. Crop-related classes in the FAO land cover for Punjab and Sindh.



90. A breakdown by district, in kilometers squared (km^2), is provided in Table 5 for Punjab and Table 6 for Sindh.

Table 5. Land Cover (km^2) in Punjab Project Districts

Land Cover	DG Khan	Khanewal	District Lodhran	Multan	Muzaffargarh
Bare Areas	19	3	2	0	2
Bare areas with sparse natural vegetation	1609	0	18	34	1163
Built up	162	167	84	259	147
Crop in flood plain	351	88	1	163	735
Crop irrigated	2520	3703	2508	2658	4434
Crop marginal and irrigated saline	39	28	23	19	56
Crop rainfed	1798	0	0	0	0
Forest (Natural trees and mangroves)	53	56	6	0	5
Natural vegetation in wet areas	497	25	2	92	453
Orchards	5	159	10	356	258
Range lands (natural shrubs and herbs)	4392	45	2	1	55
Sea Water					
Wet Areas	221	87	13	67	381

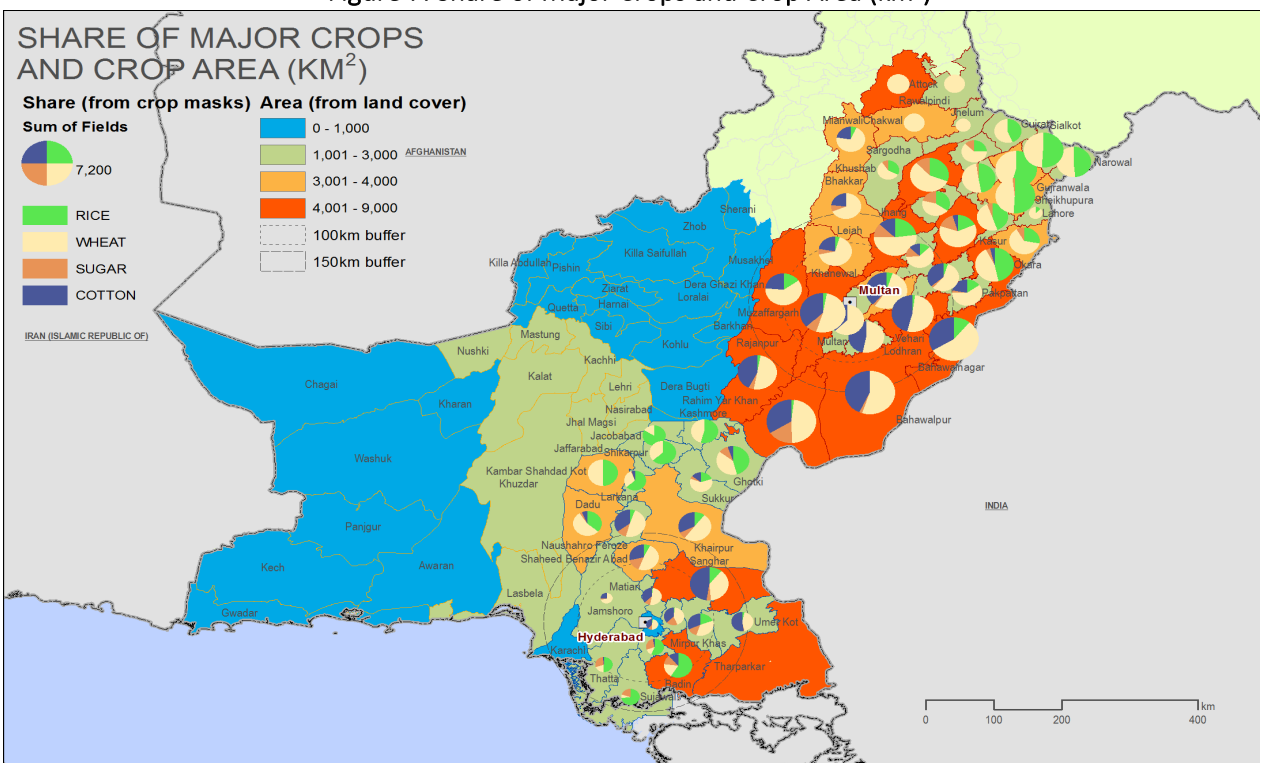
Table 6: Land Cover (km^2) in Sindh Project Districts:

Land Cover	Badin	District Sanghar	Umerkot
Bare Areas	354	310	9
Bare areas with sparse natural vegetation	32	4754	2051
Built up	132	175	100
Crop in flood plain	0	0	0

Land Cover	Badin	District Sanghar	Umerkot
Crop irrigated	4505	3561	1779
Crop marginal and irrigated saline	860	517	1137
Crop rainfed	0	0	0
Forest (Natural trees and mangroves)	14	23	3
Natural vegetation in wet areas	0	257	0
Orchards	16	48	26
Range lands (natural shrubs and herbs)	166	114	138
Sea Water	4	0	0
Wet Areas	454	387	243

91. FAO/SUPARCO crop masks and FAO land cover data were aggregated at district level and visualized together to show the districts with a larger agricultural extent and the relative occupancy of the four major crops. Figure 7 depicts the share of the four major crops from the FAO/SUPARCO crop masks in Punjab and Sindh (bigger pie charts meaning higher sum of the four crops area per district with a maximum of 7 200 km^2). The background colours of the map show the sum of the area of the four crop-related classes from the aggregated land cover classification, displayed as choropleth (thematic map where each area is shaded according to the values of a variable).

Figure 7. Share of Major Crops and Crop Area (km^2)



92. Crop masks across the province can be seen in the following four figures (Figures 8-11) for rice, wheat, sugarcane, and cotton.

Figure 8: FAO/SUPARCO Rice Mask

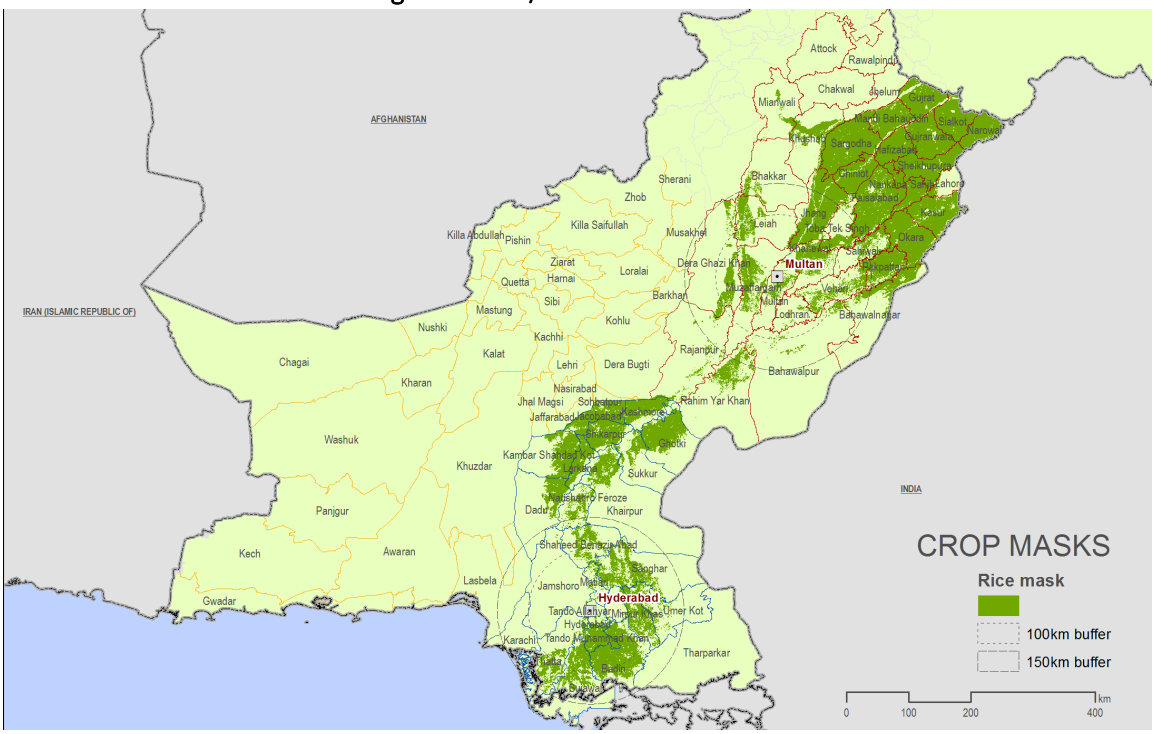


Figure 9: FAO/SUPARCO Wheat Mask

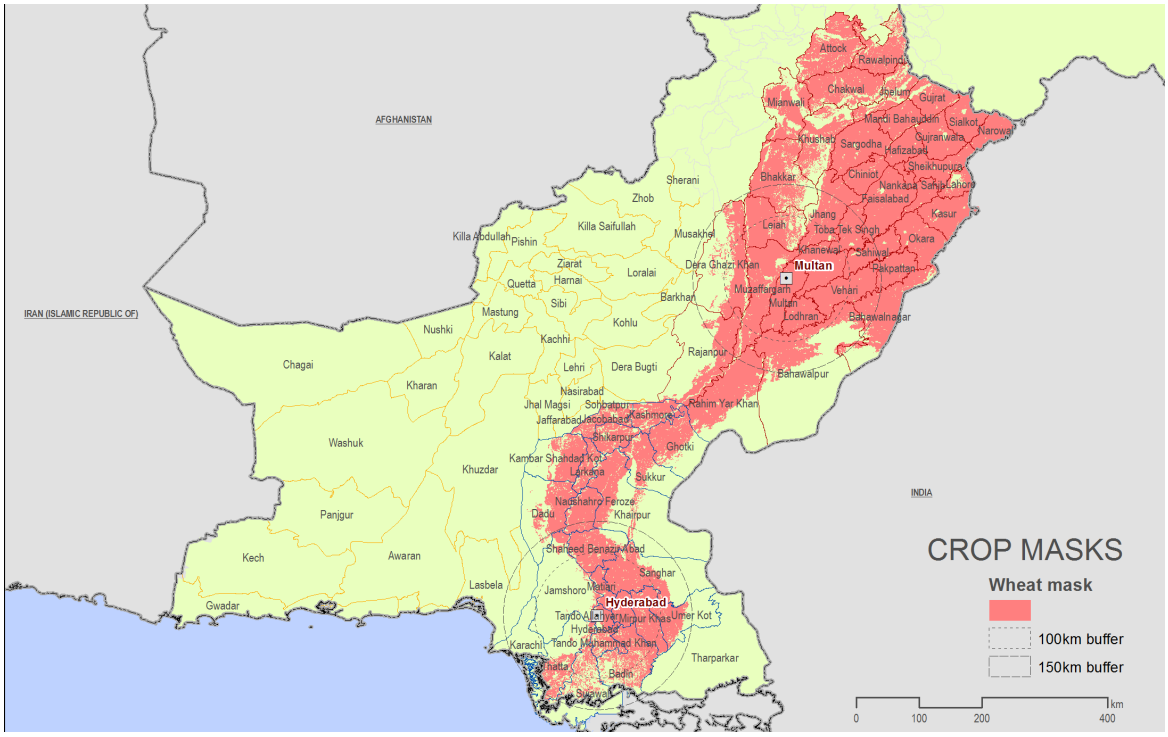


Figure 10: FAO/SUPARCO Sugarcane Mask

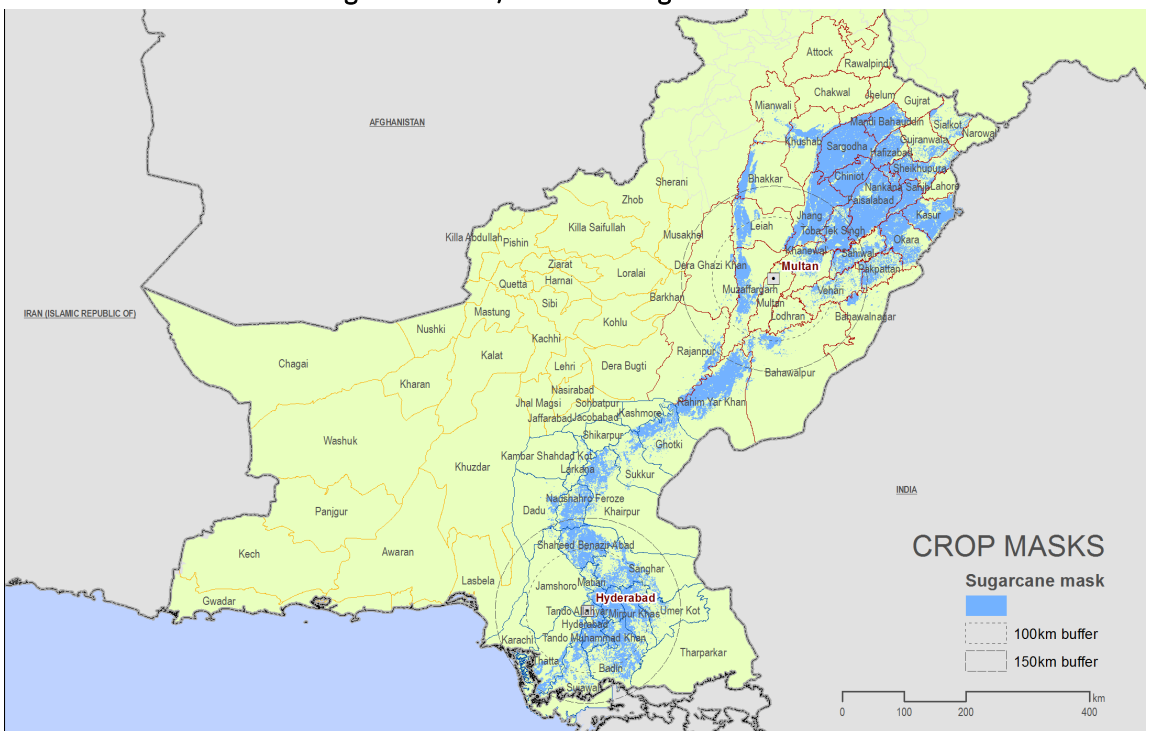
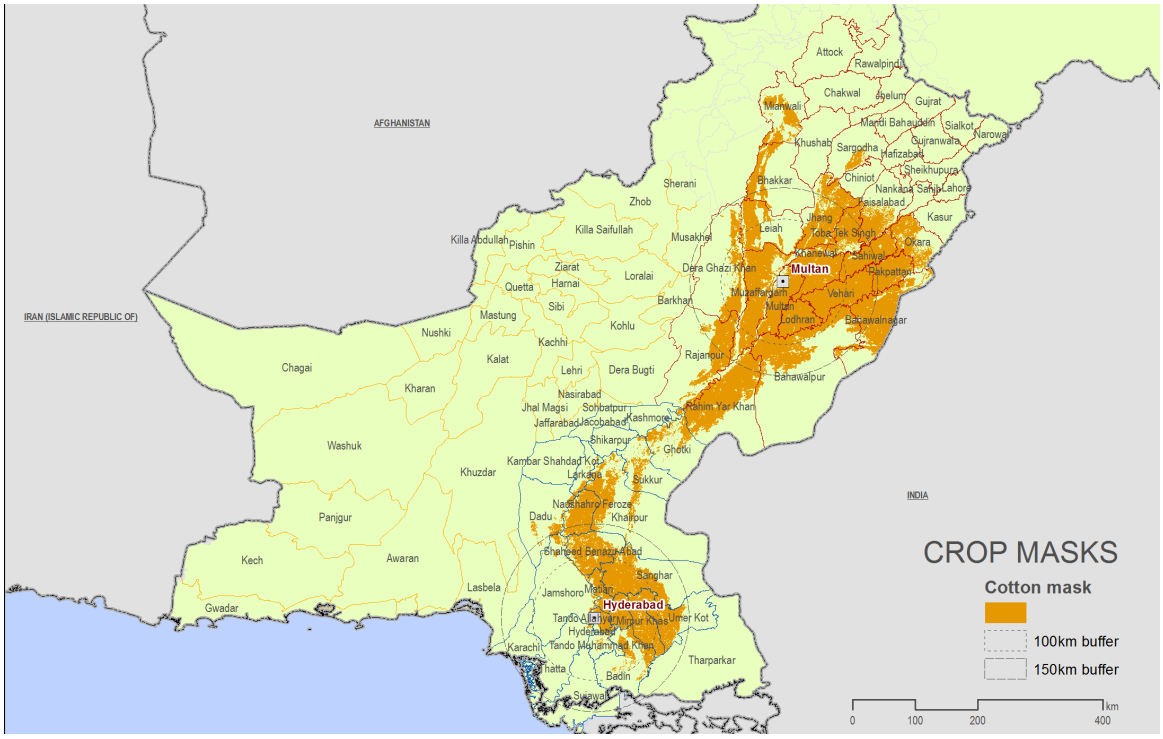


Figure 11: FAO/SUPARCO Cotton Mask



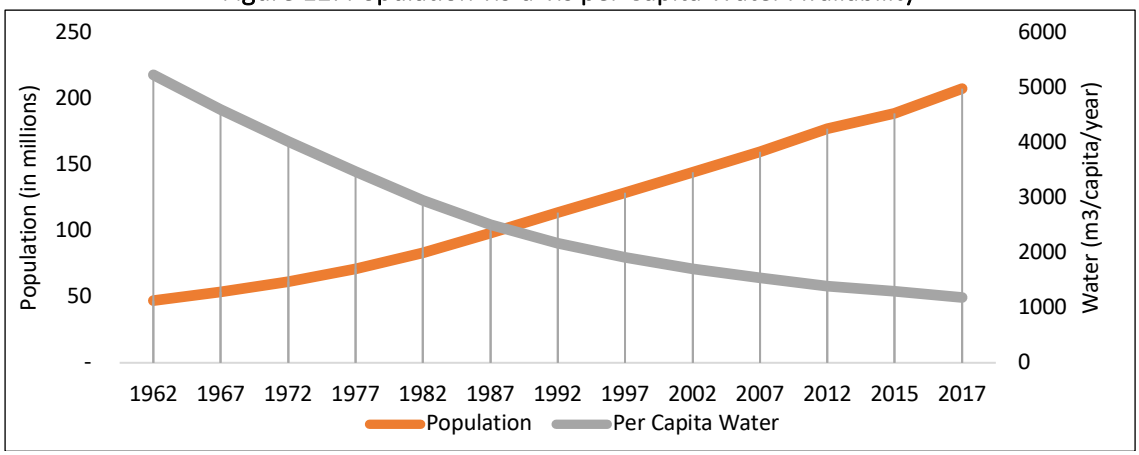
3.2.4 Water Resources

93. Pakistan is one of the 36 most water-stressed countries in the world (expected to become water scarce). With limited quantities of surface water (239.2 billion cubic meters: BCM[18]) and groundwater (55.0 BCM), the country is closer to becoming a water scarce nation, mainly due to its fast-growing population (at 2.4% per annum). With the latest population estimate of 207.774 million—of which 63.6% lives in rural

[18] *1 BCM = 0.81 Million Acre Feet (MAF)*

areas—the per capita water availability has further reduced to approximately 1 188 m^3/year from approx. 5 237 m^3/year in 1962 (Figure 12). Interprovincial disparity in population distribution vis-à-vis water availability makes this equation even more complex. The country's water balance is influenced by its increasing population, reliance on a single river system (Indus River Basin), and its arid climate. For in depth information on Pakistan's water resources, please refer to the Appendices of the Feasibility Study (specifically, *"Climate Change Impact on Water Availability in the Indus Basin"*) of the Full Project Funding Proposal may be consulted.

Figure 12: Population vis-à-vis per Capita Water Availability



Source: FAO. 2016. AQUASTAT Main Database. Accessed on 6 Nov 2017; and Provisional Summary Results of 6th Population and Housing Census 2017

94. **Indus River Basin:** The Indus River[19] is a major trans-boundary river in Asia[20] with nine tributaries.[21] Glacier/snow melt and precipitation in the Upper Indus Basin are the main sources of flow in Indus river network. The Indus River, two large western tributaries (Jhelum and Chenab) and two eastern tributaries (Ravi and Sutlej) enter into Pakistan from India. One of the western tributaries, the Kabul River is shared with Afghanistan; its watershed starts in Pakistan, traverses through the Kabul valley and then r re-enters into Pakistan, close to Nowshera. Under the Indus Water Treaty, signed between Pakistan and India in 1960, the eastern rivers, Ravi and Sutlej were allocated to India; only flood runoff is discharged into Pakistan over the course of a couple of weeks after India built storages in the upper reaches of the rivers. Resultantly, there can be years of no flows in these rivers.

95. Based on the stream hydrology and morphology, the Indus River can be broadly divided into three segments: (i) the upstream segment, from the Singi Khahad spring down to Jinnah Barrage; (ii) the midstream segment, between Jinnah and Guddu barrages; (iii) and the downstream segment, from Guddu Barrage to the Arabian Sea. The upstream segment is largely a hilly catchment area; the midstream segment is an upper floodplains area dominated by a braided pattern of channels and tributary inflows; and the downstream segment is a lower floodplains area and has a flat topography, a meandering channel pattern and deltas. The upper Indus Basin catchment is further sub-divided into four zones based on basin's

[19] *The Indus River is about 2,800 kilometres (km) long, with 2,682 km in Pakistan. Its alluvial plain area is about 207,200 km², while its deltaic area is about 20,000 km2. It originates in the Tibetan tableland at Singi Kahad spring, on Kailas Parbat (mountain) near Mansarwar Lake. It then passes through the Himalayan range, and collects runoff from the Hindu Kush and Sulaiman ranges. Its annual water runoff is about 200 cubic kilometers, and sediment discharge is approximately 200 billion kilograms yearly (Pakistan Water Gateway; accessed 29 November 2011)*

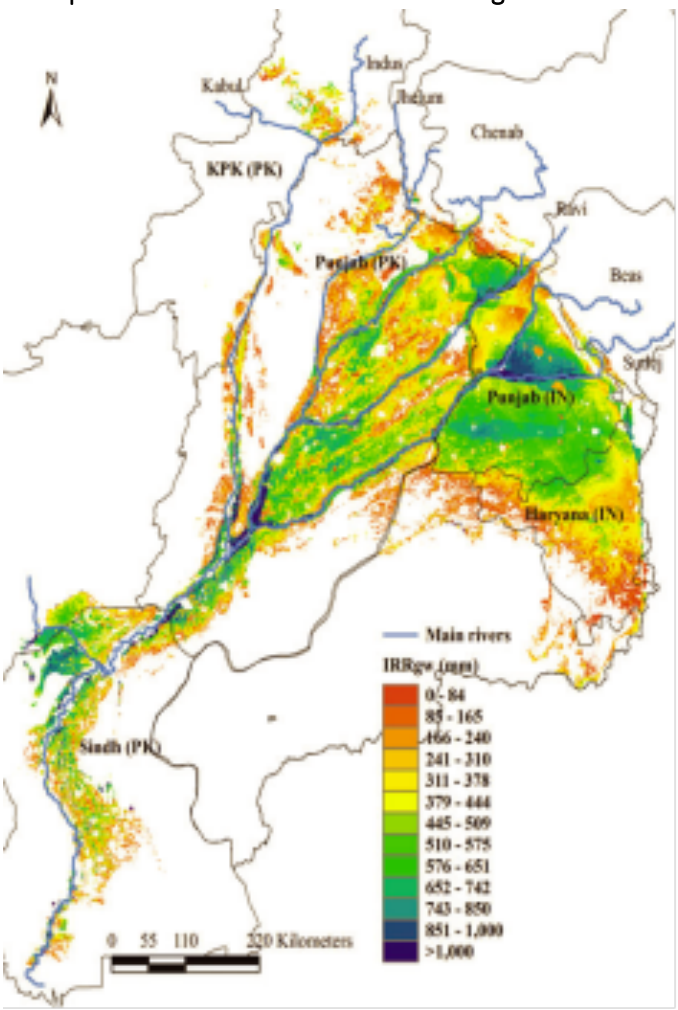
[20] *Others include the Amu Darya (Afghanistan, Turkmenistan, and Uzbekistan), Amur (People's Republic of China [PRC] and Russian Federation), Brahmaputra (Bangladesh, PRC, and India), Euphrates (Iraq, Syria, and Turkey), Ganges (Bangladesh and India), Mekong (Cambodia, PRC, Lao People's Democratic Republic, Myanmar, Thailand, and Viet Nam), and the Tigris (Iraq, Syria, and Turkey).*

[21] *Five of them are on the left bank with upper catchments of Beas, Ravi, and Sutlej in India while Chenab and Jhelum are in Pakistan. The main right bank tributaries are the Gomal, Kabul, Swat and Kurram rivers.*

geophysical and hydro-climatic characteristics:[22] zone one - more than 5,500 m above sea level (asl); zone two - 4,500–5,500 m asl; zone three, 3,000–4,000 m asl; and zone four, 1,000–3,000 m asl. Detailed information on historical inflows and mean annual discharge can be found in the Appendix of the Feasibility Study (*"Climate Change Impact on Water Availability in the Indus Basin"*).

96. **Groundwater:** Groundwater has evolved as a reliable water resource in all of Pakistan's water use sectors. Industrial and domestic supplies almost fully rely on groundwater pumping (though sometimes through an artificially developed recharge zone adjacent to a surface waterway). In agriculture, groundwater compensates for the shortage of surface supplies. Riverine areas extensively use fresh aquifers during the dry season. Globally, Pakistan is the fourth largest user of groundwater according to a recent report by the National Groundwater Association of the United States of America (2015). 'Facts about Global Groundwater' shows that India extracts water from aquifers at a rate of 251 km^3/year, followed by China and the USA, both extracting 111 km^3/year, and then by Pakistan, which extracts 65 km^3/year. As a percentage of total available water resources, Pakistan has the highest reliance on groundwater. A basin-level estimate of groundwater using hydrological modelling with the Soil and Water Assessment Tool (SWAT) was carried out by Cheema et al in 2012. Spatial presentation of the model output is generated using remote sensing information and GIS data, as shown (Figure 13). The study concludes: 'Irrigation is the largest consumer of water in the Indus basin that is using both surface (113 km^3 or 434 mm) and groundwater (68 km^3 or 262 mm) to meet crop water requirements'.

Figure 13: Spatial Map of Groundwater Abstraction in Irrigated Areas of the Indus Basin.



Source: Cheema, 2013

[22] *Hewitt, K. 1989. The Altitudinal Organization of Karakoram Geomorphic Processes and Depositional Environments. Zeitschrift für Geomorphologie, Supplementband. 76. pp.9–32.*

97. The underlying aquifer covers about 16 million ha (Mha) of surface area, of which 6 Mha are fresh and the remaining 10 Mha are saline.[23] The volume of usable ground water in storage is estimated at 2 470 BCM. The calculated amount of water that can be withdrawn from the aquifer without causing significant ecological impacts (i.e. the safe yield) estimated for agriculture, domestic and industrial sectors is about 68 BCM, and extraction is already approaching 51 BCM.[24] The gap between crop water requirements and surface water availability is met through groundwater, leading to the rapid expansion of private tube-well installation and usage.

98. Currently, around 1.355 million small capacity private tube-wells are operating in Pakistan, out of which 1.02 million[25] are located in Punjab, extracting 52 BCM of groundwater.[26] These tube-wells (exclusively) and combined with canal water irrigated 19 percent and 42 percent of cultivated land, respectively, in Pakistan accounting for more than 60 percent of farm gate water.[27] This uncontrolled and unregulated extraction of groundwater in excess of recharge is lowering the water tables making groundwater inaccessible in 5 percent and 15 percent of the irrigated areas of Punjab and Balochistan provinces, respectively, which are likely to reach 15 and 20 percent if the current trend continues.

99. **Water Quality:** The water quality of rivers, lakes and canals in Pakistan has been degrading[28]. The causes of this degradation include the direct discharge of city and industrial effluence into water bodies, failure of surface drainage networks and the trans-boundary inflow of polluted water. The water quality deterioration of freshwater bodies is directly linked to the flushing potential of the system and balanced groundwater recharge. A few examples of water pollution in surface bodies are given below. The sources of pollution can be linked to wastewater or effluence management:

- Ravi pollution from toxic industrial and domestic effluent from India and Pakistan, especially from Lahore city;
- Kabul river pollution from urban and domestic effluent;
- Chenab River reaches pollution from urban and industrial effluent;
- Lower Indus lakes pollution from urban effluent and irrigation drainage; and
- Decreasing freshwater supplies and resilience in natural ecosystems caused by pollution.

100. The increases in temperature can be linked to bacterial growth, high turbidity, low efficiency of coagulants, and re-growth of germs, mosquitoes and other water pollutants. The water quality profile of Pakistan's surface water bodies has a strong north–south trend. Water pollution increases in high temperature and low rainfall regions.

101. Groundwater extraction is now showing signs of overexploiting the resource, with high levels of salt accumulating in the system and significant negative effects on water quality from industrial, municipal and agricultural wastewater pollution.[29] An average of roughly 20 million tonnes of additional salt is stored in the Indus Basin, which means on average one tonne of salts is added to each hectare of irrigated land[30]. Sindh province suffers most from issues of salinity, as over 50% of the irrigated area is saline. Brackish groundwater explains why tube well irrigation is lowest in Sindh. It is causing increase in the salt-affected soils to more than five million hectares, over 22 percent of Pakistan's irrigated lands. Groundwater over-extraction and the installation of over 1 million private tube- wells has led to severe decline in the

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[23] A.S.Qureshi, M.A.Gill, and A.Sarwar, 2010, Sustainable groundwater management in Pakistan: Challenges and opportunities, Irrigation and Drainage, Vol. 59, Issue 2:107-116.

[24] Arshad Rafiq and Khawar Shahzad (eds.), Groundwater Management in Pakistan: An Analysis of Problems and Opportunities, LEAD Pakistan 2016

[25] Development Statistics of Punjab, 2015-16

[26] A.S. Qureshi, op.cit.

[27] Statistical Supplement of Economic Survey of Pakistan, 2016-17

[28] Environmental Concerns Study II & III, 2005; PCRWR, 2007 and PCRWR, 2011; and drinking water schemes reports

[29] Kahlowm & Majeed, 2002

[30] Qureshi A. S., 2011

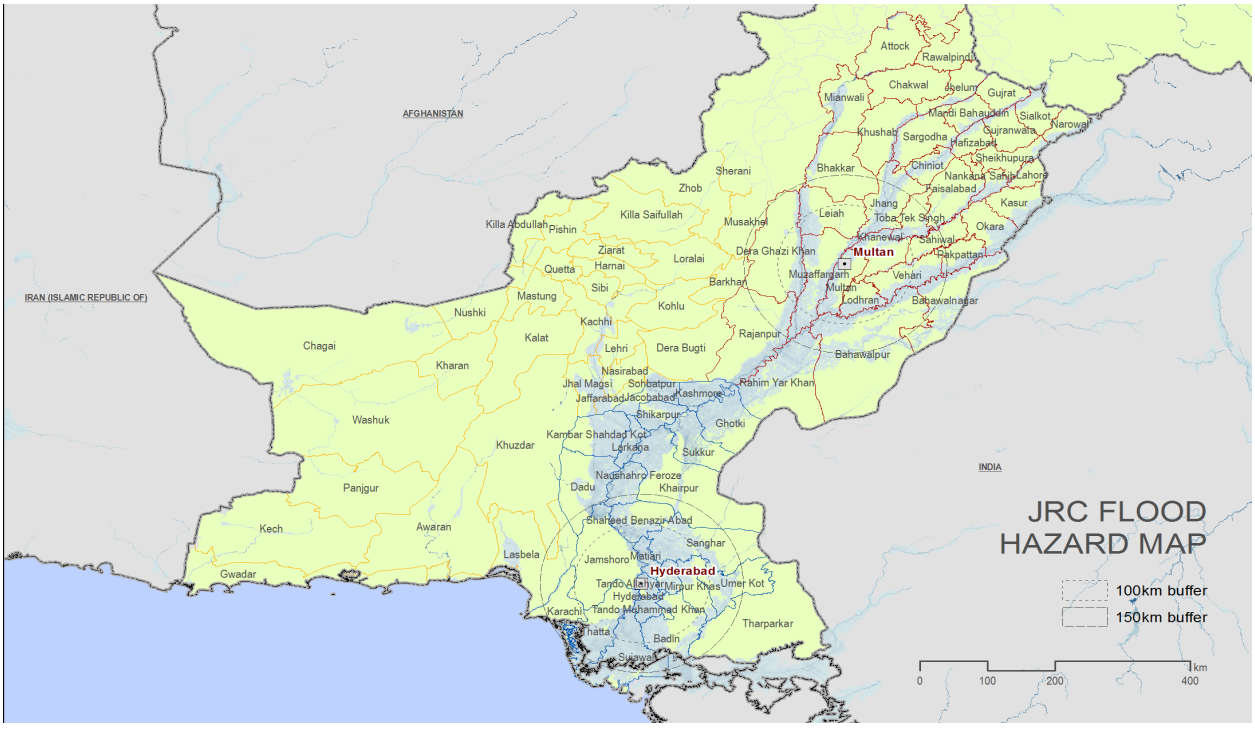
groundwater table in some areas, forcing farmers to dig deeper at higher costs and further increasing water scarcity.

102. The quality of groundwater ranges from fresh (salinity less than 1 000 mg/1Total Dissolved Solids (TDS) near the major river (49 percent), to moderate salinity between 1 000 - 3 000 mg/1 TDS (15 percent) and high salinity with more than 3 000 mg/1 TDS (36 percent), farther away. Some 14.2 million acres are underlain with groundwater having salinity less than 1 000 mg/l TDS, 4.54 million acres with salinity from 1 000 to 3 000mg/l TDS and 10.57 million acres with salinity more than 3000 mg/l TDS.

103. **Water Withdrawals:** Pakistan withdraws around 61.6 BCM of groundwater every year while the estimated renewal of groundwater is only 55 BCM per annum. This has resulted in rapid sinking of groundwater table in high extraction zones. Freshwater withdrawal is 74.4 percent of the total renewable water resources, while the imported groundwater depletes at the rate of 1.4 m^3/year/capita. Degraded quality of ground as well as fresh water due to contamination by agricultural residues from fertilizers and pesticides, and industrial and municipal effluents is another dimension of water scarcity being faced by Pakistan.

104. **Floods:** The Indus Basin has always been prone to flooding, however extreme floods have become more prevalent in recent years. Flood hazard data were obtained from the Joint Research Centre Data Catalogue of the European Commission to provide information at district level (Figure 14) and data were aggregated per district. This collection contains a set of flood hazard maps and the map depicts flood prone areas at the global scale for flood events with 10-year return period. Resolution is 30 arc-seconds (about 1 km). The map can be used to assess flood exposure and risk of population and assets. The 10-year return period data were chosen among the other existing datasets (20, 50, 100, 200 and 500 years return period) as being more appropriate for the project lifespan.

Figure 14: Joint Research Centre 10-year Return Period Flood Hazard Map



105. An increase in large and local flooding in the Indus River and its tributaries has occurred during the last three decades. Records from the past 100 years show that seven of the ten worst floods in the Ravi have occurred in the last 25 years. In 1992, an exceptionally high flood of about 31 000 m^3/sec occurred in the

Jhelum River at Mangla – this was the worst flood since 1959[31]. Heavy pre-monsoon floods occurred in Pakistan again in June 2005. These floods were a result of unprecedented melting of glacial snow due to an increase in temperature. There was no contribution of rains to these floods.

106. In Pakistan most major flooding events are associated with heavy rainfall during the summer monsoon period. Data from the PMD covering the years 1913-2016, indicate that the ten largest rainfall events in the recorded in the country have all occurred since 2001[32]. All but three of these extreme events occurred in Sindh and Punjab provinces targeted by the project. The Sindh and Punjab districts, located at the bottom of the Indus River Basin, are particularly vulnerable to flooding. In 2010, flooding affected or displaced 18,699,000 people in Pakistan. Of those, approximately 40% were located in the Sindh district and 32% in Punjab. In 2011, of the 5,800,000 people affected or displaced by flooding, over 91% of those people were in the Sindh province. Flood events in 2012, 2013, 2014 and 2015, all greatly impacted the inhabitants of these two provinces in particular.

107. **Glacial Lake Outburst Flooding (GLOF):** In the Upper Indus River system, 35 destructive GLOF events were recorded in the past 200 years; however, there have been few catastrophic floods in recent history. For example, a GLOF from the Shyok area in August 1929 extended 1 300 km downstream to Attock and had a discharge greater than 15 000 m^3/sec[33].

108. Hewitt (2005 and 2008) reported that the larger glaciers in the Central Karakoram are expanding and the number of glacier surges increasing. He agrees with Archer (2002) that the Karakoram Mountains are at high risk of glacial outburst floods generated by surging tributary glaciers blocking the main un-glaciated valleys. These studies attributed the glacier surge to the overall decreasing trend in summer mean and minimum temperatures and an increasing trend in winter precipitation in recent decades from stations in the upper Indus basin[34]. Reduced runoff, measured by the gauging stations in the heavily glaciered catchments of the area, was also reported by these studies[35]. High elevations, the shielding effect of debris coverage and snow layer above the glaciers, combined with a possible increase in orographic precipitation lead to the largest accumulation of ice[36]. Other GLOF studies include Bocchiola (2016), Lutz et al. (2013), and Din et al., (2014).

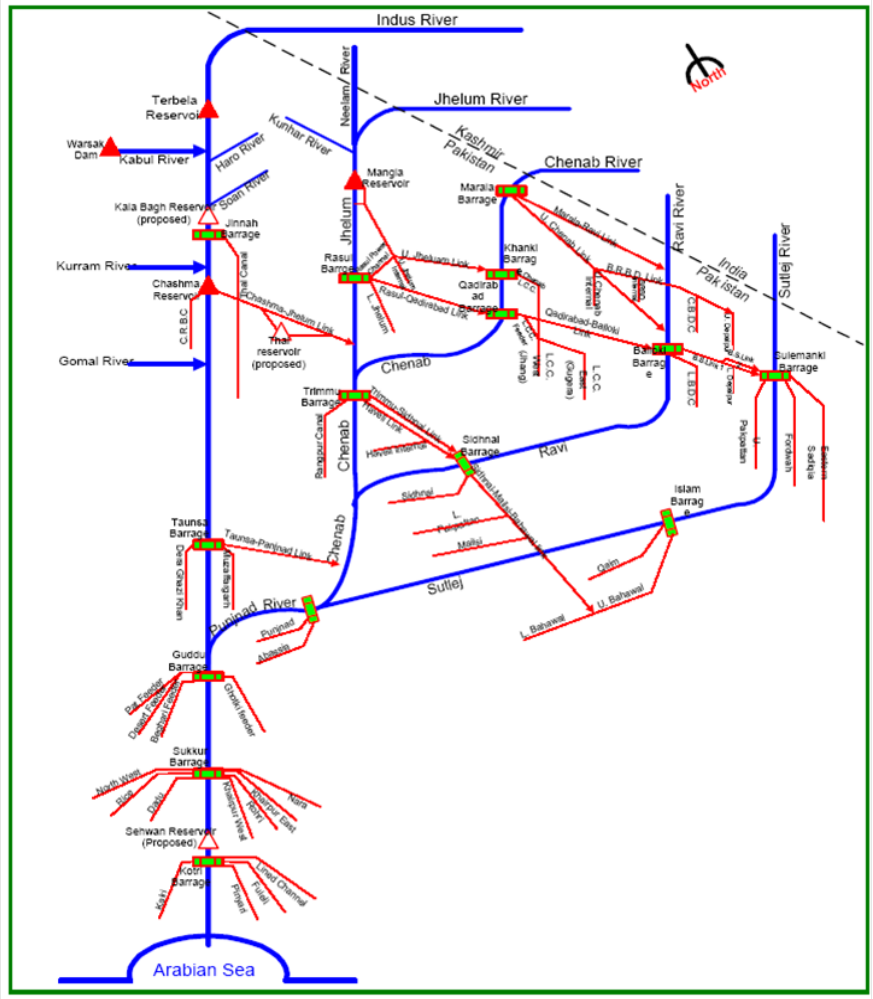
3.2.5 Irrigation System

109. The Indus Basin Irrigation System (IBIS) is the largest contigious irrigation system in the world. Pakistan's food security and water supply for all sectors of the economy is depending upon IBIS. Overall, IBIS irrigates about 18 million hectares (ha) or land in Pakistan.

110. The Indus Basin Irrigation System has: (i) three major multipurpose storage reservoirs (Mangla, Tarbela and Chasma); (ii) 19 barrages; (iii) 12 inter-river link canals; (iv) 45 major irrigation canal commands (about 56 000 km); and (v) more than 120 000 km of watercourses. In tandem with a vast and growing process of groundwater extraction through private tubewells, IBIS delivers water to farms and for other productive uses, and is the backbone of the country's agricultural economy (see Figure 15).

[31] *Sheikh, 2002*
[32] *PMD, 2018*
[33] *APNA, 2005*
[34] *Archer and Fowler, 2004; Bocchiola and Diolaiuti, 2013*
[35] *Hewitt 2005; Archer 2003; Sharif et al., 2013*
[36] *Scherler, 2011a; Minora, 2013*

Figure 15: Schematic Diagram of the Indus Basin Irrigation System (IBIS)



111. The infrastructure developed under the Indus Water Treaty of 1960 has helped improved water resource availability basin wide increasing canal diversions from 67 MAF in 1949/50 to about 106 MAF out of total annual flows of 146 MAF. The designed live while storage capacity of Indus Basin is 18.92 MAF, which includes 9.7 MAF of Tarbela, 8.51 MAF of Mangla and 0.71 MAF of Chashma is around 14 percent against world average storage capacity 35-40 percent. But due to silting, this live storage capacity has been reduced to 12.32 MAF showing a loss of 35 percent, which is for 30 days requirement against India's storage capacity of 120 days.

112. **Storage Capacity:** The live storage capacity in dams has dropped by about 35% mainly because of continuous accumulation of silt. The low storage capacity and high conveyance losses can also be attributed to inadequate asset management capacities and poor asset management. A major obstacle in developing high-return infrastructure in Pakistan has been lack of a fair and transparent approach to sharing the costs and benefits of water. Low capacity is further exacerbated by lack of adequate resources due to nominal irrigation tariffs and poor cost recovery.

3.2.6 Agro-Ecological Zones and Eco Regions

113. Pakistan is divided into ten agro-ecological zones (AEZs) (Figure 16), as determined by PARC's 1980 analysis, and five eco regions (Figure 17), as determined by the Global 200 Analysis.

Figure 16: Agroecological Zones of Pakistan[37]

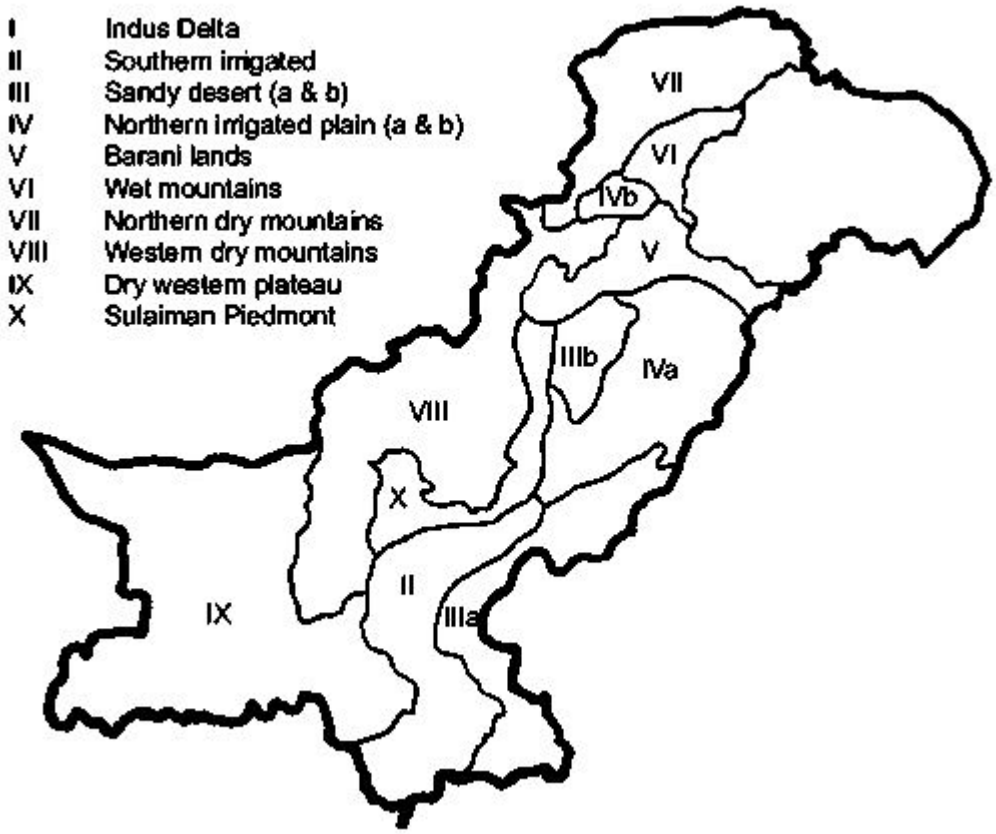
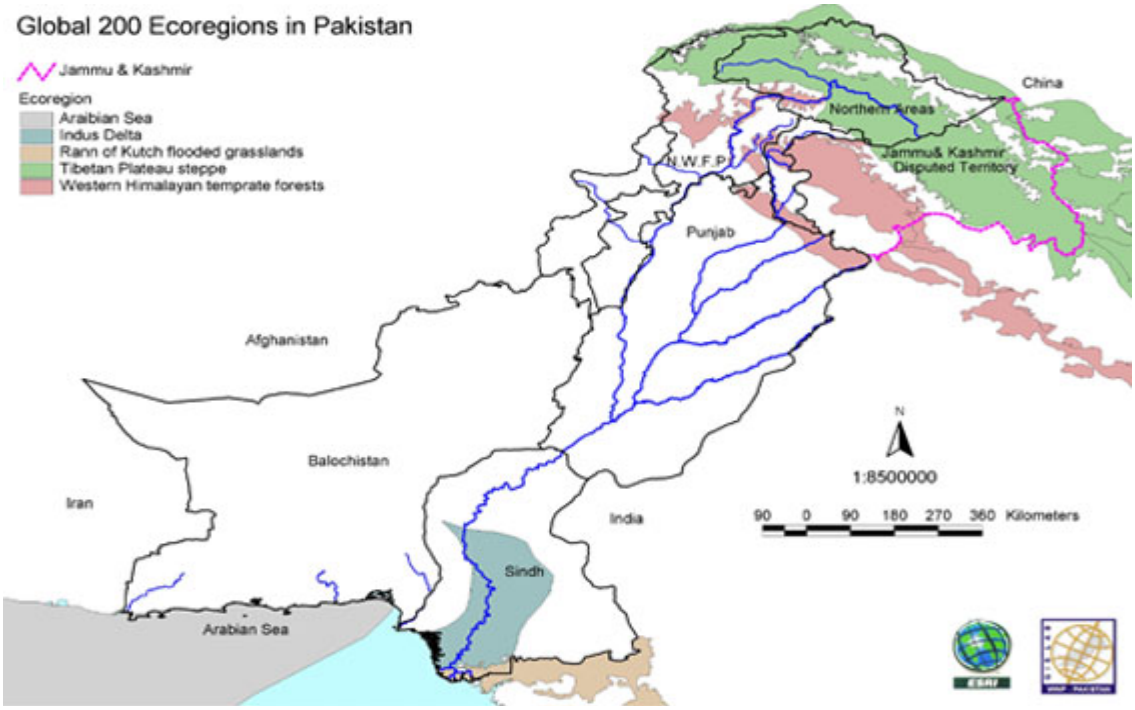


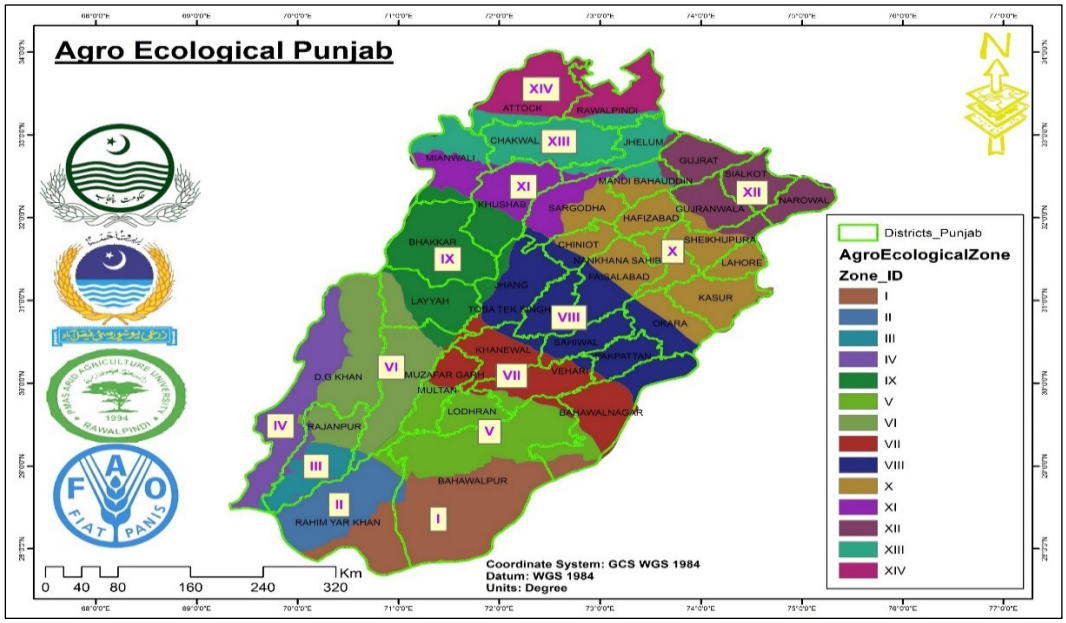
Figure 17: Ecoregions of Pakistan[38]



114. More recently, FAO and the University of Agriculture, Faisalabad (UAF) partnered together to complete a new mapping of AEZs at a finer scale, for Punjab province, based on the latest climate, edaphic, and cropping data available. Figure 18 shows the latest AEZ mapping for Punjab province, as of 2017.

[37] *Taken from: http://www.fao.org/docrep/007/y5460e/y5460e06.htm*
[38] *Taken from: http://foreverindus.org/ie_introduction_ec_pakistan.php*

Figure 18: Agro-Ecological Zone Map of Punjab Province, with District Overlay



115. Characteristics of each AEZ can be found in Table 7.

Table 7: Punjab AEZ Characteristics

Zone ID	Zone Name	Max. Temp.(0C)	Min. Temp.(0C)	Rainfall (mm)	ETO (mm)	Soil Type	pH	EC
I	Cholistan Desert	30.41	19.9	230	3.2	Mostly Sandy	7.8-10.6	0.05-27.5
II	Arid Irrigated Zone	30.51	17.32	234	3.1	Loam, Sandy Loam (9%)	7.2-13.1	0.05-27.5
III	Cotton-Sugarcane Zone	30.7	17.7	243	2.93	Sandy Loam, Clay Loam (10%), Loam (35%)	5.5-13.1	1.73-27.5
IV	Rod-i-Kohi	30.50	18.8	255	3.1	Mostly Sandy Loam	7.51-8.14	0.05-27.5
V	Semi Desert Irrigated Zone	30.75	18.79	412	2.88	Loam, Sandy Loam (20%), Clay Loam (8%)	8.6-13.1	1-27.5
VI	Mix Cropping Zone	30.84	18.6	460	2.62	Sandy Loam (55%), Loam (45%), Clay (5%) Loam	5.5-8.4	0.6-27.5
VII	Cotton Mix Cropping Zone	31.25	17.95	580	2.71	Loam, Sandy Loam (5%)	5.5-13.1	0.05-11.8

Zone ID	Zone Name	Max. Temp.(0C)	Min. Temp.(0C)	Rainfall (mm)	ETO (mm)	Soil Type	pH	EC
VIII	Maize Wheat Mix Cropping Zone	31.2	17.9	590	2.64	Loam, Sandy Loam (3%), Clay Loam(1%)	7.9-13.1	0.05-6.83
IX	Thal- Gram Crop Zone	30.4	17.98	612	2.25	Sandy Loam (50%), Sandy (35%), Loam (10%), Clay (5%)	5.5-8.4	0.05-1.7
X	Rice-Wheat Zone	30.35	17.86	760	2.74	Loam, Clay Loam (5%), Sandy Loam (3%)	5.5-13.1	0.05-1.79
XI	Thal Zone 2	30.2	17.39	1113	2.34	Sandy Loam (45%), Loam (45%), Clay Loam (5%)	5.5-8.4	0.05-3.7
XII	Rice Zone	29.5	16.34	1250	1.76	Loam (40%), Sandy Loam (20), Clay Loam (10%)	5.5-8.4	0.05-1.79
XIII	Groundnut-Medium Rainfall Zone	29.92	17.28	1620	2.1	Loam (95%), Sandy Loam (5%)	5.5-8.4	0.05-6.4
XIV	High Rainfall Zone	28.92	15.35	1780	1.95	Loam (95%), Sandy Loam (5%)	5.5-7.3	0.05-1.73

116. For the five ecoregions which the Global 200 Analysis identified in Pakistan, the Indus Ecoregion is the only one which lies fully within Pakistan's borders and which overlaps with all three of the project districts in Sindh (Badin, Sanghar, and Umerkot). Key features of the Indus Ecoregion include:

- Amongst the 40 most biologically diverse in the world
- Covers approximately 65% of Sindh Province and occupies 18 districts
- Harbours riverine forests along the Indus River and mangrove forests in the coastal areas
- Desert ecosystems occupy the peripheries of the ecoregion
- Located in a semi-arid environment

117. Threats to the ecoregion include:

- Habitat loss
- Water scarcity
- Vanishing of key species
- Destruction of forests
- Disappearance of migratory birds

118. Another eco-region which overlaps with one of the project districts is the Rann of Kutch Flooded Grasslands (Badin District). Key features of the Rann of Kutch Flooded Grasslands Ecoregion include:

- Located in the Indo-Malayan ecoregion and stretches for hundreds of square kilometers from the state of Gujarat, India and the frontier of Pakistan's Sindh desert, southward to the little Rann and

the Gulf of Kutch;

- Provides shelter to the last population of endangered Asiatic wild ass (Equus hermionus) – endemic to the area;
- Supports one of the world's largest breeding colonies of the greater and lesser flamingos (Phoenicopterus ruber and Phoenicopterus minor)
- Provides a breeding area for Grus antigone and a wintering area for migratory waterbirds (regularly supporting over 50 000 waterbirds).
- Average summer temperatures are approximately 40 degrees Celsius, but highs of 50 degrees can be reached
- Minimum winter temperatures can drop below freezing.

119. Threats to the ecoregion include:

- Cattle grazing
- Tree cutting
- Vehicular traffic
- Expansion of commercial salt extraction

3.2.7 Biodiversity and Forests

120. **Biodiversity in Pakistan:** Within the Indus and Rann of Kutch Ecoregions alone, local species include:

- **Fauna:** Hog deer (Axis porcinus), Desert fox (Vulpes vulpes pussila), Fishing cat (Prionailurus viverrinous), Indian Otter (Lutrogale perspicillata), Small Indian Civet (Viverricula indica), Indus dolphin (Platanista minor), Chinkara of Indian Gazelle (Gazella bennettii), Asiatic jackal (Canis aureus), Bengal fox (Vulpes bengalensis), Caracal or Desert Lynx (Felis Caracal); Asiatic Wild Ass (Equus hemionus khur); Ardeotis nigripes; Chlamydotis undulata; Grus antigone and Phoenicopterus minor; Gyps bengalensis; Gyps indicus; Sarcogyps calvus; Neophron percnopterus; Hyaena hyaena; Gazella gazelle; Boselaphus tragocamelus; and Canis lupus.

- **Flora:** Aak (Calotropis procera), Babur (Acacia nilotica), Baid Mushk (Eucalytputs camaldulensis), Ber (zizyphus nummularia), Devi (Prosopis juliflora), Dabh (Desmostrachya bipinnata), Gah (Eragrostis japonica), Jaar (Salvadora oleoides), Kandi (Prosopis cineraria)

121. When considering areas outside of the ecoregion, additional key species not already mentioned include:

- **Flora:** Gah (Eragrostis minor), Jaar/Khabbar (Salvadora persica), Kirar (Capparis decidua), Lai (Tamarix dioica, Tamarix aphylla, Tamarix kermanensis, Tamarix indica L.), Pan (Typha spp.), and Talhi (Dalbergia sissoo).

122. **Forests in Pakistan:** The Government of Pakistan identified 11 national forest classifications and definitions in its Global Forest Resources Assessment 2015 Country Report (Table 8).

Table 8: National forest classifications and definitions[39]

NATIONAL CLASS	DEFINITION
Coniferous Forests	These forests mostly grow in the north and north west hilly regions of Pakistan between an elevation of 1000m and 3500m.
Sub-Alpine	Betula utilis (Birch, Bhuj), Abies pindrow (Fir, Paludar)
Himalayan Moist Temperate	Abies pindrow (Fir, Palundar), Picea smithiana (Spruce, Kachal), Cedrus deodara (Deodar), Pinus wallichiana (Kail, Biar), Taxus baccata (Yew), Aesculus indica (Bankhor), Juglans regia (Akhrot, Khor), Populus ciliata (Palach), Quercus dilatita (Oak), Acer caesium (Tarkan), Prunus padus (Kalakath).

[39] *Adapted from FAO. 2014. Global Forest Resources Assessment 2015: Country Report Pakistan.*

NATIONAL CLASS	DEFINITION
Dry Temperate	Pinus wallichiana(Kail, Biar), Cedrus deodara (Deodar), Juniperus excelsa (Shur, Shupa),Pinus gerardiana (Chilgoza), Quercus ilex (Bani, Breh).
Sub-Tropical Pine	Pinus roxburghii (Chir, Chil), Quercus incana (Rin, Ring), Rhododendron arboreum (Chahan, Bras).
Scrub Forests	These forests grow up to 1000m in elevation in the north and north western regions of Pakistan. Main species include: Acacia modesta(Phulai), Olea ferruginea (Kau), Acacia nilotica (Kikar, Babul).
Tropical Thorn	Acacia nilotica (Kikar, Babul), Acacia modesta (Phulai), Prosopis cineraria (Jand, Kandi), Salvadora oleoides cineraria (Wan, Pilu), Zizyphus mauritiana (Ber), Tamarix aphylla (Farash, Ghaz), Tecoma undulata (Lahura), Nannorrhops ritchieana (Mazri)
Riverine Forests	Acacia nilotica (Kikar, Babul), Dalbergia sissoo (Shisham, Tali), Prosopis cineraria (Jand, Kandi) Tamarix dioica (Lei, Dilchhi), Populus euphratica (Bahn).
Mangrove Forests	Avicennia marina (Timur), Ceriops tagal (Chowree or Kirree).
Irrigated Plantations	Dalbergia sissoo(Shisham, tali), Morus alba (Toot), Salmalia malabarica (Simal), Populus deltoides (Sofeda, Poplar), Eucalyptus camaldulensis (Lachi, Safeda), Acacia nilotica (Kikar, Babul).
Linear Plantations Along Canals, Roads, and Railway Lines	Same as listed in the Irrigated Plantations classification, as well as some ornamental species such as Bauhinia variegata (Kachanar), Jacaranda mimosefolia (Nila Gul Mohr, Jacaranda), Cassia fistula (Amaltas), etc.

3.2.8 Natural Habitats and Protected Areas

123. As part of its commitment to the Convention on Biological Diversity (CBD), Pakistan has a national biodiversity strategy and action plan, though the most recent version that has been approved was developed in 2000 (the 2015 action plan is still in draft form), and reliable data on extent and protection of natural habitats and protected areas is very dispersed.

124. The first serious action to conserve the key ecosystems and habitats in Pakistan was made when in large number of National Parks, Wildlife Sanctuaries and Game Reserves were established under the Wildlife Act in late 1960s and early 1970. When the protected areas started receiving attention of the global conservation community and data on protected area was gathered from the countries, Pakistan listed all of its national parks, wildlife sanctuaries and game reserves as protected areas. Reviews of the protected area system were undertaken, but no follow-up action was taken to plan a protected area system in Pakistan. Vast area of natural ecosystems, except those managed as forests by the government, have undefined land tenure and are generally degraded. Thus the managed forests offer a great opportunity to conserve biodiversity in Pakistan, but unfortunately have not made part of the protected area system.

125. According to WWF[40], there are 25 National Parks, 79 Wildlife Sanctuaries, 83 Game Reserves and 114 Community Conservation Areas covering an area of 109,969 km^2 or 12.54% of the area of Pakistan. Except for a few National Parks, none of the other protected areas have a management plan. The management is limited to enforcement of wildlife laws for preventing illegal hunting and shooting. If one takes into consideration all the paper parks, coverage of protected areas exceeds international minimum recommended of 10% area.

126. **Biosphere Reserves:** There are two biosphere reserves in Pakistan (Lal Suhanra and Ziarat Juniper Forest), however both lie outside of the project areas.

127. **Ramsar Sites:** There are officially 19 recognized Ramsar sites in Pakistan, only one of which (Rann of Kutch) is found within the project districts, insofar as it begins to enter Badin District within the Thar Desert.

[40] *WWF. 2014. Management Plan: Taunsa Barrage Wildlife Sanctuary 2014-2020. URL: https://www.wwfpak.org/ecoregions/images/ManagementPlan_small.pdf*

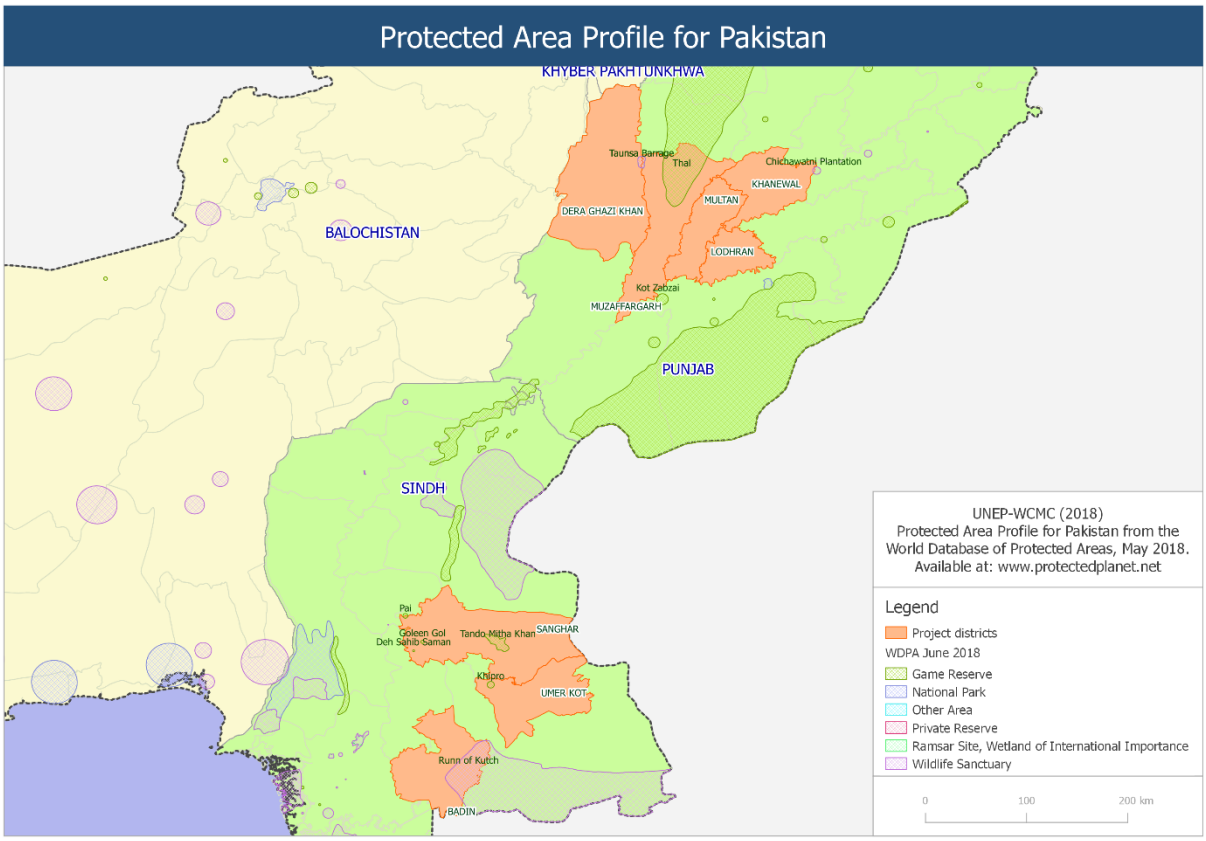
Full details on the flora and fauna of the Rann of Kutch Ramsar site was provided in the above sub-section (3.2.6) on Eco-Regions.

Relation to the Project Area:

128. A map of the Protected Area Profile for Pakistan as it relates to the project districts is provided in Figure 19. All of these areas are legally recognized by the national government, however none of these protected areas have set management plans with the exception of Taunsa Barrage Wildlife Sanctuary. Within Punjab Province, the Taunsa Barrage Wildlife Sanctuary (65.67 km^2) is located within Muzaffargarh, within Tehsil Kot Addu, and a small portion of north-east DG Khan. A management plan was developed by the World Wildlife Fund in 2014, which is valid until 2020. It has been a nationally designated site since 1972. The only other wildlife reserve which touches the northeastern border of Khanewal district is the Chichawatni Plantation, a reserved forest located in the neighbouring district of Sahiwal. Nationally designated in 1986, it has a total area of 46.66 km^2. For Punjab province districts, remaining overlap with protected areas includes the game reserves of Thal and Kot Zabzai. Game reserves recognized by the government are places where the hunting and shooting of wild animals and birds are allowed under certain conditions specified by the Forest, Wildlife and Fisheries Department. Thal Game Reserve (713.06 km^2), nationally designated in 1978, crosses into the north of Muzaffargarh District in the north. The Kot Zabzai game reserve (101.18 km^2), also nationally designated in 1978, is located within Bahawalpur District and touches the southeastern border of Muzaffargarh. Whilst these protected areas are flagged due to overlap with the project districts, the areas in which project activities will be conducted are still being determined. To avoid concerns with regard to overlap, the non-eligibility list ensures that activities in wildlife sanctuaries would not be approved.

129. Within Sindh Province, 33 Wildlife Sanctuaries are recognized, of which the project districts overlap only with the a portion of the Rann of Kutch Wildlife Sanctuary, specifically within eastern part of Badin. The Rann of Kutch (3204.63 km^2), nationally designated in 1980 and falling under IUCN Management Category IV as an internationally recognized Ramsar site (flora and fauna detailed in section 3.2.7 of this ESMF). As a wildlife sanctuary, the project will not conduct activities within the Rann of Kutch (as per the non-eligibility list). The remaining protected areas identified within project districts of Sindh province include the games reserves of Khipro (38.85 km^2) in Umerkot district, and Deh Sahib Saman (3.49 km^2), Goleen Gol (9.54 km^2), Pai (19.69 km^2), and Tando Mitha Khan (53.43 km^2) which all lie within the borders of Sanghar district.

Figure 19: Protected Areas of Pakistan with District Overlay



3.3 Social Features of the Proposed Project Area

3.3.1 Demographics

130. Since Pakistan's independence, six population censes have been conducted in the following years: 1951, 1961, 1972, 1981, 1998, and most recently in 2017. The total population of Punjab and Sindh Provinces, as per the Pakistan Census Report 2017, is 157 898 493. The population of both provinces, combined, constitutes 76% of the population of Pakistan as of 2017. Punjab and Sindh provinces have annual average growth rates of 2.13% and 2.41%, respectively, as compared to the national growth rate of 2.40%. The national population density increased to 251 persons per square kilometer in 2016 from 238 persons per square kilometer in 1998.

Table 9: Total Population (Punjab, Sindh)

	Location	Male	Female	Transgender	All Sexes
Punjab	Rural	35 197 990	34 425 030	2 124	69 625 144
	Urban	20 760 984	19 621 729	4 585	40 387 298
	Sub-Total	**55 958 974**	**54 046 759**	**6 709**	**110 012 442**
Sindh	Rural	1 922 545	1 789 994	36	3 712 575
	Urban	631 984	590 063	97	1 222 144
	Sub-Total	**24 927 046**	**22 956 478**	**2 527**	**47 886 051**
	Total	**80 886 020**	**77 003 237**	**9 236**	**157 898 493**

Source: http://www.pbs.gov.pk/sites/default/files/DISTRICT_WISE_CENSUS_RESULTS_CENSUS_2017.pdf

Table 10: Population by Project District (Punjab and Sindh)

Districts	Households	Population 2017			
		Male	Female	Transgender	All Sexes
D.G Khan	**343 361**	**1 450 105**	**1 422 023**	**73**	**2 872 201**
Rural	270 524	1 171 502	1 152 806	38	2 324 346
Urban	72 837	278 603	269 217	35	547 855
Khanewal	**466 390**	**1 484 692**	**1 437 171**	**123**	**2 921 986**
Rural	375 349	1 198 308	1 159 546	56	2 357 910
Urban	91 041	286 384	277 625	67	564 076
Lodhran	**262 650**	**862 663**	**837 873**	**84**	**1 700 620**
Rural	220 432	728 058	706 811	41	1 434 910
Urban	42 218	134 605	131 062	43	265 710
Multan	**760 858**	**2 437 412**	**2 307 504**	**193**	**4 745 109**
Rural	429 984	1 376 006	1 310 725	88	2 686 819
Urban	330 874	1 061 406	996 779	105	2 058 290
Muzaffargarh	**667 515**	**2 218 744**	**2 103 132**	**133**	**4 322 009**
Rural	557 112	1 862 671	1 764 477	90	3 627 238
Urban	110 403	356 073	338 655	43	694 771
Sub-total	**2 500 774**	**8 453 616**	**8 107 703**	**606**	**16 561 925**
Badin	**359 376**	**932 488**	**871 979**	**49**	**1 804 516**
Rural	282 574	731 235	682 883	20	1 414 138
Urban	76 802	201 253	189 096	29	390 378
Sanghar	**374 609**	**1 064 484**	**992 509**	**64**	**2 057 057**
Rural	270 891	761 365	707 277	10	1 468 652
Urban	103 718	303 119	285 232	54	588 405
Umer Kot	**212 356**	**557 557**	**515 569**	**20**	**1 073 146**
Rural	163 551	429 945	399 834	6	829 785
Urban	48 805	127 612	115 735	14	243 361
Sub-total	**946 341**	**2 554 529**	**2 380 057**	**133**	**4 934 719**
Total	**3 447 115**	**11 008 145**	**10 487 760**	**739**	**21 496 644**

Source: http://www.pbs.gov.pk/sites/default/files/DISTRICT_WISE_CENSUS_RESULTS_CENSUS_2017.pdf

131. **Indigenous Peoples:** Pakistan does not have any separate policy to define indigenous peoples or to protect their rights and cultural identities. Similarly, the diversity between regions and countries, and the differences in background, culture, history and conditions have proved extremely difficult for the development of one single definition at the international level applicable to all indigenous communities. In accordance with international consensus, FAO abides by the following criteria when considering indigenous peoples:

- Priority in time, with respect to occupation and use of a specific territory;
- The voluntary perpetuation of cultural distinctiveness, which may include aspects of language, social organization, religion and spiritual values, modes of production, laws and institutions;
- Self-identification, as well as recognition by other groups, or by State authorities, as a distinct collectivity; and
- An experience of subjugation, marginalization, dispossession, exclusion or discrimination, whether or not these conditions persist.

132. Pakistan is home to a significant number of smaller ethnic communities. In Sindh, two groups of people may be considered as indigenous. These are the Mohanas (boat people) of Manchar Lake and the original Thari people living in Tharparkar District, who have a distinctive culture and lifestyle, conditioned to living in almost perpetual drought. Neither of these indigenous communities are living within the project districts. In contrast, the non-indigenous, smaller ethnic communities are comprised of Hindus belonging to what are termed as the 'scheduled castes'. The total Scheduled Cast population in Sindh was around 300 000 as per the 1998 Census. Out of these, 93% were amongst the rural population of Sindh and out of this rural population, 87% were residing in the Tharparkar District (most are not within the project districts). The Hindu Schedule Cast tribes in Sindh that may be termed as 'ethnic minorities' are mainly Bheels, Kolhi's,

Oads and Menghwar. Some Muslim tribes of Tharparkar can also be considered as ethnic minorities, given that their culture and lifestyle is very similar to the Hindu tribes. The Bheels are mostly nomads, while the Kolhi's and Menghwar (who migrate seasonally) are engaged largely in non-farming work (e.g. road construction and house building). Large numbers of women also work on construction sites. Women of these tribes are well known for their hard work and put in long hours of physical labour whether in Thar or outside. While the Mohanas of Manchar Lake do not come within the project area, some groups of scheduled castes, mainly Tharis and Bheels, are known to migrate seasonally to work as haris and temporary wage labourers in barrage-irrigated agricultural areas bordering Thar (Mirpurkhas, Badin and Sanghar districts). However, none of these ethnic groups appear to have any collective interest in any ancestral land within the project area, and thus do not fall within the definition of indigenous peoples (they do not have ancestral land or historical ties to land within the project areas).

133. In Punjab, the tribal fishing peoples, Kihals and Mors, may be considered as indigenous. The Kihals and Mors inhabit the Middle Indus Basin between two barrages, the Chashma Barrage and the Taunsa Barrage. They estimate their own population to be between 40 000 and 45 000 families in the two barrages. A sizeable number of these tribes are settled in the project district of Dera Ghazi Khan (South Punjab), Pakistan, however it is not expected that the project will be working in (or near) their areas of residence. Kihals and Mors live by weaving baskets and birdcages from kanb, fishing and providing seasonal harvesting labor[41].

134. More information about these ethnic minority groups is available in Annex 10: Social Inclusion Planning Framework.

3.3.2 Education

135. Based on the PES (Pakistan Education Statistics) 2015-16, Pakistan's progress on the education front is severely lagging. Despite renewed commitments, the country has not met critical targets such as: improved literacy rate, retained enrolment and increased net primary enrolment. Pakistan has the highest portion of out-of-school children in South Asia[42]. It is estimated that 22.6 million (44%) children are out of school, and majority of them (49%) are girls. In Sindh and Punjab, 55% and 38% children respectively are out of school.

136. As shown in Table 11, Gender disparity in ratio of out of school children exists in both Punjab and Sindh provinces[43]. For further information, Annex 6 provides an overview of sex-disaggregated educational profiles for each project district in Sindh and Punjab.

Table 11: Out-of-School Children in Punjab and Sindh

	Male (%)	Female (%)	Total (%)
Punjab	36	40	38
Sindh	51	61	55

137. Pakistan has also very low literacy levels. In 2015-16, the national literacy rate was 58%, a 2.0 percent drop from the previous fiscal year. Punjab Province has an overall literacy rate of 62% whereas only 55% people in Sindh are literate. Tables 12 and 13 show literacy levels for target districts in Punjab and

[41] *Country Technical Note on Indigenous Peoples' Issues Pakistan, IFAD*
[42] *https://www.unicef.org/pakistan/OSC_UNICEF_Annual_Report.pdf*
[43] *http://library.aepam.edu.pk/Books/Pakistan%20Education%20Statistics%202015-16.pdf*

Sindh.

Table 12: District-Wise Literacy Rate (Punjab)

DISTRICTS	Literacy Rate (%) Ages 10 and above		
	Male	Female	Total
Dera Ghazi Khan	42	18	30
Khanewal	53	25	40
Lodhran	43	16	30
Multan	53	32	43
Muzaffargarh	41	15	28
	Province (Overall)		
	59	54	
	Urban		
PUNJAB*	82	73	62
	Rural		
	66	44	

Source (Table 12): http://www.pbs.gov.pk/pco-punjab-tables.

Table 13: District-wise Literacy Rate (Sindh)

DISTRICTS	Literacy Rate (%) Ages 10 and above		
	Male	Female	Total
Badin	35	13	24
Sanghar	43	18	31
Umerkot	36	12	25
	Province (Overall)		
	67	44	
	Urban		
SINDH*	80	65	55
	Rural		
	51	19	

Source: http://www.pbs.gov.pk/pco-sindh-tables.

138. Some of the factors responsible for the slow progress in education indicators include: (i) shortage of schools especially for girls and also in remote and far flung areas; (ii) shortage/absenteeism of teachers; (iii) lack of qualified and trained teachers; (iv) missing facilities such as water, toilets and boundary walls; (v) weak supervision; and a host of out-of-school factors such as conservative and tribal culture; insecurity and lawlessness; and poverty.

3.3.3 Health

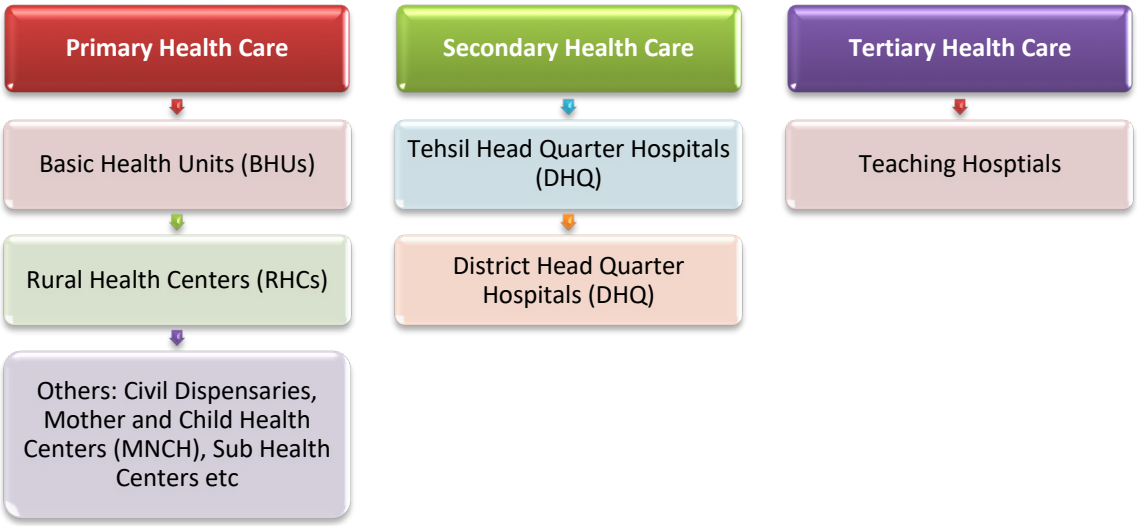
139. Pakistan has a large and dispersed primary public health system that gives citizens access to trained doctors and staff, and to subsidized medicines. However, both the use of these facilities and health outcomes remain low.[44] The country's health sector has remained fragmented; there is a huge gap between

[44] *Improving Public Health Delivery in Punjab, Pakistan: Issues and opportunities by Michael Callen, SaadGulzar, Ali Hasnain, Abdul Rehman Khan, Yasir Khan and Muhammad Zia Mehmood The Lahore Journal of Economics*

budget allocation in rural and urban areas as a consequence disproportionate distribution of health workforce, imbalance in cadre wise allocation of staff and unmet need for basic preventive and curative services. In addition, there exists a wide gap in provision of affordable and accessible health to rural and urban slum areas in Pakistan mainly due to a lack of political will, fiscal space and a deficient health workforce)[45].

140. Medical facilities that provide heavily subsidized healthcare are broadly divided into three types: Primary Healthcare, Secondary Healthcare, and Tertiary Healthcare[46]. Figure 20 shows the types of facilities under each category.

Figure 20: Types of Health Facilities under Different Categories



(Source: Annual Report Health Department 2013-14, Government of the Punjab)

141. In Punjab, there are a total 3,287 health facilities, out of which 2,461 (75%) are Basic Health Units (BHUs). In spite of extensive network of health care facilities, health status of the people of the province as a whole is below the desired level[47]. Infant mortality rate is 77 per 1000 live births. Under 5 mortality rate is 112 per 1000 live births. Maternal mortality ratio is estimated to be 300 per 100 000 live births, lower than the national figure 350. Only 58% of the population in the province has access to sanitation. Currently there are about four million malnourished children in Punjab, and about a third of all pregnant women are estimated to have iron deficiency (anaemia). According to the Health Department Punjab, malnutrition is a major contributor to infant and maternal deaths.

142. Poor health status in the province is in part explained by poverty, low levels of education especially for women, low status of women in large segments of society, and inadequate sanitation and potable water facilities, low spending/expenditure on health even by Asian standards (0.7% as compared to 1.3%, World Bank report). It is also strongly related to serious deficiencies in health services, both in public and private sectors[48].

143. In Sindh, there are a total of 1880 health facilities, 757 of these (40%) are BHUs[49]. According to the Multiple Indicator Cluster Survey (MICS) conducted in 2014, Infant mortality rate in the province is 82 deaths per 1000 live births and the under-five mortality rate is 104 deaths per 1000 live births. Maternal mortality rate is estimated to be 311 per 100 000 live births. Almost half of children under five years (48 percent) are stunted or short for their age. Access to safe drinking water is a major issue in Sindh. According to a report

[45] http://healthcare-communications.imedpub.com/spotlight-on-sindh-health-sector-budget.pdf
[46] *Annual Report Health Department 2013-14, Health Department, Government of the Punjab*
[47] http://health.punjab.gov.pk/Punjab_Health_Profile
[48] http://health.punjab.gov.pk/Punjab_Health_Profile
[49] https://www.sindhhealth.gov.pk/Tertiary

released in 2017 by the Supreme Court's Judicial Commission on water and sanitation in Sindh, more than 75% of people in Sindh drink unsafe water. Consumption of contaminated water has increased incidence of many diseases like hepatitis, liver cancer, anaemia, and stunted growth among children[50].

3.3.4 Poverty Profile

144. Poverty in Pakistan is multifaceted and dynamic. Depending on the geography and socio-political climate, households throughout the country are faced with varied challenges including devastating natural disasters, militancy, sectarian violence, volatile law and order situation, and issues related with weak governance among other problems. The situation is further exacerbated by other factors driving social development on the back step, as a result alienating citizens, and consequently halting socio-economic progress of both men and women.

145. According to the Multidimensional Poverty Index[51] report nearly 39 percent of Pakistanis live in multidimensional[52] poverty with disparities across regions and provinces. While, the MPI showed a strong decline, with national poverty rates falling from 55% to 39% from 2004 to 2015, this progress across different regions of Pakistan is uneven. Among provinces, Punjab has the lowest multidimensional poverty at 31.4%[53] followed by Sindh, with 43%. It is important to note that while the multidimensional poverty for overall Sindh is 43%, it is estimated that 75% of population in rural Sindh lives in abject poverty[54].

146. Within the proposed project districts, in Sindh, Umerkot (84.7%) and Badin (74.8%) have the highest incidence of poverty followed by Sanghar (66.8%). Whereas, in Punjab, Muzaffargarh has the highest incidence of poverty at 64.8%, followed by DG Khan (63.7), Lodhran (46.8%), Khanewal (39.9%), and Multan (35.7%). Figure 20 shows district-wise incidence of poverty across Pakistan.

Figure 20: Incidence of Poverty (2014-15)

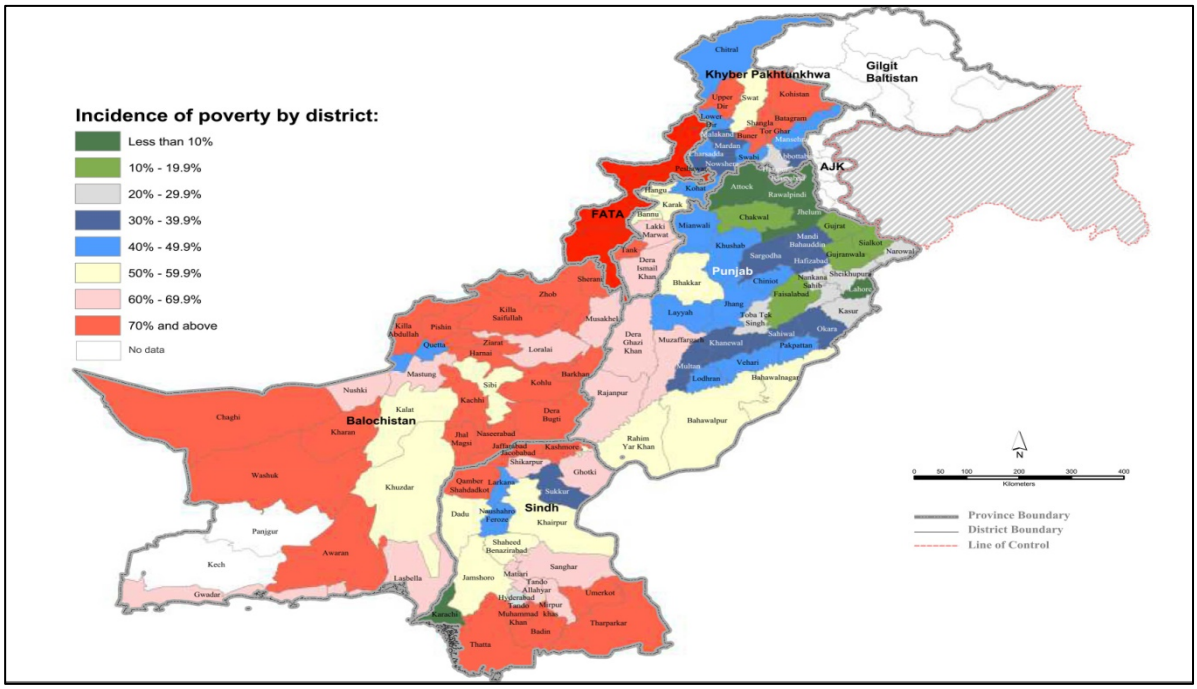
[50] http://www.supremecourt.gov.pk/web/user_files/File/Final_Report_of_Commission_Const.P.38of2016.pdf

[51] *The MPI is developed by OPHI and UNDP's Human Development Report Office. The MPI uses a broader concept of poverty than income and wealth alone. It captures severe deprivations that each person experiences with respect to education, health and standard of living*

[52] *MPI is the product of two components:1) Incidence of poverty (H): the percentage of people who are identified as multidimensionally poor, or the poverty headcount. 2) Intensity of poverty (A): the average percentage of dimensions in which poor people are deprived. In simple terms it means how intense, how bad the multidimensional poverty is, on average, for those who are poor.*

[53] *Multidimensional Poverty in Pakistan by Oxford Poverty and Human Development Initiative (OPHI) and the UNDP Pakistan*

[54] *UNDP. 2015. Multidimensional Poverty in Pakistan. URL: http://www.ophi.org.uk/wp-content/uploads/Multidimensional-Poverty-in-Pakistan.pdf*



3.3.5 Labour and Land Tenancy

147. **Migrant Labour:** Migrant Labour, specifically in agriculture, is a reality in Pakistan. In particular, there is an ethnic nomadic group called, "Khana Badosh", who traditionally move in search of work.[55] They are often self-employed, with women more salient in economic activities. Most child labourers belong to this group. Their nomadic lifestyle makes it difficult to accumulate capital and/or achieve education, and the children of the Khana Badosh seldom go to school on a regular basis.

148. **Bonded Labour and Child Labour:** Pakistan has a history of bonded (forced) labour and child labour within its provinces, however the federal and provincial governments have developed significate legislation to fast-track its eradication. Debt bondage is still the most prevalent form of slavery in Pakistan[56]. According to the Global Slavery Index, 2016, there are an estimated 2.13 million modern slavery victims in Pakistan. In terms of absolute numbers, Pakistan ranked 3 (out of 167 countries)[57]. The provinces of Punjab and Sindh are the hotspots of bonded labor, which is mainly found in the brick making, agriculture, and carpet weaving industries. In the agriculture sector in Sindh many farmers have unofficial work contracts under the *hari* (tenant) system. *Hari* laborers are give their entire yield to the landlords who employ them and are paid only in produce. To meet living costs beyond food and shelter, they borrow money from their landlord, which reinforces cycles of poverty, debt and forced labor[58].

149. Similarly, in order to repay debts, families are compelled to engage children in agricultural labor. Since the last National Child Labor Survey was undertaken in 1996, there are no exact estimates of child labor across Pakistan. A report on measuring children's work in South Asia, prepared by ILO (2015) states that approximately 3.4 million children are engaged in child labour in Pakistan, based on a national survey conducted in 2011.[59] In contrast, Pakistan's Rural Support Programmes Network (RSPN), estimates that 27

[55] https://stud.epsilon.slu.se/3996/1/nawaz_a_m_120320.pdf
[56] http://reporterbrasil.org.br/wp-content/uploads/2014/11/GlobalSlavery_2014_LR-FINAL.pdf
[57] https://www.globalslaveryindex.org/findings/
[58] *ibid*
[59] http://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/---sro-new_delhi/documents/publication/wcms_359371.pdf

million children are engaged in child labor in the agricultural sector across Pakistan (UNICEF-RSPN, 2018)[60]. In Punjab, 12.4% children aged 5-14 work, while 8.2% aged 7-14 combine both work and school. For Sindh, the number of children working jumps to 31.5%, with 11.6% of children aged 7-14 combining both work and school (US Department of Labor, 2016). It is important to note that reports of "children working" is referring to child labour by the ILO and UNICEF definitions, and not the definition of "child work", which is allowable under provincial, federal, and international law(s)/treaties.[61] In the agricultural sector, children are typically involved in farming, including harvesting cotton, wheat, sugarcane, dates, tobacco and potatoes. The girls are engaged in livestock husbandry along with their mothers. Some of this involvement is at an age-appropriate level that aligns with the definition of child work and is, therefore, not problematic, while other cases constitute child labour.

150. In efforts to eliminate the worst form of child labour, the Government of Pakistan has introduced several legislations and increased the minimum age for work. In Punjab and Sindh, the minimum age for employment is 15 years, while the minimum age for hazardous employment is 18 years in Punjab and 19 years in Sindh. Education has also been made compulsory until 16 years of age. Despite the existing regulations, forced labor occurs in cotton, sugarcane, and wheat crop value chains – particularly during harvesting[62], and, there are reports from SPARC (2016), Nawaz (2012), and World Vision Australia (2012) that would suggest child labour is occurring in those value chains as well. The International Labour Organization (ILO), in collaboration with the Government of Pakistan, launched the Elimination of Child and Bonded Labour Project on 24 August 2016, and the project is already working in Khanewal, Multan, and Dera Ghazi Khan Districts.

151. **Land Tenancy:** The pattern of house ownership in the targeted project districts is such that on average, 91% of households in the targeted project districts in Punjab are owned by the people living within them, and 87.1% of households in the targeted project districts in Sindh are owned. Agricultural land holding ownership is much better in the targeted districts of Punjab: 35.8% of household members own agricultural land, whereas only 22.7% own agricultural land in the targeted districts of Sindh. The laws of Pakistan concerning land ownership are written such that is either owned by government or a private individual – all land is accounted for, either through the landowner or state ownership.[63]

152. Whilst the specific villages within the target districts to be involved in the project will be selected during screening and implementation in the first year of the project, consultations with farmers (both land owners and tenants) in the targeted districts highlighted that many farmers fall within a category of tenant farmers who have orally agreed upon land leases with the landowner, something which is allowed under Islamic law, though has been discouraged in an effort to ensure that all land leases have been registered in writing. Only one instance (Village Azizabad, located in the Union Council of Azizabad, Tehsil Kot Adu in Muzaffargarh District) was identified as a case where minority Christian farmers were granted land by the government, yet some of those farmers were still awaiting their written titles. Despite this, the government has recognized that the area was granted to the Christian minority community, other NGOs have actively worked with the community and established basic infrastructure (e.g. a school for the children), and it is not

[60] http://www.rspn.org/index.php/current-projects/unicef-rspn-promoting-child-rights-in-cotton-farming-areas-of-sindh/

[61] *According to ILO and UNICEF, all work done by children can't be classified as child labour – there is a need to differentiate between child labour and child work. If work is not affecting the health and personal development as well as the schooling of children, then this type of work cannot be taken negatively and does not fall in the category of child labour, e.g. assisting in family business or working during school holidays or after school hours. These activities are not "child labour", rather these can be termed as 'child work'. Child work is not only important for the personal development of children but it also provides them with necessary skills to be useful and productive members of a society.*

[62] *The US Department of Labor – Bureau of International Labor Affairs, 2016*

[63] *UN-Habitat, 2012. A Guide on Land and Property Rights in Pakistan. URL:* http://www.ndma.gov.pk/Publications/A%20Guide%20on%20Land%20and%20Property%20Rights%20in%20Pakistan%202012.pdf

expected that these farmers would/will be removed. In addition to consultations with farmers across all districts, meetings with local staff working with the United Nations FAO in Hyderabad Office in Sindh Province made clear that, in the case of Sindh Province, the government was highly supportive of the Voluntary Guidelines on the Responsible Governance of Tenure (VGGT) and is already engaging in work to utilize VGGT in instances where written registration of land and/or lease agreements has not yet been achieved. Similarly, the World Bank supported Sindh Water Sector Improvement Project (SWSIP) has included, with technical assistance from FAO, capacity building for Farmers' Organizations (FOs) to improve landlord-tenant relationships and has resulted in a number of farmers in this project's targeted districts receiving written confirmation of their land-leasing agreements.

153. The history of land tenure in rural, post-independence Pakistan has been largely feudal, whereby elite landowners have engaged tenant farmers and labourers to work their land holdings[64]. Within the rural economy, land with access to water is considered the principal asset. About 43% of the rural population is landless or near-landless and lacks access to irrigation water and other factors of production. Within the Indus Valley, ownership of irrigated land is highly concentrated. Between 20% and 40% of rural households are reported to be landless or near-landless. They either lease or share-crop land when they can, or they work as labourers on and off farms; many raising stall-fed livestock[65].

154. Concentration of land ownership has been considered a root cause of persistent poverty and instability across the country[66]. In 1990, smallholders with less than 2 hectares of land made up 96% of the landholders but owned only 55% of the land. By 2000, only 37% of rural households owned agricultural land and between 20% and 40% of the rural population was landless or near landless. Countrywide, 7% of farms had 200 hectares or more and controlled 40% of the agricultural land. The median size of a private farm in Pakistan is about 1.3 hectares of cultivated area. The incidence of poverty is highest amongst agricultural labourers and tenants and is correlated with sharecropping arrangements[67]. Declines in the incidence of poverty have been linked to increases in landholdings and vanishes in households with land holdings of 1 to 2 hectares and above[68]. The current tenure system and continued concentration of land and power among a very small class of landowners has been identified as a barrier to robust growth within Pakistan's agriculture sector[69].

155. Attempts have been repeatedly made by government to address inequality of land access, as well as the issue of tenure insecurity, though they have largely failed to transform the system. Tenants and sharecroppers have little incentive to invest in sustainable production practices, thus practices depend largely upon the landowner. This insecurity of land tenure, coupled with issues of poor water policy and management, have contributed to environmental impacts like increasing degradation of land. Opportunities to address issues of land tenure that have been identified by other international organizations, like USAID, include options for increasing rural land access for the poor, such as the provision of micro-plots. This provision would then give poor households economic, nutritional, and psychological benefits of land ownership, without requiring the government to identify large amounts of agricultural land for redistribution. Likewise, it has been suggested that the development of methods for permitting women to acquire land and water rights in ways consistent with Islamic law and Pakistan's Constitution could also increase women's economic opportunities and productivity[70].

156. Land in Pakistan is classified as state land, privately held land, or land subject to communal rights under customary law. Land for which there is no rightful owner vests in the Provincial Government if within a Province, or with the federal government if not.[71] Major tenure types include:

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[64] *USAID, 2010*
[65] *USAID, 2016*
[66] *ibid*
[67] *ADB, 2002*
[68] *Anwar et al. 2005; Chaudhry et al. 2006; Gazdar 2007; World Bank 2007; Khan 2000; GOP 2003*
[69] *USAID, 2010*
[70] *USAID, 2016*
[71] *GOP Constitution 1973; GOP 2006; USAID 2008*

- **Ownership:** this is the most common tenure type in Pakistan. Private individuals and entities can obtain freehold rights to land, and communal ownership rights are recognized under customary law.

- **Lease:** term leases are common for parcels of agricultural land over 30 hectares. Leases are for fixed rates, generally run at least a year and may have multi-year terms. Leases may be written or oral agreements.

- **Sharecropping.** Sharecropping arrangements are common on agricultural land that is smaller than 30 hectares. Roughly 67% of Pakistan's tenant-operated land was sharecropped in 2000, and 48% of sharecropper households fell below the national poverty line. Sharecropping arrangements usually provide the landowner with half of the production from the land, although the arrangements vary regarding provision of inputs. Most agreements are unwritten and are verbal only. Given that rural land in Pakistan is rarely bought and sold, land leases are more common, and the lease market is active. Thirty-three percent of cultivated land was under some form of tenancy arrangement in 2000; in 2001–2002, 18% was sharecropped (the percentage sharecropped in 2010 was estimated to be about 66%). The productivity of sharecropped land is about 20% lower than that of owner-operated land[72].

157. Freehold land in Pakistan tends to be retained by families and passed inter-generationally by inheritance, and ownership is rarely registered. Despite formal laws mandating registration, incentives for registering land are weak or non-existent, with complex procedures for applicants and numerous loopholes. Land is typically titled in the name of the head of household or eldest male family member of an extended family. While community property rights are recognized in formal law, joint titling of land is uncommon. There are some inconsistencies between the Islamic law and statutory law; Islamic law permits oral, unrecorded declarations of gifts of land, while statutory law requires a writ, with the Benami Act legalizing documented but unrecorded transactions. The amount of land accurately registered countrywide is unreported[73].

158. At present, landowners who cannot or do not want to cultivate agricultural land routinely lease it out under fixed-term agreements or sharecropper arrangements, and the land-lease market is quite active. Leasehold interests tend to be considered secure within the circumscribed terms agreed to by the parties. In rural areas, tenants on smallholdings have seasonal or annual contracts that as a matter of practice are generally renewed for a number of years. As a matter of formal law, however, tenancy reforms have been ineffective in increasing security, and tenants have little legal recourse in the event of eviction.[74]

3.3.6 Social Protection[75]

159. A National Social Protection Strategy (NSPS) was designed by Government of Pakistan in 2007. The NSPS aimed at developing an integrated and comprehensive social protection system, covering all the population, especially the poorest and the most vulnerable. The NSPS was designed during an era when the country's economy was flourishing. However, immediately after the design of NSPS, a series of uncertain and unfortunate domestic and external shocks occurred, such as global financial crises, high food and fuel prices in the world markets, unstable law and order situation, etc., leaving little national resources for the implementation of the NSPS.

160. In order to mitigate some of the adverse effects of the domestic and external shocks described

[72] *World Bank 2007; Jacoby and Mansuri 2006; Barnhart 2010*
[73] *Dowall and Ellis 2007; GOP 2006; SDPI 2008*
[74] *Jacoby and Mansuri 2006*
[75] *The following is provided by Cynosure Consultants (pvt) Ltd, who prepared an Analysis of Social Protection Schemes for Smallholder farmers in Sindh and Punjab*

above as well as catastrophic floods of 2010 and 2011, the Government of Pakistan took steps through a series of social protection programs that have been put in place to protect the poor and vulnerable. These programs often fall into Social Security/Social Insurance, Safety Net/Social Assistance, and Labour Market Program categories of social protection in schemes in Pakistan. Table 14 shows key features of social protection schemes in Pakistan.

Table 14: Key Features of Social Protection Schemes in Pakistan

Name of Social Protection Scheme	Key Features
Social Security/Social Insurance	• Generally based around formal employment, and include social insurance and social assistance measures. • In Pakistan, examples of such schemes include Government servants' pension funds, EOBI, Public Sector Benevolent Funds and Group Insurance, Employees Social Security or Institutions, WWF, etc.
Safety Nets/Social Assistance	• Usually short-term emergency measures. • People, who are outside the domain of labour market and are extremely poor and considered marginalized segment of the society are provided safety net assistance, usually in the form of in-kind or unconditional cash transfers. • Examples include the Benazir Income Support Programme (BISP), Zakat, PBM, and Watan Card.
Labour Market Programs	• Programs under this category have included the Peoples Works Program, *Khushal* Pakistan Program (KPP), and *Tameer-e-Watan* Program. • The programs comprised of schemes which have an immediate impact on the standard of living of ordinary people. • Under the programs, demand-based funds were provided to the locally elected representatives.
Microfinance and Other Safeguards for the Informal Sector	• Generally, three initiatives form this category: i. Community Development Centers, managed by provincial and federal governments ii. NGOs that carry out community development work and iii. Rural Support Organizations (RSOs). • Examples include the NRSP, PPAF, community development, micro finance, income generation, value chain development programs operated by international aid agencies (IFAD, FAO, and USAID, etc.) and agriculture support programs.

161. A list of key public provisioned Social Protection measures belonging to the 'Social Security' or 'Safety Net' categories is provided in Annex 7.

162. Agricultural Programmes and Projects: Generally, the GOP programs for farm protection are targeted at farm inputs, including fertilizer, improved seed, farm mechanization, irrigation, and agricultural credit. In addition, support to agricultural enterprise development may form a small part of some umbrella programs on economic development and job creation. The schemes are often targeted at farmers in general, without assigning specific distribution between provinces or among gender. The following sub-section provides details of some key safeguard programs available to the farming community through the GOP under its development programs.

163. The key agricultural schemes available nation-wide include:

- Agricultural Credit
  1. Credit Guarantee Scheme for Small and Marginalized Farmers
     - Crop Loan Insurance Scheme
     - Livestock Insurance Scheme for Borrowers
     - Prime Minister's Youth Business Loan Scheme
     - Guidelines on Value Chain Contract Farmer Financing

2. Relief Package for Farm Sector (2015)
3. Waseela-e-Haq (part of the Benazir Income Support Programme (BISP))
4. Waseela-e-Rozgar (part of BISP)

3.3.7 Languages

164. Urdu is the national and one of the two official languages of Pakistan (other being English.) Although only about 8% of Pakistanis speak it as their first language, it is widely spoken and understood as a second language by the vast majority of Pakistanis. The country is also home to several regional languages and four provincial languages namely: Punjabi, Sindhi, Balochi, and Pashto.

165. Punjabi is the provincial language of Punjab and also the most-widely spoken language. In addition to Punjabi, Saraiki is a regional language mostly spoken in south Punjab, whereas Pashto is spoken in some parts of northwest Punjab, especially in Attock District and Mianwali District near Khyber Pakhtunkhwa province.

166. Sindhi is the provincial language of Sindh and the second most-widely spoken language of the Pakistan. It is also the official language of the Sindh province. As of 2016, Sindhi is spoken by an estimated 27 million people. Key dialects of Sindhi include Kutchi, Lasi, Memoni, Lari, Vicholi, Utradi, Macharia and Dukslinu (which is spoken by Sindhi Hindus). Other languages in the province include Gujarati and Parkari Koli (sometimes called just Parkari), a language spoken by only 275 000 natives of Sindh according to a 2004 estimate.

3.3.8 Religion

167. Pakistan is an Islamic Republic, meaning Islam is the official religion and laws are written to be consistent with its teachings. The state religion is central to the daily life in Pakistan; mosques are located in almost every neighborhood and the call to prayer heard throughout the country five times a day. About 96% of Pakistanis identify themselves as Muslims. While not everybody may practice Islam on a regular basis, the religion's moral beliefs and tenets are widely recognized and respected.

168. Sunni and Shi'a Islam are the two major Islamic sects practiced in Pakistan. Pakistan is a Sunni majority country, with 76% of Pakistanis identifying as Sunni and 10-15% estimated to be Shi'ites as of 2010. It is estimated that 4% of Pakistanis belong to a non-Muslim religious minority. These include Christians, Hindus, Sikhs, Zoroastrians and Bahá'i. There are also minorities among Muslims, the most significant being the Ahmaddiyas who make up approximately 2.2% of the Muslim population.

169. **Religious Minorities:** Among non-Muslims, Christians and Hindus make up the largest minority groups. Hindus are predominantly concentrated in the Sindh Province, whereas a large majority of Christians are settled in the Punjab province. According to official estimates in 2011, with a 7.5 million-strong population, Hindus are the biggest religious minority of Pakistan and the majority lives in Sindh. Unofficial estimates put the number higher. But various Hindu rights organizations estimate that around 6.8 million or 90% of them are scheduled caste or 'untouchables'. Some of these lower caste Hindus are scattered in southern Punjab as well as the northern districts of upper Sindh, but the vast majority of them are in different districts of lower Sindh, particularly in Mirpurkhas division (Tharparkar, Sanghar, Umerkot and Mirpurkhas). The scheduled casts, considered lower class in the sub-continental culture, are marginalized in social, political, and economic fields, and consequently are excluded from the socio-political systems[76]. Based on the latest credible sources, scheduled castes in rural areas represent 0.05% of the population in Punjab Province, and 1.79% of the population in Sindh Province. Accurate and further disaggregated

[76] https://aawaz.org.pk/cms/lib/downloadfiles/14742596661Final%20Hindus%20in%20South%20Punjab.pdf

information by district was unavailable.[77]

170. Christians are the second-largest minority group, representing about 1.6% of the population. Within the project districts, the Christians comprise less than 0.0035% of the population. The majority of Pakistan's Christians are descended from low-caste Hindus who converted under the British Raj, in part to escape the caste system. Christian communities remain in the poorest sector of society doing menial jobs. Entire villages in parts of Punjab are Christian with inhabitants working as laborers and farmhands. Like Hindus, due to their weak social status and absence of voice and agency, Christians are also unable to fully benefit from state institutions, democratic processes, and economic opportunities.

[77] *The Joshua Project estimates that less than 0.003% of the population in the project districts are hindu (and that includes non-scheduled castes as well as scheduled castes), but these estimates are not official. URL: https://joshuaproject.net/states_districts/PK/PK04/PK0416*

4. LEGAL FRAMEWORKS AND APPLICABLE SAFEGUARD POLICIES

171. The following chapter provides an overview of the existing national legislation and nationally signed and ratified international treaties, along with the applicable FAO and GCF safeguards required for the project. The most stringent policy and/or law will be followed in any instances of discrepancy between national legislation and GCF/FAO requirements. In practice, this means that the project will follow national policy and/or law to the extent that it is applicable/relevant, while ensuring that supplementary actions and/or measures are taken in the event that the application of the relevant national policy and/or law is not sufficient to adhere to GCF/FAO requirements. In so doing, the project will ensure that the most stringent standards are consistently adhered to, while still applying (and building directly on) the relevant national policies and/or laws.

4.1 Pakistan Environmental and Social Legislation

172. Pakistan's statute books contain a number of laws concerned with the regulation and control of the environmental and social aspects. However, the enactment of comprehensive legislation on the environment, in the form of an act of parliament, is a relatively new phenomenon. Most of the existing laws on environmental and social issues have been enforced over an extended period of time, and are context-specific. The laws relevant to this project are briefly listed below, with explanations of the most pertinent provided below the summary list. The summary list includes:

- Pakistan Climate Change Act (2017)
- Pakistan Environmental Protection Act (1997);
- Punjab Environmental Protection Act (1997; amended 2012);
- Sindh Environmental Protection Act (2014)
- Punjab Forest Act (1999)
- Sindh Forest Act (2012)
- Agricultural Pesticides Ordinance 1971 (II of 1971)
- Agricultural Pesticide Rules (1973);
- Pakistan Environmental Protection Ordinance (1983)
- The Punjab Wildlife (Protection, Preservation, Conservation, and Management) Act, 1974 (Pb Act II of 1974)
- Sindh Wildlife and Protected Areas Act, 2010
- Punjab Soil Reclamation Act, 1952
- The Land Acquisition Act, 1984
- The Punjab Seed (Amendment) Act, 2017 (Proposed)
- Punjab Seeds & Fruit Plants Ordinance,1965
- Seed Act, 1976 (and subsequent Environmental Samples Rules, 2001)
- On-Farm Water Management and Water Users' Associations Ordinance, 1981 (and subsequent Water Users Associations Rules)
- Punjab Agricultural Development And Supplies Corporation Act, 1973
- Punjab Agricultural Development Finance Corporation (Recovery of Arrears) Act, 1958
- Punjab Agricultural Pests Ordinance, 1959
- Punjab Fertilizers (Control) Order, 1973
- Punjab Seed Corporation Act, 1976
- Plant Breeders Rights Act, 2016
- Punjab Public Private Partnership Act, 2014
- Punjab Cotton Control Ordinance, 1966
- The Punjab Cotton Control Rules, 1966
- Punjab Rice (Restrictions On Cultivation) Ordinance, 1959
- Punjab Silkworms (Regulation And Control) Ordinance, 1972
- West Pakistan Cotton Control (Validation of Levy of Fees) Ordinance, 1966

- Punjab Sugar (Licensing Control) Order, 1972
- The Cotton Standardization Ordinance, 2002
- The Sugar Factories Control ACT, 1950
- Sugarcane ACT, 1934
- Transfer of Property Act, 1882
- Land Revenue Act, 1967
- Registration Act, 1908
- The Employment of Children Act, 1991
- The Bonded Labour System Abolition Act, 1992
- The Punjab Compulsory Education Act, 1994
- Sindh Right of Children to Free and Compulsory Education Act, 2013
- Indus River System Authority Ordinance
- Sindh Irrigation Act (1879, amended in 1976)
- Sindh Irrigation Ordinance (1984, amended in 1999)
- Sindh Irrigation Water User Association Ordinance (1982, amended in 1984)
- Antiquities Act, 1975

173. **Pakistan Climate Change Act, 2017:** The Pakistan Climate Change Act establishes a Pakistan Climate Change Council, Pakistan Climate Change Authority, and Pakistan Climate Change Fund. The purpose of the Act is *"to meet Pakistan's obligations under international conventions relating to climate change and address the effects of climate change."* Regulatory powers are allocated to the Climate Change Authority under this Act. While the legislation exists to address issues related to climate change, there has been little evidence as of yet to determine whether its enforcement is successful.

174. **Pakistan Environmental Protection Act, 1997:** The Pakistan Environmental Protection Act, 1997 (the Act) is the basic legislative tool empowering the government to frame regulations for the protection of the environment (*the 'environment' has been defined in the Act as: (a) air, water and land; (b) all layers of the atmosphere; (c) all organic and inorganic matter and living organisms; (d) the ecosystem and ecological relationships; (e) buildings, structures, roads, facilities and works; (f) all social and economic conditions affecting community life; and (g) the inter- relationships between any of the factors specified in sub-clauses 'a' to 'f'*). The Act is applicable to a broad range of issues and extends to socioeconomic aspects, land acquisition, air, water, soil, marine and noise pollution, as well as the handling of hazardous waste. The discharge or emission of any effluent, waste, air pollutant or noise in an amount, concentration or level in excess of the National Environmental Quality Standards (NEQS) specified by the Pakistan Environmental Protection Agency (Pak-EPA) has been prohibited under the Act, and penalties have been prescribed for those contravening the provisions of the Act. The powers of the federal and provincial Environmental Protection Agencies (EPAs), established under the Pakistan Environmental Protection Ordinance 1983, have also been considerably enhanced under this legislation and they have been given the power to conduct inquiries into possible breaches of environmental law either of their own accord, or upon the registration of a complaint.

175. The requirement for environmental assessment is laid out in Section 12 (1) of the Act. Under this section, no project involving construction activities or any change in the physical environment can be undertaken unless an initial environmental examination (IEE) or an environmental impact assessment (EIA) is conducted, and approval is received from the federal or relevant provincial EPA. Section 12 (6) of the Act states that the provision is applicable only to such categories of projects as may be prescribed. The categories are defined in the Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2000.

176. **The Punjab Environmental Protection Act (1997, amended 2012):** The Punjab Environmental Protection Act, 1997 (amended 2012) empowers the Punjab Environmental Protection Agency to:

- Administer and implement the provisions of the Act and the rules and regulations made there-under to comply with the environmental policies approved by the Council;

- Enforce the provisions of the Act through environmental protection orders and environmental tribunals headed by magistrates with wide-ranging powers, including the right to fine violators of the Act;
- Prepare or revise, and establish the Environmental Quality Standards with the approval of the Council;
- Develop environmental emission standards for parameters such as air, water and land;
- Identify categories of projects to which the IEE or EIA will apply;
- Develop guidelines for conducting the IEE and EIA's and procedures for the submission, review and approval of the same;
- Review IEE or EIA with the objectives that these meet the requirements of the Act;
- Public participation shall be ensured during review process of IEE or EIA reports.

177. **The Punjab Wildlife (Protection, Preservation, Conservation, and Management) Act, 1974 (Pb Act II of 1974):** This law was enacted to protect the province's wildlife resources directly and other natural resources indirectly. It classifies wildlife by degree of protection, i.e., animals that may be hunted on a permit or special license, and species that are protected and cannot be hunted under any circumstances. The Act specifies restrictions on hunting and trade in animals, trophies, or meat. The Act also defines various categories of wildlife protected areas, i.e., National Parks, Wildlife Sanctuaries, and Game Reserve. The project activities will have to be carried out in accordance with this Act. In particular, no activities will be carried out inside any protected areas defined under the Act.

178. **Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2000:** The Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2000 (the "Regulations"), developed by the Pak-EPA under the powers conferred upon it by the Act, provide the necessary details on preparation, submission and review of the IEE and the EIA. Categorization of projects for IEE and EIA is one of the main components of the Regulations. Projects have been classified on the basis of expected degree of adverse environmental impacts. Project types listed in Schedule I are designated as potentially less damaging to the environment (including agriculture projects of PKR 10 million / USD 86 500 addressing poultry, livestock, and fish-farms), and those listed in Schedule II are deemed to have potentially serious adverse effects (e.g. all project situated in environmentally sensitive areas). Schedule I projects require an IEE to be conducted, provided they are not located in environmentally sensitive areas. For the Schedule II projects, conducting an EIA is necessary. The sub-activities under this Project will likely require no IEE or EIA, as they do not fall within Schedule I or II; specifically, work with livestock and poultry would be limited to women's activities around the house, and would not involve the establishment of new farms/etc.

179. **National Environmental Quality Standards:** The National Environmental Quality Standards (NEQS), promulgated under the PEPA 1997, specify the following:

- Maximum allowable concentration of pollutants in gaseous emissions from industrial sources;
- Maximum allowable concentration of pollutants in municipal and liquid industrial effluents discharged to inland waters, sewage treatment and sea (three separate set of numbers);
- Maximum allowable emissions from motor vehicles;
- Ambient air quality standards;
- Drinking water standards;
- Noise standards.

Within the context of Punjab and Sindh, many farmers burn their crop residues – a practice which incites issues with the NEQS and results in subsequent fines. As part of the proposed Climate Resilient Agriculture practices, this project will advocate for (and actively practice) the return of crop-residues to the soils as mulch or compost.

180. **Land Acquisition Act, 1894:** The Land Acquisition Act (LAA) of 1894 amended from time to time has been the de- facto policy governing land acquisition and compensation in the country. The LAA is the most commonly used law for acquisition of land and other properties for development projects. It is comprised of 55 sections pertaining to area notifications and surveys, acquisition, compensation and apportionment

awards and disputes resolution, penalties and exemptions. The project does not have plans to relocate people, though there may be instances in which the Pakistan Meteorological Department (PMD) may acquire land for the purpose of installing the six new agromet stations and/or some of the ET monitoring equipment under Component 1. This process would follow the regulations stipulated in the LAA, including just compensation for any land acquired, but the process would also be complemented with consultation processes required by FAO in instances where the land is owned privately by farmers. Given that the project will involve landless and tenant (*hari*) farmers, it will therefore be cognizant of the farmers' wellbeing and tenancy arrangements to avoid any potential disinheritance of land traditionally farmed (full mitigation measures are explained later in this chapter and under Chapter 7).

181. **Antiquities Act, 1975:** The Antiquities Act of 1975 ensures the protection of cultural resources in Pakistan. The Act is designed to protect "antiquities" from destruction, theft, negligence, unlawful excavation, trade and export. Antiquities have been defined in the Act as ancient products of human activity, historical sites, or sites of anthropological or cultural interest, and national monuments. The law prohibits new construction in the proximity of a protected antiquity and empowers the Government of Pakistan to prohibit excavation in any area that may contain articles of archeological significance. Under this Act, the project proponents are obligated to:

- Ensure that no activity is undertaken in the proximity of a protected antiquity; and
- If during the course of the project an archeological discovery is made, it should be protected and reported to the Department of Archeology, Government of Pakistan, for further action.

This Act will be applicable to the on-farm interventions, only in instances where a "chance-find" reveals the existence of articles of archeological/cultural significance during the implementation of the proposed project.

182. **Employment of Child Act, 1991:** Article 11(3) of the Constitution of Pakistan prohibits employment of children below the age of 14 years in any factory, mines or any other hazardous employment. In accordance with this Article, the Employment of Child Act (ECA) 1991 disallows the child labor in the country. The ECA defines a child to mean a person who has not completed his/her fourteenth year of age. The ECA states that no child shall be employed or permitted to work in any of the occupation set forth in the ECA (such as transport sector, railways, construction, and ports) or in any workshop wherein any of the processes defined in the Act is carried out. The processes defined in the Act include carpet weaving, biri (kind of a cigarette) making, cement manufacturing, textile, construction and others). For the purposes of this project, participating farmers and any contracted third parties (e.g. NGOs or Rural Support Programmes, etc.) will be bound by the ECA to disallow any child labor at the project sites.

183. **Pakistan Penal Code, 1860:** The Code deals with the offences where public or private property or human lives are affected due to intentional or accidental misconduct of an individual or organization. The Code also addresses control of noise, noxious emissions and disposal of effluents. Most of the environmental aspects of the Code have been superseded by the Pakistan Environmental Protection Act, 1997.

4.2 Relevant International Conventions and Treaties

184. Pakistan is signatory of several Multilateral Environmental Agreements (MEAs), including:

- Basel Convention;
- Convention on Biological Diversity (CBD);
- Convention on Wetlands (Ramsar);
- Convention on International Trade in Endangered Species (CITES);
- UN Framework Convention on Climate Change (UNFCCC);
- Kyoto Protocol;
- Montreal Protocol;
- UN Convention to Combat Desertification;
- Convention for the Prevention of Pollution from Ships (MARPOL);
- UN Convention on the Law of Seas (LOS);

- Stockholm Convention on Persistent Organic Pollutants (POPs);
- Cartagena Protocol on Biosafety.

These MEAs impose requirements and restrictions of varying degrees upon the member countries, in order to meet the objectives of these agreements. However, the implementation mechanism for most of these MEAs is weak in Pakistan and institutional setup mostly nonexistent.

185. With specific regard to the use of pesticides in the project areas, there are a number of relevant conventions to be considered. Even though the project will not procure pesticides and will likely result in the decrease of pesticide use due to good agricultural practices, the following conventions are relevant to general pesticide use within the project area:

186. *Rotterdam Convention:* Pakistan has been a signatory of the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides and their Disposal since 1992. Many of the pesticides on Annex III of the Rotterdam Convention have been banned in the country. Despite this, monitoring and enforcement of the compounds used has been problematic, and pesticides not yet banned continue to be used in fields.

187. *Stockholm Convention:* Pakistan signed the Stockholm Convention on Persistent Organic Pollutants (POPs) on 6 December 2004, and ratified the convention on 16 April 2008. In the context of enabling activities, a National Implementation Plan (NIP) was prepared which outlines the proposed programmes that would be required to meet obligations under the Convention. This document provides a policy framework, which lays out a road map for addressing the specific issues of POPs in Pakistan and aims to:

- (i) eliminate POPs pesticides, with rational management of obsolete stockpiles/ contaminated sites;
- (ii) eliminate PCBs and PCB contaminated equipment, with decontamination and rehabilitation of contaminated sites
- (iii) reduce emissions of unintended POPs
- (iv) strengthen legal and institutional frameworks for managing POPs and chemical pollutants;
- (v) establish monitoring programmes for POPs and other chemical pollutants;
- (vi) enhance transfer of appropriate technology for control of POPs releases; and
- (vii) Improve public information, awareness and education concerning hazards of POPs and their elimination.

188. *Other relevant bans and conventions for environmental protection (including pesticide use and animal/plant health) in Pakistan:*

a. The import of CFC-based compressors has been banned in line with the Montreal Protocol (ratified on 18 December 1992), and Pakistan has been gradually phasing out ozone-depleting substances (ODS), even though the country is not a large emitter itself.
b. Pakistan is party to the Basel Convention (signatory since 1994), the Convention on Biodiversity and member of the World Organization for Animal Health (OIE), the Codex Alimentarius Commission, Asia and Pacific Plant Protection Commission (APPPC), and the Animal Production and Health Commission for Asia and the Pacific. It has signed and ratified the Agreement on Application of Sanitary and Phytosanitary Measures (SPS Agreement), which pertains to food safety (e.g. bacterial contaminants, pesticides, inspection, and labelling), animal health, and plant health (e.g. addressing the issue of imported pests and diseases).
c. Pakistan also is a Contracting Party to the Convention on Wetlands (Ramsar Convention) to which is acceded in 2010. It has 19 sites designated as Wetlands of International Importance, with a surface area of 1 343 627 hectares.

189. *International conventions and treaties in Pakistan relevant to social safeguards:* Pakistan has been a member of the International Labour Organization (ILO) since 1964. The country has ratified a total of 36 ILO Conventions, including all of the eight ILO core Conventions and Indigenous and Tribal Peoples' Convention.

Table 15. International treaties and conventions in Pakistan relevant to social safeguards

No	Name of Convention	Date of Signature	Date of Ratification/Accession
1	International Covenant on Civil and Political Rights	2008	2010
2	Convention Concerning the Abolition of Forced Labour, 1957	1960	In Force (date unknown)
3	Minimum Age Convention: 1973 (No. 138)	2006	In Force (date unknown)
4	Worst Forms of Child Labour Convention: 1999 (No. 182)	2001	In Force (date unknown)
5	Convention on the Rights of Persons with Disabilities	2008	2011
6	Vocational Rehabilitation and Employment (Disabled Persons) Convention, 1983	1994	In Force (date unknown)
7	International Convention for the Protection of All Persons from Enforced Disappearance	Not yet signed	Not yet ratified
8	International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families	Not yet signed	Not yet ratified
9	Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment	2008	2010
10	Convention on the Rights of the Child	1990	1990
11	Optional Protocol to the Convention on the Rights of the Child on the involvement of children in armed conflict: 2002	2001	2016
12	Optional Protocol to the Convention on the Rights of the Child on the sale of children, child prostitution, and child pornography: 2002	2001	2011
13	Convention on the Elimination of All Forms of Discrimination against Women	N/A	1996
14	International Covenant on Economic, Social and Cultural Rights	2004	2008
15	International Convention on the Elimination of All Forms of Racial Discrimination	1966	1966
16	Right of Association (Agriculture) Convention, 1921	1923	In Force (date unknown)
17	Indigenous and Tribal Populations Convention, 1957	1960	In Force (date unknown)
18	UN Convention Against Corruption	2003	2007
19	UN Declaration on the Rights of Indigenous Peoples	2007	2007

4.3 Applicable Environmental and Social Safeguard Policies

190. The proposed project investments are designed to have positive social and environmental benefits. The Project has been classified as moderate risk (Category "B") and it is expected that the project activities, as described in Chapter 2, will trigger the following Environmental and Social Safeguard Policies: ESS3, ESS5, ESS7, and ESS9. To comply with these policies, given that not all the sub-activities can be identified during appraisal, specific safeguard instruments were identified in Table 16.

Table 16. List of safeguard policies triggered for the Project

Safeguard Policies	Triggered	Safeguard Instruments & Mitigation Measures
ESS 1 – Natural Resources Management	NO	Non-Eligible activities (Annex 1)
ESS2 – Biodiversity, Ecosystems, and Natural Habitats	NO	Non-Eligible activities (Annex 1)
ESS3 – Plant Genetic Resources for Food and Agriculture	YES	ESMF/ESMP, ensuring that seeds used are registered.

Safeguard Policies	Triggered	Safeguard Instruments & Mitigation Measures
ESS4 – Animal – Livestock and Aquatic Genetic Resources for Food and Agriculture	NO	Non-Eligible activities (Annex 1)
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)). A tentative Pest Management Plan (PMP) is provided in Annex 3.
ESS6 – Involuntary Resettlement and Displacement	NO	Non-Eligible activities (Annex 1)
ESS7 – Decent Work	YES	ESMF/ESMP; Training for farmers and sensitization sessions for government will be held on decent rural employment, age-appropriate works, and Occupational Health and Safety, and the project will utilize the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries, and Forests
ESS8 – Gender Equality	NO	The Project already 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 (Annex 4)

191. **ESS3 – Plant Genetic Resources for Food and Agriculture. This policy is triggered.** The proposed project includes activities under Component 2 that involve use of certified seeds for the Farmer Field Schools, and may involve introduction of locally developed and registered climate-resilient crop varieties, thus ESS3[78] is triggered. The specific varieties and crops are still to be determined, as are the amounts required, though an initial selection of potential varieties has been identified through review and includes:

- **Rice:** KSK 282 in Punjab (water stress tolerant); KSK 133 in Punjab and Sindh (flood/excessive water tolerant/still stem that resists lodging);
- **Cotton:** MNH 886 in Punjab and Sindh (Cotton Leaf Curl Virus (CLCV) tolerant/heat tolerant; short duration crop); FH 142 in Punjab and Sindh (CLCV tolerant/heat tolerant/short duration); IUB 13 in Punjab and Sindh (CLCV tolerant/highly heat tolerant);
- **Wheat:** Jauhar 2016 in Punjab (resistant to leaf and yellow rust); Ujala 2017 in Punjab (strong resistance to major wheat diseases; suitable for late sowing); Faisalabad 2008 in Punjab (heat tolerant; resistant to leaf and strip rust); TD-1 in Sindh (high yield; responsive to increased use of inputs); Benazir-2013 in Sindh (high yield, heat tolerant); Kiran-95 in Sindh (high yield, heat

[78] *ESS 3 defines Plant Genetic Resources for Food and Agriculture (PGRFA) as the entire diversity of the plants used, or with the potentials to be used, in agriculture for the production of food, fodder, and fiber. Plant Genetic Resources for Food and Agriculture (PGRFA) include the accessions of germplasm holdings (ex-situ collections), wild species found in nature (in situ) that may include crop wild relatives (CWRs); landraces or traditional varieties maintained on-farm; breeding materials in crop improvement programs; and improved varieties registered and/or released for cultivation. ESS 3 recognizes the International Plant Protection Convention (IPPC) as the framework that provides tools to protect plant resources from pests and diseases (including weeds). ESS 3 recognizes the two key instruments that regulate access and benefit-sharing, Indigenous Peoples' Rights (IPR) and farmers' rights relating to PGRFA as the International Treaty on Plant Genetic Resources for Food and Agriculture and the Convention on Biological Diversity (CBD) through its Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization. ESS 3 recognizes that the application of the Cartagena Protocol on Biosafety to the CBD results in safeguards that ensure that the handling, transport and use of living modified organisms (LMOs) resulting from modern biotechnology do not have adverse effects on biological diversity and/or pose risks to human health.*

tolerant);

- **Sugarcane:** HSE 240 in Punjab (tolerant to water stress and disease); CPF 246 in Punjab (water stress tolerant and lodging resistant); Thatta 10 in Sindh (water stress tolerant); Thatta 2109 in Sindh (water stress and frost tolerant).

192. **ESS5[79] – Pest and Pesticide Management. This policy is triggered.** Given that there is high use of pesticides in the project areas, particularly with regard to cotton crops, this policy is being triggered. The project, while it will not procure pesticides and/or promote the use of pesticides, may result in indirect increased use of pesticides in nearby areas if production increases. To mitigate against this, the project will be using IPM and also avoiding the use of any Highly Hazardous Pesticides. Moreover, given that the project does not promote pesticide use, allowance of pesticide use on farms engaged in the project would only extend to respecting a farmer's choice in adopting proposed climate resilient practices (e.g. Integrated Pest Management) or not. Farmers will be educated on the benefits of approaches like IPM, but will not be forced to change their practices against their will. There will be no allowance of HHP use under any circumstances.

193. **ESS7 – Decent Work. This policy will be triggered.** Within the project area, a number of tenant farmers and migrant farmers are present, including those from scheduled casts (often treated with lesser rights than others). Given this, as well as the presence of youth workers who assist their families outside of school hours, ESS7 has been triggered. Under ESS7, training will also be provided on basic occupational health and safety pertaining to agriculture, given the hazards currently existing in the project area (e.g. pesticide use). ESS 7 recognizes that promoting decent work and full and productive employment is essential to achieving food security and reducing poverty. ESS 7 is anchored in FAO's vision for sustainable food and agriculture, which explicitly prioritizes decent work. ESS 7 defines "Decent Work" as defined by ILO as "productive work for women and men in conditions of freedom, equity, security and human dignity."

194. **ESS9 – Indigenous Peoples and Cultural Heritage. This policy will be triggered.** Although the Government of Pakistan does not officially recognize indigenous peoples, there are a number of scheduled castes and minorities within Pakistan who fit the definition of indigenous for the purposes of FAO and GCF safeguards; as such, ESS 9 is triggered.[80] In order to address the requirements of Free Prior and Informed

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[79] *ESS 5 defines pesticides as any substance, or mixture of substances of chemical or biological ingredients intended for repelling, destroying or controlling any pest or regulating plant growth. A pest is defined as any species, strain or biotype of plant, animal or pathogenic agent injurious to plants and plant products, materials or environments and includes vectors of parasites or pathogens of human and animal disease and animals causing public health nuisance. ESS 5 recognizes that pesticides can contribute to effective crop and food protection during production and in storage. Pesticides are also used in forestry, livestock production and aquaculture to control pests and diseases. At the same time pesticides are designed to be toxic to living organisms, are intentionally dispersed in the environment and are applied to food crops. ESS 5 recognizes that pesticide use poses risks to users, others nearby, consumers of food and to the environment. In LMICs these risks are often elevated by overuse, misuse and lack of effective regulatory control. ESS 5 follows the guidance on the life-cycle management of pesticides as provided by the International Code of Conduct on Pesticide Management and its supporting technical guidelines that are drawn up by a FAO\WHO expert panel and expand on specific articles.*

[80] *ESS 9 recognizes indigenous peoples' traditions and knowledge present opportunities for many of the challenges that humankind will face in the coming decades. This is of particular significance in relation to indigenous food systems in the face of increasing food demand and traditional knowledge with respect to adapting to climate change vulnerabilities and impacts. Indigenous peoples are estimated to comprise about 5% of the world's population, yet 15% of the global poor. An agenda that pursues global food security, sustainable natural resources management and poverty alleviation is incomplete unless it addresses indigenous peoples' needs. For this reason, FAO approved in 2010 its Policy on Indigenous and Tribal Peoples which is based on international legal agreements, such as the UN Declaration on the Rights of Indigenous Peoples (UNDRIP), adopted by the General Assembly in 2007, and ILO Convention 169. The FAO Policy on Indigenous Peoples underpins ESS 9 and provides the corporate guidance to respect, include and promote indigenous peoples' issues in FAO's work. The core principles of the policy are: self-determination: respect for indigenous knowledge, cultures and traditional practices that contribute to sustainable and equitable development; and Free, Prior and Inform Consent (FPIC). ESS 9 furthermore recognizes the importance of tangible and intangible cultural heritage for current and future generations.*

Consent, consultations have been held with these minority groups in each project district in order to determine their differentiated needs and priorities, key concerns, and their preferred method(s) of grievance redress. Attendees were told about potential positive and negative impacts of the project, and whilst all confirmed support for and interest in the project, iterative discussions will be confirmed at village level once the project has been approved. This approach has been taken in order to avoid losing trust of the communities (e.g. promising to hold a project when their village might not be selected as a final site). The plan for addressing indigenous communities is addressed in the stakeholder engagement chapter of this ESMF.

195. The GCF has provisionally adopted the International Financial Corporation (IFC) Performance Standards and directives of implementation for the purposes of safeguarding GCF projects. Under these standards, there are eight which cover the main environmental and social questions that must be considered when starting a project and determining safeguards, using best international practices. This project has been screened against FAO environmental and social standards, ensuring that the project is consistent with the objectives of GCF Performance Standards (see Table 17):

Table 17. IFC Performance Standards & corresponding FAO Environmental and Social Safeguards

IFC Performance Standards (PS)	FAO Environmental and Social Safeguards
PS 1 – Assessment and Management of Environmental and Social Risks and Impacts	**ESS 1** – Natural Resources Management **ESS8** – Gender Equality
PS2 – Labour and Working Conditions	**ESS7** – Decent Work
PS3 – Resource Efficiency and Pollution Prevention	**ESS5** – Pest and Pesticide Management
PS4 – Community, Health, Safety, and Security	**ESS7** – Decent Work (partially)
PS5 – Land Acquisition and Involuntary Resettlement	**ESS6** – Involuntary Resettlement and Displacement
PS6 – Biodiversity Conservation and Sustainable Management of Living Natural Resources	**ESS2** – Biodiversity, Ecosystems, and Natural Habitats **ESS3** – Plant Genetic Resources for Food and Agriculture **ESS4** – Animal – Livestock and Aquatic Genetic Resources for Food and Agriculture
PS7 – Indigenous Peoples	**ESS9** – Indigenous Peoples and Cultural Heritage
PS8 – Cultural Heritage	

196. An exclusion (non-eligibility) list is provided in Annex 1, which details activities that will not be financed under the project.

4.4 Summary of Objectives and Principles for Implementation of the Gender Action Plan

197. **Gender Action Plan.** To safeguard against issues of gender equality (ESS8) and to ensure mainstreaming of gender throughout the project design, a Gender Action Plan was prepared for the project. Specifically, the plan ensures adequate inclusion and promotion of women throughout the project's activities and helps in preventing missed opportunities.

198. *Objective.* The objective of the Gender Action Plan is to establish clear targets, in a time-bound framework, to ensure the inclusion of women in the project and operationalization of the GCF Gender Policy. The GCF Gender Policy is meant to ensure that the project adopts a gender-sensitive approach so that the GCF-funded project will efficiently contribute to gender equality and achieve greater and more sustainable climate change results, outcomes and impacts.

199. *Principles*. The principles that govern the Gender Action Plan are in accordance with ESS8 – Gender Equality, as well as the GCF's guidance on Gender Action Plans, vis-à-vis their Gender Policy. The following six fundamental principles provide the basis upon which the Gender Action Plan has been developed:

- Commitment to gender equality and equity;
- Inclusiveness in terms of applicability to all GCF-funded activities;
- Accountability for gender and climate change results and impacts;
- Country ownership in terms of alignment with national policies and priorities and inclusive stakeholder participation;
- Competencies throughout the GCF's institutional framework; and
- Equitable resource allocation so that women and men benefit equitably from the Fund's adaptation and mitigation activities.

200. There are six priority areas for the Gender Action Plan, namely:

- Governance and institutional structure;
- Operational guidelines;
- Capacity building;
- Outputs, outcomes, and impact indicators for monitoring and reporting purposes;
- Resource allocation and budgeting; and
- Knowledge generation and communications.

201. The Gender Analysis and Gender Action Plan for this project are provided as separate, stand-alone documents, submitted in complement to this ESMF. FAO, as executing entity, would be responsible for implementation, compliance, and reporting.

5.0 STAKEHOLDER ENGAGEMENT

5.1 Stakeholder Identification

202. Since its conception, this project has involved a high level of country ownership and stakeholder engagement. This stakeholder engagement was viewed as crucial in order to develop a strong project which would directly benefit an expected 1.3 million rural people. Stakeholders were initially determined through discussions between the Nationally Designated Authority (NDA) and FAO, during the design of the preliminary project concept. These discussions identified the initial ministries, departments, and line agencies that would likely be involved. During subsequent field visits, connections were made with relevant Civil Society Organizations (CSOs), Non-Governmental Organizations (NGOs), other UN agencies, multinational organizations (e.g. World Bank), and community organizations working within the project districts to further determine overlap and areas for collaboration in relation to the project. Meetings with farmers, women (including women farmers), and ethnic and religious minorities living and working in the project areas were also held in every district, in order to best understand the needs of the populations in each district, including differentiated needs based on gender and/or minority status.

203. Given that the exact villages to be included for project implementation have not yet been determined, more specific stakeholder identification (particular to determine ethnic and religious minority groups present in those villages), will occur during the first four months of project implementation. The purpose of this would be to ensure that direct beneficiaries are consulted with, once the exact project locations are determined.

5.2 Stakeholder Engagement during Project Preparation/Formulation

5.2.1 Consultations at the National Level

204. This project was prepared in response to the expression of interest by Pakistan's National Designated Authority (NDA) at the Ministry of Climate Change (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, specifically in the Ministry of Planning, Development and Reform; Ministry of Food Security and Research; Global Change Impact Study Centre (GCISC); National Agricultural Research Center (NARC); Climate Change Alternate Energy and Water Resources Institute (CAEWRI); Pakistan Agricultural Research Council (PARC); Pakistan Council of Research in Water Resources (PCRWR); and Pakistan Meteorological Department (PMD). FAO gathered technical inputs and institutional background on the mandate, role, capacity and workplans 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.

205. Following initial information gathering and scoping for the project on the behalf of the NDA from April 2017 through July 2017, FAO provided its preliminary findings and suggestion 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.

206. 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 that they are providing. Amongst these partners, including CIAT, DfID, GiZ and the World Bank, FAO has conferred most closely with CIAT and the World Bank on this proposal in the context of its on-going collaboration with both. 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. The Government and World Bank are both eager that the outputs of this project are made available and incorporated in the Strengthening Markets for Agriculture and Rural Transformation (SMART) project in the Punjab and the follow on project to the Sindh Water Sector Improvement Project (SWISP) in Sindh.

5.2.2 Consultations at Provincial and Village Levels

207. A high-level stakeholder consultation for Punjab Province 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, Sindh Province 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.

208. In-depth consultations with stakeholders in the eight project districts took place over a period of 10 days in February-March 2018 in order to assess possible environmental and social safeguard issues related to proposed project activities. The consultations were focused on meetings with local communities, especially the potential project affected peoples, minorities, and other relevant stakeholders. The consultations were conducted to provide information on the: a) purposes of the project; b) overview of potential impacts; and c) project implementation plan. They were also used as forums to determine (i) stakeholder preferences on how a project-level grievance redress mechanism could be established, and (ii) broad scale community support for the project. Care was given to ensure that vulnerable communities, specifically women, youth, and ethnic and religious minorities, were met with in each project district to determine their unique needs, sensitivities, and potential risks. Key results of the consultations are listed under section 5.4 of this ESMF. Both this ESMF and the related Gender Action Plan are outcomes of the February-March 2018 fieldwork, and the consultations were used to inform the safeguards documents as well as overall project design.

209. Discussions in October were held only for initial safeguard screening purposes, and involved the following locations and groups:

- Punjab Province:

- **Lahore:** Director General (DG) Irrigation (Punjab); DG On Farm Water Management (Punjab); Director of Agricultural Extension (Punjab)
- **Dhamke:** Local farmers from SmartAgrofarm
- **Dhamke:** Local farmers from a farm that promoted direct-seeding rice
- **Multan:** Superintendent Engineer of Irrigation (Multan Circle only) and the Director of Agricultural Extension (Multan)
- **Bhand-Bosn:** Local farmers
- **Village 206:** Farmers' Integrated Development Association (FIDA – Vehari Chapter), the "Green Army" youth group (focused on promoting climate resilience and climate change awareness), local farmers and women, and Farmer Field School participants

- **Sindh Province:**
  - **Hyderabad:** DG of Agricultural Extension (Sindh) and the Chief Engineer of Irrigation Development for Sindh Region 1 (working on the Government's Salinity Control and Reclamation Project).
  - **Chauthry Nizan-Uddin:** Local farmers and women

210. Based on the initial screening conducted in October 2017, the subsequent safeguards consultations were held in February and March 2018 with farmers, women, and ethnic minorities in all of the project's eight districts, in order to:

- **Inform affected households and communities** about the project and its potential impacts;
- **Collect information and feedback from the local peoples**, including women and as many representatives as possible from ethnic groups in the project area (in this case, "ethnic groups" includes those fitting the definition of indigenous peoples by FAO terms, even though indigenous peoples are not officially recognized by the Government of Pakistan);
- **Confirm the broad community support**, especially from potentially affected ethnic and religious minority groups, for project implementation. Confirmation from ethnic and religious minority groups was provided based on the presentation of the project's purpose, activities, implementation plan, and potential impacts, though it is understand that this consultation process will be repeated during the first four months of implementation, once the project sites have been selected.

211. A full list of participants from the February and March 2018 consultations can be found in Annex 8. Annex 10, a separate PDF, provides proof of consultation attendance. In addition to informing the development of these safeguards, including the Gender Action Plan, the feedback from consultations was used to further inform project design.

Consultations with women's groups, farmers, and ethnic minorities

5.3 Stakeholder Engagement during Project Implementation

212. Consultation through a community outreach during implementation is a good practice that can be adopted to ensure that the potential negative impacts and concerns are properly addressed during construction and operation of a project. Extensive consultation with affected populations and ethnic/religious minorities are required when sub-activities involve temporary impacts that affect income generation activities, livelihoods, and agricultural production of local people, including people from ethnic groups.

213. Stakeholder consultations during project implementation will be conducted on an annual basis. The field-level consultation process will be facilitated by the local project staff, whilst the overall schedule for consultations will be coordinated by the Lead Safeguards Specialist based in the Multan (Punjab) project office. Annex 9 provides an overview of the budget and timeline for stakeholder consultations, as well as other safeguards measures.

214. Given that Free Prior and Informed Consent can be considered a positive engagement practice, even when indigenous peoples are not present, this project will utilize the FPIC process in instances where ethnic and religious minorities are present, insofar as the communities (i) are engaged with material in their relevant language/dialect(s); (ii) understand that benefits accrued under the project are shared with all participants and community members; and (iii) have opportunity to re-confirm their respectively preferred Grievance Redress Mechanisms. Thus far, and as detailed in section 5.4 of this ESMF, the community-specific GRM will likely include additional representation of minority groups to ensure fair and transparent redress. More information about planned stakeholder engagement with ethnic minority groups during project implementation is available in Annex 10: Social Inclusion Planning Framework (see in particular Section 4).

5.4 Public Consultation Results

215. On the basis of potential project impacts, the consultations with community members provided the following feedback.

- Potential Project Impact(s): Participants agreed that the project would have largely positive impacts, and concurred with the positive social and environmental impacts described. Some had had experience with climate-focused FAO projects before, particularly project which involved increasing agricultural resiliency and introducing IPM, and those farmers expressed great interest in having further engagement in similar projects. Farmers consulted (including ethnic minorities) did not have concerns regarding their land tenancy, even though the facilitators from FAO inquired about land rights and access – including questions about whether they would lose access to their land if it became more productive. Even with the current land ownership situation in Sindh and Punjab, the farmers did not seem concerned. It was noted, however, that some *hari* farmers may have been hesitant to express their sentiments in full, based on the fact that (in one instance) a member of the landlord's family joined the consultation. It was explained that the project would, as part of the requirements for FAO and GCF, have safeguards to mitigate against any potential issues re: land use and decent rural employment, and that – when applicable – it would build on the land tenure work already being done within the project areas (e.g. FAO and the provincial Government of Sindh are already engaged in promoting the use of VGGT in some of the same and neighbouring districts).

- Grievances Redress Mechanism (GRM). Farmers, women, and ethnic minorities from all districts preferred that the project use a GRM that is managed directly by FAO or by an established local community organization (e.g. in the case of DG Khan), in order to avoid concerns with grievance redress established within the government departments/line agencies themselves – particularly in instances where ethnic minorities are explicitly involved. Preference was given to a hotline that could be established. Ethnic minorities were met with in every district to determine how they typically lodged any complaints for projects and/or within their communities – particularly in mixed-religion communities. Most preferred using the village elder and to keep disputes outside of the official government system, and they expressed that a hotline and/or complaints box from existing community organizations (or the project more specifically) would be welcome.

- Participation. Consultations helped discern ways in which women and ethnic minorities could be encouraged to participate in project activities, based on activities that were/are appropriate to them in terms of culture and farming practices. Feedback from this was provided directly to the project design team and incorporated within the Full Project Funding Proposal and Feasibility Study. Additional information about potential barriers to the participation of ethnic minorities in project activities (and the process through which the project will aim to support ethnic minorities to overcome these barriers) is included in Annex 10: Social Inclusion Planning Framework.

- Gender. Women are involved with crop production (growing, transplanting, harvesting) and livestock, and some had kitchen/homestead gardens, though much of the work is unofficially recognized. The visibility of women in each district depended on the community/village: some were allowed to work alongside men and/or had opportunity to seek daily labour without a male escorting them to the field; however, other communities had barrier walls, within which the women could work, but outside of which would be difficult unless escorted by a male. Men work more with pest management and fertilizer application, given that those are considered "heavier" types of work with heightened health and safety risks due to the chemical compounds. Men also typically deal with irrigation of crops and agricultural land. During consultation, women were met with separately to ensure that they had an open space to share their stories, concerns, and preferences. This feedback is detailed and acted upon within the Gender Action Plan.

- Community Support. Given the potential social and environmental positive impacts, and that the project benefits outweigh the limited adverse impacts, all participants consulted with, including ethnic minority groups, indicated their support for project implementation.

5.5 Disclosure

216. According to GCF and FAO policies on access to information, all safeguard instruments under this project, including the ESMF and Gender Action Plan must be disclosed online in the English and local language (Urdu, in the case of Pakistan) at least 30 days prior to GCF board meeting and approval of the project. Access to the documents must be possible for any locals (i.e. it must be disclosed locally in an accessible place) in a form and language understandable to key stakeholders. Such disclosure of relevant project information helps stakeholders effectively participate. FAO is committed to disclosing information in a timely manner and in a way that is accessible and culturally appropriate, placing due attention to the specific needs of community groups which may be affected by project implementation (e.g. literacy, gender, differences in language or accessibility of technical information or connectivity).

217. For moderate risk projects like this one, FAO releases the applicable information as early as possible, and no later than 30 days prior to project approval. The 30 day period commences only when all relevant

information requested from the project has been provided and is available to the public. FAO undertakes disclosure for all moderate risk projects, using a disclosure portal to publicly disclose all of the projects' documentation related to environmental and social safeguards (e.g. Environmental and Social Management Frameworks, Gender Action Plans, Indigenous Peoples Plans, and other relevant documents). The website is: http://www.fao.org/environmental-social-standards/disclosure-portal/en/.

218. In order to ensure the widest dissemination and disclosure of project information, including any details related to applicable environmental and social safeguards, local and accessible disclosure tools including audiovisual materials (e.g. flyers, brochures, community radio broadcasts) will be utilized in addition to the standard portal disclosure tool. Furthermore, particular attention will be paid to farmers, indigenous peoples, illiterate or technological illiterate people, people with hearing or visual disabilities, those with limited or no access to internet and other groups with special needs. The dissemination of information among these groups will be carried out with the project counterparts and relevant local actors (e.g. Tehsils, Union Councils, ethnic groups, farmers associations, government, and others).

219. In relation to each Category B sub-activity to be funded under the Project, FAO shall disclose the Environmental and Social Management Plan (ESMP), Social Inclusion Management Plan, and as appropriate any other associated information required to be disclosed in accordance with the GCF Information Disclosure Policy (Project Disclosure Package). FAO shall disclose the sub-activity safeguards information at least 30 calendar days prior to commencing execution of any sub-activities that have been categorized as Category B, in English and in the local language (if not English), on its website and in locations convenient to affected peoples, and provide the Project Disclosure Package to the GCF Secretariat for further distribution to the Board and Active Observers and for posting on the GCF website. Within 180 days of the GCF Board approval of the Project, FAO and GCF Secretariat shall agree on a process to enable communication of any comments to FAO, including from the GCF Board members and Active Observers, on Category B sub-activities relating to the Project Disclosure Package, and to take account of such comments in the finalization of such documents.

5.6 Grievance Redress Mechanism

220. The grievance redress mechanism (GRM) is an integral project management element that intends to seek feedback from beneficiaries and resolve of complaints on project activities and performance. The mechanism is based on FAO requirements and most importantly, it is based on existing, community-specific grievance redress mechanisms preferred by the local beneficiaries.

FAO's Approach to the GRM:

221. FAO is committed to ensuring that its programs are implemented in accordance with the Organization's environmental and social obligations. In order to better achieve these goals, and to ensure that beneficiaries of FAO programs have access to an effective and timely mechanism to address their concerns about non-compliance with these obligations, the Organization, in order to supplement measures for receiving, reviewing and acting as appropriate on these concerns at the program management level, has entrusted the Office of the Inspector-General with the mandate to independently review the complaints that cannot be resolved at that level.

222. FAO will facilitate the resolution of concerns of beneficiaries of FAO programs regarding alleged or potential violations of FAO's social and environmental commitments. For this purpose, concerns may be communicated in accordance with the eligibility criteria of the Guidelines for Compliance Reviews Following

Complaints Related to the Organization's Environmental and Social Standards[81], which applies to all FAO programs and projects.

223. Concerns must be addressed at the closest appropriate level, i.e. at the project management/technical level, and if necessary at the Regional Office level. If a concern or grievance cannot be resolved through consultations and measures at the project management level, a complaint requesting a Compliance Review may be filed with the Office of the Inspector-General (OIG) in accordance with the Guidelines. Program and project managers will have the responsibility to address concerns brought to the attention of the focal point.

224. The principles to be followed during the complaint resolution process include: impartiality, respect for human rights, including those pertaining to indigenous peoples, compliance of national norms, and coherence with the norms, equality, transparency, honesty, and mutual respect.

Project-Level GRM:

225. Consultations during project preparation highlighted that potential project-affected peoples, including ethnic minorities, would prefer to share the same Grievance Redress Mechanism (GRM). Ethnic minorities consulted with throughout preparation indicated interest in sharing the same GRM, so long as it was project-based and not built into existing government structures (preference was for either FAO or local community organizations acting on FAO's behalf to manage the GRM). Consultations also highlighted the preference for use of a hotline on which grievances could be made. With these recommendations in mind, the project-level GRM was designed. It is understood that, in line with consultations conducted during implementation, the GRM may be amended to meet the needs of specific ethnic/religious minorities as the project sites are determined.

226. The project will establish one or more grievance mechanisms at the field level to file complaints, sensitive to the location wherein the project is being implemented. Both (i) contact information and (ii) information on the process one must follow in order to file a complaint will be disclosed in all meetings, workshops and other related events throughout the life of the project. It is also expected that all awareness raising material to be distributed will include the necessary information regarding the process for filing grievances and key contacts. The project will be responsible for documenting and reporting, as part of the safeguards performance monitoring, on any grievances received and how they were addressed.

227. The Grievance Redress Mechanism for this project includes the following steps:

- Following on preferences indicated in consultations, minor grievances will begin processing at the local level, and will sought to be resolved through traditional means of community discussion with the concerned parties and respected village elder(s). In instances where an ethnic minority is reporting a grievance and: (i) one respected village elder is chosen to resolve the grievance, then that elder must also be a member of the ethnic minority community; or (ii) two or more village elders are chosen to resolve the grievance, then there must be at least 50% of minority representation amongst those elders.

- In instances whereby the claimant would prefer to have the grievance addressed directly through FAO, but does not have the ability to file a claim personally, the concerned person(s) will express the grievance (either orally or in writing) to the local implementation unit (i.e. FAO or contracting community organization). The project staff at local level who receives the complaint will be responsible for presenting/filing those complaints to the Lead Safeguards Specialist based in the Provincial Project Implementation Unit (PPIU) in Multan. In instances where the claimant has the means to directly file a claim, he/she has the right to do so, presenting it directly to the Lead Safeguards Specialist within the PPIU in Multan. The process of filing a complaint will duly consider

[81] *Available online at: http://www.fao.org/3/a-i4439e.pdf*

anonymity as well as any existing traditional or ethnic dispute resolution mechanisms and it will not interfere with the community's self-governance system. Contact information will also be given for processing a grievance directly to the Lead Safeguards Specialist within the PPIU by phone.

- After the complainant files a complaint through one of the channels of the grievance mechanism, this complaint will be registered by the Lead Safeguards Specialist and sent to the PMU Project Coordinator to confirm that the complaint is eligible. The confidentiality of the complaint must be preserved during the process.

- Eligible complaints will be addressed by the PMU or the applicable institution. The PMU Project Coordinator will be responsible for recording the grievance and how it has been addressed, if a resolution was agreed.

- If the situation is too complex, or the complainer does not accept the resolution, the complaint must be sent to a higher level, until a solution or acceptance is reached.

- For every complaint received, a written proof will be sent within ten (10) working days; afterwards, a resolution proposal will be made within thirty (30) working days.

- In compliance with the resolution, the person in charge of dealing with the complaint, may interact with the complainant, or may call for interviews and meetings, to better understand the reasons.

- All complaints received, its response and resolutions, must be duly registered.

Internal Process:

228. Lead Safeguards Specialist. The complaint could come in writing or orally (including over the phone) to the Lead Safeguards Specialist within the PPIU. At this level, received complaints will be registered and screened by the Lead Safeguards Specialist for eligibility. Screened complaints will then be sent to the Project Coordinator in the PMU.

229. Project Management Unit. The should come in writing from the Lead Safeguards Specialist within the PPIU to the Project Coordinator in the PMU directly. The Project Coordinator will provide final confirmation of eligibility and proceed to investigate and resolve the complaint.

230. Project Oversight Committee (POC). If the complaint has not been solved and could not be solved with the PMU, then the chair of the POC must address the complaint. If this still cannot be resolved, then the complaint is sent to the next level (FAO Representative).

231. FAO Representative. The assistance of the FAO Representative is requested if a resolution was not agreed in the first two levels (PMU and POC).

232. FAO Regional Office for Asia and the Pacific. The FAO Representative will request, if necessary, the advice of the Regional Office to resolve a grievance, or will transfer the resolution of the grievance entirely to the regional office, if the problem is highly complex.

233. The FAO Regional Representative will request – only on very specific situations or complex problems – the assistance on the FAO Inspector General, who would then pursue procedures of the Office of the Inspector General (OiG) to solve the problem.

Resolution:

234. Upon acceptance of a resolution by the complainant, a document with the agreement should be signed, clearly indicating the terms of the resolution.

RECIPIENT OF GREIVANCE	ACTIONS REQUIRED
Lead Safeguards Specialist (PPIU)	Must register the complaint and send eligible complaints to the PMU within 2 working days.
Project Management Unit	Must respond within 5 working days of receipt.
Project Oversight Committee (POC)	Any organization may receive a complaint and must provide proof of receipt of said complaint. If the case is accepted, then the receiver must send all of the information to all of the Project Oversight Committee members and call for a meeting to find a resolution. The response must be sent within 5 working days after the meeting of the Project Oversight Committee.
FAO Representative in Pakistan	Must respond within 5 working days, in consultation with POC. **FAO Representative:** Mina Dowlatchahi FAO-PK@fao.org; mina.dowlatchahi@fao.org Tel. +92-51-9255491, or +92-51-9255454
FAO Regional Office for Asia and the Pacific	Must respond within 5 working days in consultation with FAO's Representation. **FAO Representative:** Kundhavi Kadiresan FAO-RAP@fao.org; kundhavi.kadiresan@fao.org Tel.: (+66 2) 697 4000
Office of the Inspector General	To report possible fraud and bad behavior by fax, confidential: (+39) 06 570 55550 By e-mail: Investigations-hotline@fao.org By confidential hotline: (+ 39) 06 570 52333

235. Members of ethnic group communities can make a complaint or appeal on any and all aspects of sub-activities' design and implementation. A complaint and grievance feedback form, as well as a pamphlet explaining the mechanism, will be developed under the project and distributed to ethnic group communities for their use. Ethnic group community members will be clearly informed of the complaint and appeal channels (as described above) in community meetings and other forms of communication that are convenient to them. Information and communications technology and media tools should be used to disseminate information. Opinions and suggestions related to resettlement which are provided by concerned people and/or organizations should be well documented.

6.0 EXPECTED PROJECT IMPACTS

6.1 Overview of Environmental and Social Impacts

236. Overall, the cumulative project impacts are expected to be positive, as the overall objective is to increase climate resiliency of the most vulnerable farmers in Pakistan. Even with these expected, major positive impacts, the project has been classified as moderate risk (Category B) largely due to inequality in the labour market and presence of landless farmers in the project area who will be included in project activities. The key findings on potential positive and negative impacts of the project include:

237. **Positive Impacts:** 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). Environmentally, improved farming practices will support better functioning ecosystems which, in turn, can positively affect human health and well-being in the long run. 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. Special FFS sessions and activities under Component 2 will ensure that farmers are able to proactively "do better" than they would under the without-project scenario. For example, Integrated Pest Management (IPM) will be used under the project in order to promote sustainable pest management that reduces reliance on (and overall use of) pesticides. Socially speaking, livelihoods are expected to improve based on increased adaptive capacities within the target communities. The project may also positively reduce levels of migrant labour, given that increased productivity of land may reduce the need for farmers to migrate in search of work elsewhere. The drive to implement climate resilient agriculture and to establish climate smart water management information 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. The project also engages women through a Gender Action Plan that ensures proactive mainstreaming of women into all activities, empowering women with agricultural skills and knowledge.

238. **Negative Impacts:** Potential negative impacts are minor, mitigatable, and forecast only for the implementation/operation stages. From the social perspective, the project's inclusion of landless farmers and tenants means that there is a potential risk of changes in tenant/landlord relationships due increased in land value resulting from increased agricultural productivity. In addition to this, youth often assist with the farming work of their respective families in Pakistan, and there is a risk that those youth may work beyond what is age-appropriate, unless closely monitored. From the environmental perspective, increased agricultural production may result in the generation of new environmental waste; for instance, slow-release fertilizers that do not fully breakdown/decompose. Increased production is also often a trigger for increased pesticide use, even if the pesticide use is indirect and not promoted under the project. Provision of seed and planting materials for the FFS and introduction of climate-resilient crop varieties also increases the project to medium risk, even though the inputs used and varieties recommended would be registered/certified and already in use within the country (albeit on a smaller scale). Last of all, while the project is not focused on construction activities, 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 mitigatable, for example: noise pollution during installation, air pollution due to dust, and health/safety risks during installation. All of these negative impacts – most of which are linked to Component 2 – are envisaged to be low-to-moderate, localized, temporary, and mitigatable.

6.2 Breakdown of Impacts by Component

239. A breakdown of the expected positive and potential negative impacts, by component, is provided in the following charts, based on component:

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

SUBCOMPONENT	POSITIVE IMPACTS	NEGATIVE IMPACTS
Developing a Water Accounting System	• Sound, scientific water accounting system that meets international standards combining space technology and ground measurements • Water accounting will be standardized across the country • Increased data on groundwater flows, based on hydrological modelling and change projections based on climate • Built capacity within PCRWR, IRSA, provincial irrigation departments, and provincial irrigation and drainage authorities	
Establishing an Evapotranspiration (ET) based Water Management System	• Robust, high resolution ET-data and ET-based system to monitor actual water use in agriculture • Increased capacity amongst Ministry of Water, PCRWR, Punjab Irrigation Department, and Sindh Irrigation and Drainage Department	• Installation of ET-equipment and Agro-Met Systems may require (i) acquisition of small portions of land; and/or (ii) involve temporary noise/dust pollution
Improving Availability and Use of Information Services	• Increased access to much-needed information and data on climate, agriculture, and water (and their interlinkages)	

Component 2: Building on-Farm Resilience to Climate Change

SUBCOMPONENT	POSITIVE IMPACTS	NEGATIVE IMPACTS
Improving Practices for Climate Resilience	• Widespread availability of up-to-date learning (training and communications) materials on CRA practices for producers in the Indus Basin • Feedback opportunities to further inform CRA practices based on field experiences	
Training of Trainers in Climate Resilient Agriculture and On-Farm Water Management	• Increased capacity of extension workers and farmer facilitators to provide climate-change information and climate-resilient agricultural practices	
Development of Farmers' Capacity to Transform Agriculture Practices with CRA and OFWM	• Increased resilience of farmers to climate change • Improved agricultural land, based on good agricultural practices that are climate smart and beneficial to the ecosystem (increased soil fertility, etc.) • Developed capacity of approximately 140 000 farmers on important technical, farm management, business, and leadership skills	• Provision of seeds and other agricultural inputs for FFS carries a risk of uncertified/unregistered seeds being used. • Climate-resilient varieties may be developed and in-use within the country, but not yet fully registered • Increased agricultural productivity could result in issues with increased, indirect use of pesticides/fertilizers, and/or generate new environmental waste (e.g. use of slow release fertilizers that do not fully breakdown) • Increased land productivity may cause issues with age-appropriate work and/or tenancy arrangements

Component 3: Creating an Enabling Environment for Continued Transformation

SUBCOMPONENT	POSITIVE IMPACTS	NEGATIVE IMPACTS
Improving Information and Awareness Raising Campaigns	• Widespread outreach of information providing actionable recommendations on CRA to farmers at all levels • Increased awareness amongst government staff, NGOs, and private sector stakeholders	
Supporting Policy Implementation by Federal and Provincial Governments	• Harmonized policies and procedures, enabling CRA uptake • Increased use of evidence in policy-making and planning	
Development of Services that Enable Farmers to Adopt Climate Resilient Practices	• Increased access to financial capital required for uptake of CRA • Increased assurance of quality inputs required for CRA • Increased capacity of rural youth to prepare land for climate resiliency	

7.0 MITIGATION MEASURES & APPROACH TO ENHANCE POSITIVE IMPACTS

240. This section discusses the impacts and mitigation measures for two prospective components. The following table is described the impacts and mitigation measure from the agricultural production activities.

Table 18: Proposed Mitigation Measures

POTENTIAL RISK	MITIGATION MEASURES & OPPORTUNITIES TO ENHANCE POSITIVE IMPACTS	RELEVANT NATIONAL POLICIES AND/OR LAWS, GAPS THEREIN, AND SUPPLEMENTARY ACTIONS/MEASURES TO BE TAKEN
Component 1: Enhancing Information Services for Climate Change Adaptation in the Water and Agriculture Sectors		
Temporary dust/noise pollution during installation of ET-equipment and/or Agro-Met Stations	Wetting of installation site during dry and windy weather, when within 50m of an occupied dwelling. Installation to be conducted during regular working hours.	The National Environmental Quality Standards (NEQS) – enforced in part through the Pakistan Environmental Protection Act, 1997 – stipulate broader standards with regards to air and noise pollution. However, these standards do not directly apply to individual sites in a manner that would regulate the modest dust/noise pollution that could arise from the installation of ET equipment and/or agro-met stations. As such, the measures proposed in the preceding column are supplementary actions/measures to be taken to ensure full adherence GCF/FAO standards, including in relation to FAO's ESS 7 on Decent Work.
Minor land acquisition for the purposes of ET-equipment and/or Agro-Met Station installation	In instances where land acquisition is required by Pakistan's Meteorological Department (PMD) for installation of ET-equipment and/or Agro-Met stations, the following will procedures will be used: 1) **For land acquisition from an existing government institution:** the PMD can use the land of an existing government	The modest land acquisitions envisaged under this project (e.g. for ET equipment and agro-met stations) will adhere to the Land Acquisition Act (LAA). Among other elements, the LAA requires

POTENTIAL RISK	MITIGATION MEASURES & OPPORTUNITIES TO ENHANCE POSITIVE IMPACTS	RELEVANT NATIONAL POLICIES AND/OR LAWS, GAPS THEREIN, AND SUPPLEMENTARY ACTIONS/MEASURES TO BE TAKEN
	institution/provincial agriculture department, and/or research fields of any university after it has signed either a Memorandum of Understanding (MOU) or another form of leasing agreement. For example, in Multan District, the Multan Agriculture University has provided its agricultural land/research fields to the PMD (80km away from the urban area) for the installation of one of the agro-met stations. The technical staff is provided by the PMD to monitor the data and take readings. In return, Multan University is getting a free copy of the recorded data. 2) **For land acquisition from private owners:** the PMD will adhere to the Land Acquisition Act, which provides regulations on land acquisition for public purposes, including the rules pertaining to just compensation. In addition to this, and for any installations occurring under the project, land acquisition will require FAO-mandated prior consultation with the person(s) affected, with the understanding that no land will be taken/purchased without the consent of the involved persons (i.e. no appropriation of land and no use of eminent domain).	that the government provide just compensation for all private land that is acquired. This is considered to be sufficient to comply with GCF/FAO standards with regards to compensation for land acquisitions. Processes related to consultation and consent in the LAA are not considered to be fully sufficient to adhere to GCF/FAO standards. As such, the following supplementary actions/measures will be taken: (i) FAO-mandated prior consultation with the person(s) affected; (ii) Consent of the individual(s) whose land is sought to be acquired, thus ensuring there is no involuntary resettlement under the project.
Component 2: Building on-Farm Resilience to Climate Change		
Effects of intensified agricultural production	Train farmers on environmentally appropriate farming practices. Instruction in safe selection and use of pesticides (in instances where use is unavoidable), promotion of organic fertilizers, as well as the informed use of mineral fertilizers (when unavoidable), promotion of the concept of integrated pest management, and emphatic discouragement of the use of persistent herbicides/ pesticides.	Numerous national laws are relevant to fertilizer and pesticide use in agriculture, including those detailed in Chapter 4 and annexes 1-3. These laws are considered to be sufficient based on FAO/GCF standards. However, there are often gaps in the application and enforcement of these laws. As such, the project proposes supplementary measures (as outlined in

POTENTIAL RISK	MITIGATION MEASURES & OPPORTUNITIES TO ENHANCE POSITIVE IMPACTS	RELEVANT NATIONAL POLICIES AND/OR LAWS, GAPS THEREIN, AND SUPPLEMENTARY ACTIONS/MEASURES TO BE TAKEN
		the preceding column) to ensure that farmers are aware of and abide by these rules and guidelines. In particular, the project is offering training in relevant areas of IPM and environmentally appropriate farming practices.
Indirect overuse of herbicides/ pesticides	Provision of training on IPM and GAP procedures/practices to farmer groups at demonstration sites. When use of pesticides is inevitable, bio-pesticides will be recommended over other types. Training will also be provided on the safe handling of pesticides. No pesticides will be procured under the project, and highly-hazardous pesticides (HHP) will not be used (see Annex 1 for the non-eligibility list, and Annex 2 for the list of banned pesticides in Pakistan). Annex 3 provides guidelines for pest management.	As above.
Excessive application of fertilizer and/or generation of new environmental waste due to slow-release fertilizer	Provision of extension and training on correct identification and use of fertilizer appropriate to the soil and crop(s); promotion of composting and use of manure, when possible. For the use of fertilizers, as management practices differ according to the site conditions and farm systems, fertilizers (nutrients) will be applied following the guiding principles of **4R Stewardship** (as recommended in the Soil Atlas of Pakistan), specifically: 1. **R**ight Source (suitable source of nutrients) 2. **R**ight rate (quantity applied according to crop requirement and soil test) 3. **R**ight time (Fertilizer applied at the time when the crop can best utilize it) 4. **R**ight placement (Suitable method of nutrient/fertilizer application)	As above.
Introduction of climate resilient varieties developed and used within country, but not yet properly registered	Only use native species and/or locally developed varieties that are registered (see negative list in Annex 1 for more details). When deemed necessary, screening by FAO's technical unit on plant protection (AGPM) will be conducted.	National laws include: the Plant Breeders Rights Act (2016); the Seed Amendment Bill (2014); and the Seed Act (1976). These laws provide a

POTENTIAL RISK	MITIGATION MEASURES & OPPORTUNITIES TO ENHANCE POSITIVE IMPACTS	RELEVANT NATIONAL POLICIES AND/OR LAWS, GAPS THEREIN, AND SUPPLEMENTARY ACTIONS/MEASURES TO BE TAKEN
		sufficiently robust basis for managing risks associated with introducing newly developed varieties, including certification. To further ensure the project only positively impacts the agricultural landscapes within which it works, the project will only pursue introduction of varieties that are native species and/or locally developed and registered.
Provision of seeds (carrying risk of uncertified/unregistered varieties)	Only use registered, certified seeds (see negative list in Annex 1 for more details)	National laws include the Punjab Seed (Amendment) Act, 2017 (Proposed); Punjab Seeds & Fruit Plants Ordinance, 1965; and the Seed Act, 1976 (and subsequent Environmental Samples Rules, 2001). These laws are considered to be sufficient to ensure adherence to GCF/FAO standards as they relate to risks associated with seed distribution. The project will therefore comply with these laws by exclusively using seeds that are registered and certified.
Bonded labour and/or age-inappropriate youth work	The project will not conduct any activities if child labour is present; rather, activities and community participation would be dependent upon ensuring that children are not engaged in child labour or age-inappropriate youth work. For any areas in which bonded labour and/or age-inappropriate youth work is identified during safeguards screenings prior to project implementation, the project will offer sensitization training on safe, decent rural employment, and age-appropriate work (given that youth often assist with the farming work of their respective families). Use of the	The Employment of Child Act (1991) prohibits employment by any child (defined as an individual who has not completed his/her fourteenth year of age) in a range of fields, as outlined in Section 4.1 (Para 181) of this ESMF. Under this project, participating farmers and contractors will be bound by this Act to avoid child

POTENTIAL RISK	MITIGATION MEASURES & OPPORTUNITIES TO ENHANCE POSITIVE IMPACTS	RELEVANT NATIONAL POLICIES AND/OR LAWS, GAPS THEREIN, AND SUPPLEMENTARY ACTIONS/MEASURES TO BE TAKEN
	Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests (VGGT), building on good work already conducted by FAO in the province of Sindh, is also expected to improve labour and land tenancy relations. More broadly speaking, trainings provided through the Farmer Field Schools create a win-win situation for land owners and tenants. Equal opportunity is provided for participants to increase their capacities to understand Good Agriculture Practices (GAP), decent rural employment, and safe, age-appropriate work. The same approach is used in the Women Open School (WOS). The approach taken in FFS has been seen to increase income and standards of living whilst, at the same time, raise awareness on social issues. To ensure ongoing monitoring of potential child and/or bonded labour issues, the project already provisions (as detailed further under Chapter 9 and Annex 9): (i) annual refresher trainings on safeguards; (ii) annual consultations with participants to identify changes in status, potential concerns, etc.; and (iii) monitoring and reporting on ESMPs every six months.	labour and age-inappropriate youth work within project activities, and thus ensure adherence to (and respect for) relevant human rights. However, the Employment of Child Act (1991) does not include any broader requirements to actively discourage child labour and age-inappropriate youth work more generally. As such, the preceding column includes supplementary measures (e.g. trainings for farmers) geared toward addressing this gap, and thus ensuring full adherence to GCF/FAO standards, including FAO's ESS 7 on Decent Work. Trainings for project staff are geared toward ensuring full and effective application of both the provisions of the Employment of Child Act (1991) and the supplementary requirements actions/measures to be taken to ensure full adherence to GCF/FAO standards.
Increased value of land due to heightened agricultural productivity, prompting issues with land tenancy arrangements	Use of the VGGT.	No national policies and/or laws directly address potential risks associated with the changing value of land as a result of increasing agricultural productivity associated with external support/assistance, and the associated potential

POTENTIAL RISK	MITIGATION MEASURES & OPPORTUNITIES TO ENHANCE POSITIVE IMPACTS	RELEVANT NATIONAL POLICIES AND/OR LAWS, GAPS THEREIN, AND SUPPLEMENTARY ACTIONS/MEASURES TO BE TAKEN
		impacts on tenancy arrangements. As such, the project includes supplementary actions/measures to actively promote the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests (VGGT) to ensure full adherence to GCF/FAO safeguards. This will build on FAO's previously successful experiences promoting the VGGT in Sindh province, including in partnership with government entities.
Inadequate inclusion of ethnic minorities in the project activities, and/or lack of sensitivity to ongoing societal and cultural constraints	Given that it can be considered a positive practice for social inclusion, the project will utilize Free, Prior, and Informed Consent as sub-activities are identified, and participatory monitoring and evaluation will be practiced, thus feeding into ongoing improvement of the project activities. The GRM will be sensitive to ethnic minorities. More information on potential barriers to inclusion of ethnic minorities in project activities (as well as the envisaged process to be followed with a view to overcoming these barriers) is included in Annex 10: Social Inclusion Planning Framework.	As outlined in Annex 10: Social Inclusion Planning Framework, this project does not envisage any additional environmental or social risks or negative impacts that are specific to ethnic minorities. However, there is a risk that ethnic minorities will encounter barriers that may inhibit them from benefiting from the project to the same extent as other farmers. There are no national policies and/or laws related to actively/systematically promoting social inclusion to overcome such barriers. As such, the project includes supplementary actions/measures to actively encourage social inclusion (e.g. by overcoming barriers to

POTENTIAL RISK	MITIGATION MEASURES & OPPORTUNITIES TO ENHANCE POSITIVE IMPACTS	RELEVANT NATIONAL POLICIES AND/OR LAWS, GAPS THEREIN, AND SUPPLEMENTARY ACTIONS/MEASURES TO BE TAKEN
		social exclusion) to ensure full adherence with GCF/FAO standards. These supplementary actions/measures are briefly summarized in the preceding column, and described in more detail in Annex 10: Social Inclusion Planning Framework.

241. **Summary of Environmental Mitigation Measures:** Indirect, increased use of pesticides will be mitigated against be proactively offering 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 (HHP) would not be used in the project areas.

242. **Summary of Social Mitigation Measures:** Risks associated with decent rural employment, occupational health, and land tenure will be mitigated with application of: (i) the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests; (ii) sensitization training on safe, decent rural employment and age-appropriate work, given that youth often assist with the farming work of their respective families; and (iii) safe use of pesticides. With respect to ethnic minorities, FPIC will be used and ongoing consultations/participatory M&E will continue throughout the project as a means of providing a feedback loop. The established grievance redress mechanism (GRM) will be conducted in line with the requests from community consultations and will be sensitive to the needs of ethnic minorities. Additional information on planned engagement with (and support to) ethnic minorities is included in Annex 10: Social Inclusion Planning Framework.

8.0 PRINCIPLES AND PROCEDURES TO MITIGATE IMPACTS FOR IMPLEMENTATION

243. This ESMF, along with the Gender Action Plan, is not being used solely as a compliance process: it goes beyond compliance and takes a proactive approach in design. Similarly, the grievance redress mechanism included in this document is not just about being a last-resort mechanism; rather, the GRM is about creating a project culture of transparency with built-in feedback systems. Both the ESMF and the Gender Action Plan are taken as positive aspects that help the project implementation units in identifying and developing activities for greater environmental and social co-benefits. In order to ensure that the environmental and social issues are addressed properly in accordance and in compliance with the FAO and GCF Policies, all project activities shall undergo screening, assessment, review, and clearance process before execution of the project activities.

244. This chapter describes the process for ensuring that environmental and social concerns are adequately addressed through the institutional arrangements and procedures used by the project for managing the identification, preparation, approval, and implementation of sub-activities.

245. The detailed environmental and social safeguard process is listed below. Additional information on the process specifically as it relates to ethnic minorities is included in Annex 10: Social Inclusion Planning Framework (see in particular Section 4 on engagement during project implementation, and Section 5 on the envisaged process for developing Social Inclusion Management Plans).

8.1 Step 1: Defining Sub-Activities

246. By design, the project is expected to have far greater environmental benefits than adverse environmental impacts. The potential adverse environmental impacts from the project are likely to be small and limited. However, it is recognized that such impacts can accrue into larger impacts if they are not identified early during the planning cycle and their mitigation measures integrated into the project planning and implementation.

247. Considering the activities to be implemented in each implementing site will be very similar in nature and scale across the implementation area, it is proposed that screening for potential risks is undertaken at sub-activity level. Sub-activities constitute a valid tool to identify expected impacts and mitigation and monitoring measures.

248. In this context, sub-activities will be identified during the inception phase in Year 1. For each sub-activity, implementing sites will be identified along with activities, including capacity building/training and stakeholder engagement information specific to each site.

8.2 Step 2: Environmental and Social Risk Screening of Sub-Activities

249. FAO's environmental and social screening checklist (Annex 5) will determine if a sub-activity will require an Environmental and Social Management Plan (ESMP). While the nature, magnitude, reversibility, and location of impacts are main elements in the screening of sub-activities, expert judgment will be a main factor in deciding whether an ESMP is required for a sub-activity or not.

250. For a sub-activity that requires an ESMP, the proposal must include a set of mitigation measures with monitoring and institutional arrangements to be taken during the implementation phase to correctly manage any potential adverse environmental and social impacts that may have been identified.

251. FAO will undertake environmental and social screening following FAO's Environmental and Social Screening Checklist. Once the implementation sites and beneficiaries are determined, a screening checklist will be completed per sub-activity and signed off by the safeguards specialist at the Project Management

Unit (PMU). The results of the screening checklists will be aggregated by the safeguards specialist. This document will be sent to ESM unit in FAO for endorsement.

252. Screening of sub-activities involves:

- Checking that the activities involved are permissible (as per the legal and regulatory requirements of the project);
- Determining the level of environmental assessment required based on the level of expected impacts.

253. The E&S screening checklist will result in the following screening outcomes: (i) determine the category for further assessment; and (ii) determine which environmental assessment instrument to be applied.

254. Pre-implementation safeguards documents (one per sub-activity) will be prepared by the environmental and social safeguards specialist in the PMU prior to the implementation of activities and sent to ESM Unit in FAO Headquarters for endorsement.

255. The documents will outline the following information relative to each sub-activity:

a. description of the activities to be carried out in all sites
b. description of each implementing site:
    i. geography and specificities in terms of activities
    ii. Beneficiaries and stakeholders
    iii. Map of the site
c. Description of the stakeholder engagement process that was carried out in the inception phase and the stakeholder engagement plan to be carried during implementation
d. Break down of information by site about the grievance mechanism and disclosure
e. Aggregated results of the environmental and social screening checklists per sub-activity signed off by the Safeguards Specialist in the Management Unit.
f. Where applicable, Environmental and Social Management Plans identifying mitigation measures, indicators, responsibilities and timeframe. The ESMP will be added to the monitoring plan to ensure safeguards performance is regularly reported upon along with stakeholder engagement monitoring per site.

8.3 Step 3: Environmental and Social Risk Management (Monitoring and Reporting)

256. Sub-activities classified as medium risk based on the environmental and social risks identified during the screening process will then be required to develop ESMPs that include information on the mitigation actions, the indicators and timeframe where the completion of such mitigation actions are expected.

257. While the nature, magnitude, reversibility, and location of impacts are main elements in the screening of sub-activities, expert judgment will be a main factor in deciding whether an ESMP is required for a sub-activity or not.

258. The ESMP should include:

- Mitigation Measures: Based on the environmental and social impacts identified from the checklist, the ESMP should describe with technical details each mitigation measure, together with designs, equipment descriptions and operating procedures as appropriate.

- Monitoring: Environmental and social monitoring during the implementation of the sub-activities, in order to measure the success of the mitigation measures. Specifically, the monitoring section of the ESMP provides:
    - A specific description and technical details of monitoring measures that include the

parameters to be measured, the methods to be used, sampling locations, frequency of measurements, detection limits (where appropriate), and definition of thresholds that will signal the need for corrective actions.

- Monitoring and reporting procedures to ensure early detection of conditions that necessitate particular mitigation measures and to furnish information on the progress and results of mitigation, e.g. by annual audits and surveys to monitor overall effectiveness of this ESMF.

- Institutional Arrangements: The ESMP should also provide a specific description of institutional arrangements, i.e. who is responsible for carrying out the mitigating and monitoring measures (for operation, supervision, enforcement, monitoring of implementation, remedial action, financing, reporting and staff training). Additionally, the ESMP should include an estimate of the costs of the measures and activities recommended so that the necessary funds are included. The mitigation and monitoring measures recommended in the ESMP should be developed in consultation with all affected groups to incorporate their concerns and views in the design of the ESMP.

259. Once the pre-implementation documents with ESMPs are endorsed by the ESM unit in FAO Headquarters, the safeguards specialist from the PMU will ensure ESMPs are included and reported upon, along with stakeholder engagement in the context of the monitoring plan.

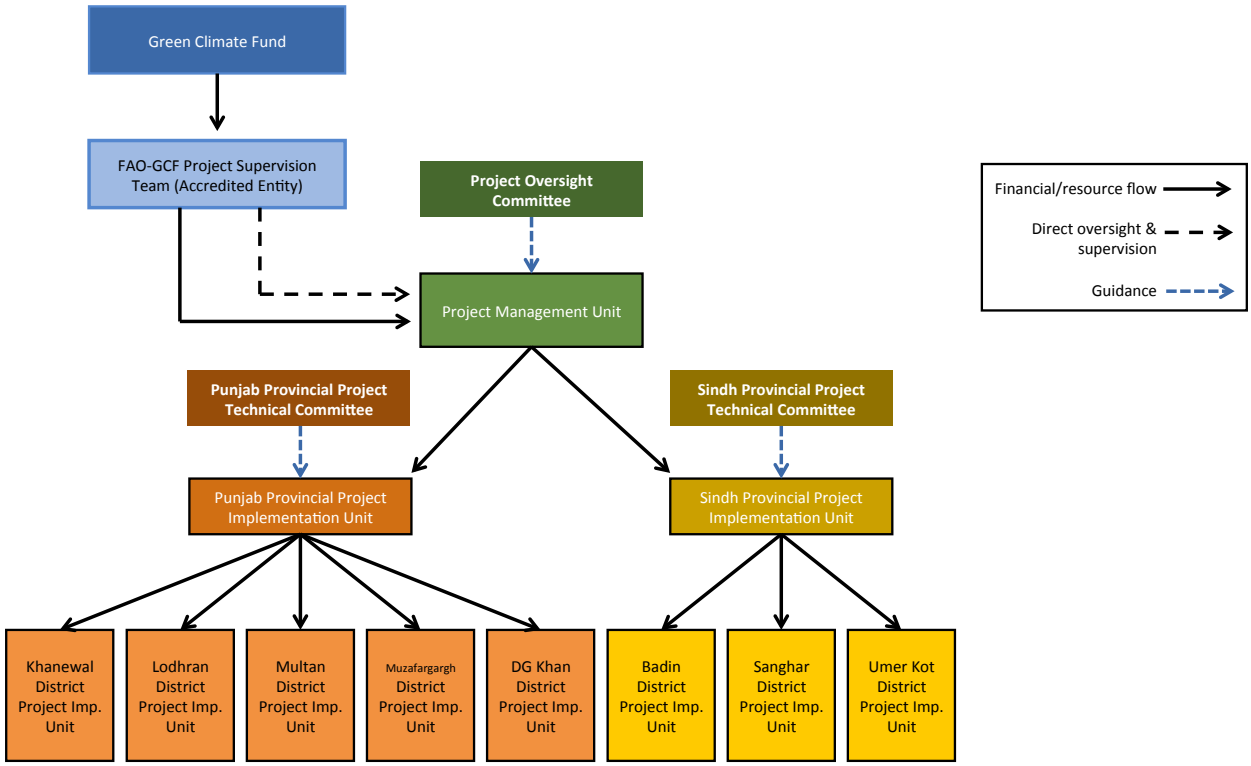
260. In this context, field staff will be responsible for monitoring the progress, as relevant, in the monitoring plan, as well as to identify any potential risks that may emerge through the implementation phase. This information will be compiled in progress reports and templates will include a section on E&S risk management, where the above information will be reported upon.

261. Information from progress reports will be received by the environmental and social safeguards specialist in the project management unit (PMU) who will compile the information received in the progress reports, as well as that related to grievances to feed in a semi-annual report on Environmental and Social Safeguards Performance to be endorsed by the ESM unit in FAO.

9.0 IMPLEMENTATION ARRANGEMENTS

262. The implementation of the environmental and social safeguards will follow the project implementation arrangement seen in Figure 21. 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 in the funding proposal and in Section 5 of the Feasibility Study. Along with specialized 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 fulfil FAO's Accredited Entity functions. This will ensure built-in project oversight and supervision functions are fulfilled.

Figure 21: Overall Project Governance and Implementation Structure



263. The PMU, PPIUs and DPIUs 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. 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 in the funding proposal, whilst their role in individual activities is specified in Section 5 of the Feasibility Study. The implementation arrangements as they pertain specifically to safeguards can be found within this ESMF in the following pages.

Project Implementation Arrangement for Safeguards:

264. **Project Management Unit (PMU)**: 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. For safeguards implementation, the Project Coordinator will also be the recipient of grievances at the central level, as detailed with the Grievance Redress Mechanism process under section 5.6 of this ESMF. The roles and responsibilities of PMU staff are described in more detail in Section 7 of the Feasibility Study.

265. **Provincial Project Implementation Units (PPIU):** 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 (PPD) nominated by the Agriculture Department in each province, and a Joint Project Director (Chief Engineer or equivalent) nominated by the respective provincial Irrigation Department. Day-to-day project operations will be supported by the Provincial Project Coordinator (PPC) who will be recruited by FAO specifically for the project implementation at the provincial level and implementation of Component 3. 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.

266. The PPC will ensure effective liaison and coordination with PMU and the other PPIU in implementation of the project activities. The PPC will also be responsible for delivering complaints received during project implementation to the Lead Safeguards Specialist located within the Multan PPIU, in any instances where the Lead Safeguards Specialist has not received the complaint directly. In cases where the complaint is resolvable at the district or provincial level, notification will be given to the Lead Safeguards Specialist, however resolution will be identified and enacted at the local/district/provincial level, as applicable (with the PMU kept informed of any resolutions).

267. The Lead Safeguards Specialist will be hired[82] to ensure compliance with the ESMF, its implementation, and its regular reporting across all project activities. In order to retain close proximity to the project districts, the Lead Safeguards Specialist will be based out of the PPIU in Multan, Punjab.

268. The Lead Safeguards Specialist is responsible for ensuring that staff on-ground in the project areas conduct a screening for sub-activities prior to implementation, and then mitigate for any medium-risk

[82] *This hire is listed under Annex 9 as the "Lead Safeguards Specialist", based in the PPIU situated in Multan.*

activities using ESMPs developed during implementation, based on that screening. The approach allows for specificity under each project area and for the nature of the sub-activities, rather than blanketing all districts with the same training/mitigation measures (some measures will only be applicable in a few areas, and this will only be discernible once specific villages/communities have been selected during implementation). Guidance for screenings and for ESMPs is provided as part of the ESMF. The Lead Safeguards Specialist would also manage the monitoring and evaluation (M&E)/reporting for the environmental and social safeguards aspects of the project, working closely with the project's M&E and knowledge teams.

269. The Lead Safeguards Specialist will also be responsible for ensuring that the Provincial Project Coordinators (PPCs) are aware of the GRM to be used under the project, including adequate reporting mechanisms such that complaints are registered by the Lead Safeguards Specialist with notification to the PMU. The ESS Specialist will ensure that, within the Provincial Project Implementation Units (PPIUs) and the District Implementation Units (DIUs), monitoring and reporting duties for safeguards are included within the Terms of Reference of the most relevant PPIU/DIU staff. In some instances, this may include safeguards-specific staff, like the Provincial Safeguards Specialist with a Biodiversity Focus, who will be based in the PPIU in Hyderabad, Sindh.

270. Reporting to the Lead Safeguards Specialist will be the remaining safeguards specialists, including the: (i) Provincial Safeguards Specialist with a Biodiversity Background (to be based in the PPIU of Hyderabad, Sindh Province); (ii) Land Tenure Specialist; (iii) Ethnic Minority Specialist; and (iv) Gender Specialist. These specialists will report to the Lead Safeguards Specialist for smooth implementation of the ESMF (and resulting ESMPs), as well as the semi-annual and reporting required.

271. District Implementation Unit (DIU): 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.

272. For the purposes of safeguards, FAO recruited consultants will have the responsibility of screening and reporting on the environmental and social risks of sub-activities, based on overall guidance from the Lead Safeguards Specialist in the Multan PPIU. Any government staff involved with the project will also be trained on the screening process, as well as the GRM, as part of the annual implementation workshops; however, in light of the public consultations which indicated non-government grievance redress was preferred, any grievances at district level would be the responsibility of FAO.

273. As part of the project's effort to ensure sufficient capacity of project personnel to effectively manage environmental and social risks throughout the project implementation period, the project will: (i) include safeguards-related requirements in the Terms of Reference for relevant project-recruited staff; and (ii) actively strengthen the relevant capacity of these individuals once recruited. The envisaged capacity strengthening (as outlined in Annex 9: *ESMF Timeline and Budget* of this document) includes: (i) an initial training on E&S safeguards for all project personnel; and (ii) annual refresher trainings on E&S safeguards for all project personnel and implementing partners.

ANNEXES

ANNEX 1: NON-ELIGIBILITY LIST

1. The following activities are prohibited under the Project (ineligible or the "Non-eligibility list") in order to avoid adverse irreversible impacts on the environment and people, the following activities are explicitly excluded from funding:

(i) Relocation and/or demolition of any permanent houses or business.

(ii) Use of the project as an incentive and/or a tool to support and/or implement involuntary resettlement of local people and village consolidation.

(iii) Land appropriation

(iv) Land acquisition using eminent domain without FAO-mandated consultation and agreement of the owner.

(v) New settlements or expansion of existing settlements.

(vi) Activities that would likely create adverse impacts on ethnic groups/indigenous peoples within the village and/or in neighboring villages, or activities unacceptable to ethnic groups living in an ethnic homogenous village or a village of mixed ethnic composition.

(vii) Imposing ideas and changing priorities identified by the community and endorsed at the Union Council and/or Tehsil level meetings without community consultation, prior review and clearance from the PMU.

(viii) Damage or loss to cultural property, including sites having archeological (prehistoric), paleontological, historical, religious, cultural and unique natural values.

(ix) Resources access restriction (e.g. restricted access to farming land) that could not be mitigated and will result in adverse impacts on the livelihoods of ethnic groups and disadvantage peoples.

(x) Activities of any kind within natural habitats and existing or proposed protected areas.

(xi) Purchase of banned pesticides, insecticides, herbicides and other unbanned pesticides, unbanned insecticides and unbanned herbicides and dangerous chemicals exceeding the amount required to treat efficiently the infected area. However, if pest invasion occurs, the use of small amounts of eligible and registered pesticides in Pakistan will be allowed if supplemented by additional training of farmers to ensure pesticide safe uses in line with FAO/IFC policies and procedures (FAO clearance is needed). And no pesticides, insecticides and herbicides will be allowed in the buffer zone of protected area, protected forest and natural habitats. Highly Hazardous Pesticides (HHP) will not be used by the project.

(xii) Purchase of destructive farming gear and other investments detrimental to the environment.

(xiii) Forestry operations, including logging, harvesting or processing of timber and non-timber products (NTFP).

(xiv) Unsustainable exploitation of natural resources.

(xv) Introduction of non-native species, unless these are already present in the vicinity or known from similar settings to be non-invasive.

(xvi) Significant conversion or degradation of natural habitat or where the conservation and/or environmental gains do not clearly outweigh any potential losses.

(xvii) Production or trade in any product or activity deemed illegal under Pakistan's laws or regulations or international conventions and agreements, or subject to international bans.

(xviii) Labor and working conditions involving harmful, exploitative, involuntary or compulsory forms of labor, forced labor[83], child labor[84] or significant occupational health and safety issues.

(xix) Trade in any products with businesses engaged in exploitative environmental or social behavior.

(xx) Sub-activities that require full EIA will not be funded including any projects that will use or induce the use of hazardous materials (including asbestos) or any banned chemicals.

Preference list

i) Promote climate resilient agriculture practices;

ii) Promote sustainable and climate-smart management of water resources;

iii) Promote utilization of Integrated Pest Management (IPM), as well as the use of natural/organic pesticides from herbs (biopesticides), rather than chemical pesticides, in instances where pesticides must be used;

iv) Promote skills development to increase climate resiliency of farmers; and

v) Promote improvement of the enabling environment (financial opportunities, governing institutions, agricultural extension, policies and/or acts) to facilitate increased and sustained uptake of CRA practices and climate-informed water management.

[83] *Forced labor means all work or service, not voluntarily performed, that is extracted from an individual under threat of force or penalty.*

[84] *Harmful child labor means the employment of children that is economically exploitive, or is likely to be hazardous to, or to interfere with, the child's education, or to be harmful to the child's health, or physical, mental, spiritual, moral, or social development.*

ANNEX 2: LIST OF BANNED PESTICIDES IN PAKISTAN

Regulation on the control of pesticides in Pakistan is based on the *Agricultural Pesticides Ordinance (1971)*, which is applicable for both Punjab and Sindh provinces. Further to the *Agricultural Pesticides Ordinance (1971)*, banned pesticides include the following, as stipulated by the Government of Pakistan's Department of Plant Protection, within the Ministry of National Food Security and Research:

Banned Pesticides and Active Ingredients of Pesticides:

1. BHC
2. Binapacryl
3. Bromophos Ethyl
4. Captafol
5. Chlordimeform
6. Chlorobenzilate
7. Chlorthiophos
8. Cyhexatine
9. Dalapon
10. DDT
11. Dibromochloropropane & Dibromochloropropene
12. Dicrotophos
13. Dieldrin
14. Disulfoton
15. Endosulfan
16. Endrin
17. Enthylenedichloride & carbontetrachloride
18. Heptachlor
19. Leptophos
20. Mercury compound
21. Methamidophos
22. Methyl Parathion
23. Mevinphos
24. Monocrotophos
25. Toxaphene
26. Zineb

ANNEX 3: PEST MANAGEMENT PLAN

This annex provides guidance on pest and pesticide management within field projects, as well as a simplified pest management plan.

FAO Guidance Document for Pest and Pesticide Management in Field Project:

This guidance document has been prepared by the FAO Plant Production and Protection Division (AGPM) and replaces a Field Programme Circular from 8/92 on Pesticides Selection and Use in Field Projects.

It provides guidance on pest management and the selection and use of pesticides in FAO projects. Its objective is to reduce reliance on pesticides through promotion of Pest Management (PM) and to avoid that pesticides procured by FAO, or on the advice of FAO, cause harm to people, animals, plants or the environment. As such, it also serves to limit reputational risk and liabilities for FAO.

The outlined rules and procedures apply to all pesticide procurement, and advice on pesticide procurement, within the framework of FAO field projects, including emergency assistance and activities implemented by subcontractors. It involves an established procedure for mandatory clearance of such projects and activities by the Deputy Director AGP, as specified below.

Background

Pesticides require special attention because they are toxic and their distribution and use should always involve managing the risks to human health and the environment. Furthermore, inappropriate use of pesticides may reduce agricultural productivity and result in pesticide residue levels that become a constraint to marketability of crops both on domestic and export markets.

Although most countries have pesticide legislation, many may still lack capacity to ensure appropriate selection, management, use and disposal of pesticides. Circumstances in developing countries often make it difficult for farmers to follow recommended practices regarding personal protection, use and cleaning of application equipment, storage of pesticides, and disposal of obsolete pesticides and empty containers.
In many cases, use of pesticides is still unnecessarily high, uneconomic and unsustainable. Available non-chemical techniques and PM approaches often can help reduce pesticide use.

The overall framework for sound pest and pesticide management is provided by the FAO/WHO International Code of Conduct on Pesticide Management[85] and its accompanying technical guidelines.

Pest management

The protection of plants from pests is an integral part of agriculture. The presence of pests does not automatically require control measures, as pest populations are usually under some form of natural control and actual economic damage may be insignificant. When plant protection measures are deemed necessary, available non-chemical pest management techniques should be considered with preference before a decision is taken to use pesticides, even if the cost is higher or specialist inputs are required that make use of non-chemical options more complex.

Proper comparison of pest management strategies requires a full assessment of costs that takes into account additional private costs (e.g. personal protection, storage, health effects on users) and public costs (negative effects on public health and the environment).

[85] *AGPM Website: FAO/WHO International Code of Conduct on Pesticide Management (2014): http://www.fao.org/agriculture/crops/thematic-sitemap/theme/pests/code/en/*

Where possible, pest management strategies should be based on an IPM approach. Pesticides should only be supplied following a detailed assessment of the actual field situation, the nature and the impact of the pest, and an evaluation of available pest management options.

Selection and procurement of pesticides

If pesticides are deemed to be the best or only available option, then careful and informed consideration should be given to the selection of pesticide products. Factors to be taken into account include efficacy and likelihood of development or presence of resistance by the target organism. Overriding importance should be given to reducing negative effects on human health and the environment.

FAO does not maintain a list of permitted or non-permitted pesticides. However, in line with the provisions of the FAO/WHO International Code of Conduct on Pesticide Management and relevant multilateral environmental agreements that include pesticides, the following list of criteria will need to be met in order for a pesticide to be considered for use in an FAO project:

1. The product should not be subject to the Stockholm Convention on Persistent Organic Pollutants. The list of pesticides concerned can be found at: http://chm.pops.int
2. The product should be registered in the country of use. If specified in the registration decision, the product should be permitted for the crop-pest combination concerned.
3. Users should be able to manage the product within margins of acceptable risk. This means that FAO will not supply pesticides that fall in WHO Hazard Class 1 or GHS Class 1 and 2. Pesticides that fall in WHO Hazard Class 2 or GHS Class 3 can only be provided if less hazardous alternatives are not available and it can be demonstrated that users adhere to the necessary precautionary measures[86].
4. Preference should be given to products that are less hazardous, more selective and less persistent, and to application methods that are less hazardous, better targeted and requiring less pesticides. Products listed in Annex 3 of the Rotterdam Convention should for instance be avoided.

Any international procurement of pesticides must abide with the provisions of the Rotterdam Convention on the Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals and Pesticides in International Trade. Pesticides listed in Annex III of the Convention and subject to the PIC procedure, and requirements of the Convention, can be found at the website of the Secretariat of the Rotterdam Convention: http://www.pic.int/Implementation/Pesticides/tabid/1359/language/en-US/Default.aspx

Pesticide management

The following requirements apply to all pesticides that are being supplied directly by FAO and to pesticides supplied by others within the framework of FAO projects.

1. Procurement of pesticides should be preceded by a thorough risk assessment, which should lead to adequate measures to reduce health and environmental risks to acceptable levels.
2. Quantities to be provided should be based on an accurate assessment of actual needs in order to avoid over-use or accumulation of stockpiles that may become obsolete. Pesticides should not be

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[86] *The hazard classification concerns the formulated product. Formulations with a low concentration of active ingredient are less hazardous than formulations with a high concentration of the same active ingredient. The WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification (http://www.who.int/ipcs/publications/pesticides_hazard/en/) classifies technical products based on acute oral and dermal toxicity. It includes a conversion table that allows determination of the hazard class for the pesticide formulation under consideration. Towards 2008, this list will be replaced by the Globally Harmonized System of Classification and Labelling of Chemicals, which in addition to acute toxicity also takes into consideration chronic health risks and environmental risks (http://www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html). The term "pesticide formulation" means the combination of various ingredients designed to render the product useful and effective for the purpose claimed; the form of pesticide as purchased by users. The term "active ingredient" means the biologically active part of the pesticide.*

provided as fixed components of input packages of projects, credit schemes or emergency assistance.

3. Appropriate application equipment and protective gear should be provided in adequate quantities along with the pesticides, unless it is explicitly confirmed that the recommended equipment and gear is already sufficiently available.
4. Training of users may be required to ensure they are capable of handling the supplied pesticides in a proper and responsible manner.
5. Proper storage of pesticides in accordance with FAO guidelines should be ensured for all supplies.

Clearance

The following documents and activities require clearance from the respective FAO Sub- and/or Regional Coordinator and Plant Protection Officer. Review and clearance of pesticide purchase requests including treated seeds and treatment of stored agricultural products will be carried out in close collaboration with FAO HQ based Pest and Pesticide Management Group (AGPMC) (c/o Senior Officer Pesticide Risk Reduction Group (AGPMC)):

- All orders for pesticides to be procured by FAO, regardless of whether bought through Headquarters order, field project order or local purchase.
- Project documents that envisage procurement of pesticides.
- Terminal reports for projects that involved pesticide supply.

Requests for clearance should be submitted to the respective FAO Sub-/Regional Coordinator and Plant Protection Officer (focal point for pesticides and crop protection). Requests for procurement of pesticides must include a completed Request for Procurement of Pesticides (Annex I: Pesticide check list) for each pesticide.

In addition, clearance must be obtained from the respective FAO Sub-/Regional Coordinator and Plant Protection Officer for any contemplated collaboration with a pesticide company or other entity of the pesticide industry (e.g.: in designing or implementing training). This in addition to the established general procedure for OPC approval of collaboration with the private sector as described in DGB 2014/14.

Conditions to be met for purchase and use of pesticides

For the purchase and use of any pesticide product, it must be assured, that the following conditions are met:

- The product must be registered in the *target country* by the respective national authority;
- The company providing the pesticide has to declare that they are observing the **FAO/WHO International Code of Conduct on Pesticide Management**, especially its provisions on labelling[87], as well as packaging and transport of pesticides;
- Individuals involved in applying the pesticide will be trained in the use of protective equipment, use of the pesticide application equipment and protection of health and the environment from exposure to pesticides;
- The protective equipment supplied to applicators complies with EC, US or appropriate internationally accepted standards;
- Suitable application equipment that permits pesticide applicators to apply the pesticide in the correct dose without causing human and environmental exposure, will be used or provided if it is not available;

[87] *Reference to Guideline on Good labelling practice for pesticides:* *http://www.fao.org/ag/AGP/AGPP/Pesticid/Code/Download/label.pdf*

- All empty pesticide containers will be triple rinsed and punctured in accordance with FAO guidelines[88]

If pesticides are to be purchased for seed treatment (seed storage chemical or seed treatment), the following conditions must be met:

At the seed treatment facility:

- Each pesticide seed treatment product must be cleared by AGP and must be registered in *Countries concerned* (*importing/exporting country*) by the relevant national authority/authorities.
- The company providing the pesticide has to declare that they are observing the FAO/WHO International Code of Conduct on Pesticide Management, especially its provisions on labelling, as well as packaging and transport of pesticides or pesticide-treated seeds.
- Users of seeds treated with pesticides must adhere to the necessary precautionary measures described on the product labels (e.g. wearing a protective mask, goggles and gloves).
- The treatment of seeds must be done in an appropriately equipped facility that ensures full containment of the pesticides.
- Users of seed treatment equipment should be provided with suitable application equipment and instructed on calibration, use and cleaning of the equipment.
- Treated seeds must be dyed using an unusual and unpalatable color to discourage consumption.
- All packages containing treated seeds must be clearly marked "*Not for human or animal consumption*" and with the skull and crossbones symbol for poison.

At the point of use of the treated seeds:

- Those handling treated seeds should be informed that the seeds are treated with pesticides which can have toxic effects on their health, the health of others and on the environment.
- Handlers should be advised to wear clothes that fully cover their body (long sleeves, long trousers/skirt and closed shoes), and -if not available- be provided with gloves and dust masks and instructed on their use and advised to wash themselves and their clothes after handling the seed.
- Packaging from treated seeds should not be reused for any purpose.

Further guidance

Further guidance on all aspects of pesticide distribution, handling and use, is provided by the International Code of Conduct on Pesticide Management, and the Technical Guidelines that have been produced in support of the Code itself (Copies are available from the AGPMC website: http://www.fao.org/agriculture/crops/core-themes/theme/pests/en/).

The Plant Production and Protection Department (AGPM) and Pest and Pesticide management group/Pesticide Risk Reduction team (AGPMC) and Sub-, Regional Plant Protection Officers will be available to provide further clarification.

SAMPLE: Simplified Pest Management Plan (PMP):

This simplified PMP aims to provide basic knowledge to the national, provincial and district government, the project implementation team, consultants, Tehsil and Union Council staff, village officials, and any private and public sector agencies partnered with for the purposes of the project, with adequate guidance for effectively addressing the safeguard issues in line with ESS5. The process will be implemented as part of the project cycle and fully integrated into the sub-activity selection, approval, implementation, and monitoring and evaluation process. The project does not include procurement of pesticides, but the ESMF identifies key issues related to the existing use of pesticide and chemical fertilizers and identified mitigation measures

[88] *Reference to Guideline on Management options of empty pesticide containers: http://www.fao.org/fileadmin/templates/agphome/documents/Pests_Pesticides/Code/Containers08.pdf*

required in relation to prohibited items, training, and guidelines on safe use and disposal of pesticides. The PMP will be applicable for all project activities related mostly to:

- Component 2: Building On-Farm Resilience to Climate Change, which supports (2.1) Development of Practices for Climate Resilience; (2.2) Training of Trainers in Climate Resilient Agriculture and On-Farm Water Management; and (2.3) Development of Farmers' Capacity.

Village visits indicted that chemical based pesticides (and, in some instances, fertilizers) are currently being used in the project areas, particularly in instances where monoculture is practiced.

Responsible agency: The project staff at central and local levels will be responsible for implementation of the PMP and ensuring full compliance, including keeping proper documentation in the project file for possible review by the GCF and FAO.

This document is considered a living document and could be modified and changed as it is appropriated. Close consultation with the GCF and FAO, including final clearance of revisions to the PMP, will be necessary.

SECTION I. POLICY AND REGULATIONS

FAO's safeguard policy on pest management (ESS5):
The ESS5 policy requires that projects involving procurement and/or use of pesticides to prepare and implement a Pest Management Plan to ensure that the handling, transportation, usage, disposal of pesticides is safe for both human and the environment. The project will not promote the procurement of any chemical pesticides or herbicides. However, if pest invasion occurs, small amounts of eligible and registered pesticides in the project provinces is allowed if supplemented by additional training of farmers to ensure pesticide safe uses in line with FAO policies and nationally/internationally recognized guidelines. Given that the project is designed to promote the reduction in chemical pesticide and fertilizer use in existing farm land by enhancing climate resilient and sustainable farming practices, this simplified Pest Management Plan was prepared, along with a negative list (Annex 1). While the project will not procure and promote use of chemical pesticides and fertilizers, which are included in the non-eligibility list, it may be unrealistic to completely prevent all farmers from applying chemical inputs. Specifically, shifts is agriculture production and/or control of infestation of diseases may necessitate – in some instances – the use of pesticides, herbicides, and insecticides. To mitigate this potential impact, this simplified PMP has been prepared outlining clear regulations and procedures for management of pesticides and/or toxic chemical as well as providing knowledge and training on health impacts and safe use of pesticides and/or, when possible, promotion of non-chemical use alternatives such as organic farming. The simplified PMP is informed by the Agricultural Pesticides Ordinance (1971) as well as guidelines and best practices, including guidelines on Integrated Pest Management (IPM) provided by the Food and Agriculture Organization of the United Nations (FAO).

Relevant definitions under ESS 5 include the following:

- ***Pesticides*** as any substance, or mixture of substances of chemical or biological ingredients intended for repelling, destroying or controlling any pest or regulating plant growth.
- ***Pest*** is defined as any species, strain or biotype of plant, animal or pathogenic agent injurious to plants and plant products, materials or environments and includes vectors of parasites or pathogens of human and animal disease and animals causing public health nuisance.

The ESS 5 safeguard recognizes that pesticides can contribute to effective crop and food protection during production and in storage. Pesticides are also used in forestry, livestock production and aquaculture to control pests and diseases. At the same time pesticides are designed to be toxic to living organisms, are intentionally dispersed in the environment and are applied to food crops. ESS 5 recognizes that pesticide use poses risks to users, others nearby, consumers of food and to the environment. In LMICs these risks are often elevated by overuse, misuse and lack of effective regulatory control. ESS 5 follows the guidance on the life-cycle management of pesticides as provided by the International Code of Conduct on Pesticide

Management and its supporting technical guidelines that are drawn up by a FAO\WHO expert panel and expand on specific articles. Given that there is high use of pesticides in the project areas, particularly with regard to cotton crops, this policy is being triggered. The project, while it will not procure pesticides and/or promote the use of pesticides, may result in indirect increased use of pesticides in nearby areas if production increases. To mitigate against this, the project will be using IPM and also avoiding the use of any Highly Hazardous Pesticides.

The PMU will work closely with the Department of Agriculture and Department of Plant Protection to apply the Pest Management Plan and subsequent IPM.

Government regulation related to pest management:
Pakistan abides by the Agricultural Pesticides Ordinance, 1971. The country has strict requirements on for the import, manufacture, formulation, refilling/repackaging, sale, use & advertisement of pesticides. Responsibility related to compliance and reporting, including registration of pesticides, based on the Agricultural Pesticides Ordinance rests with the Department of Plant Protection. The Department of Plant Protection is a technical arm under the Ministry of National Food Security and Research is mandated to oversee all pesticide use. Convening meetings of the Agricultural Pesticides Technical Advisory Committee and Sub-committees are held under the Department of Plant Protection, and the Department is responsible for quality-checks of pesticides.

SECTION II. KEY ISSUES AND MITIGATION MEASURES

Key issues related to use of pesticide and chemical fertilizer:

The PMP is developed to support project community and a responsibility of all parties to support the implementation and proper applicability of the ESS5. Negative impacts from the use of pesticides and chemical fertilizers are expected to be minor and localized and could be mitigated during the planning and implementation of the project. Given that uses of pesticides and inorganic fertilizers are normal practices of some farmers, the project will promote IPM to avoid inappropriate use of these inputs. However, it is important for the PMU, government staff, and local communities to understand the nature of such activities to encourage farmers to reduce the uses of pesticides and inorganic fertilizers.

Below summarize the possible activities which could be associated with the uses of pesticides and inorganic fertilizers under project.

- Implementation of sub-activities resulting in increased agriculture productivity within key crops (e.g. cotton, sugarcane, rice, wheat) for commercialization may lead to indirect increased use of pesticides, chemicals, and fertilizers.

Actions for mitigation:

The negative impacts from the use of pesticides and chemical fertilizers from project activities would be minor and localized and could be mitigated during the planning and implementation of the project. During the consultation stage with villages, there are opportunities to enhance positive impact during the planning and selection of the sub-activities. Below summarize the activities to be carried out during the planning and implementation of the project as they relate to pest management.

(a) Prohibition

To avoid adverse impacts due to pesticides, procurement of pesticides will not be promoted and this has been included in the “non-eligibility list” (Annex 1).

(b) Project and Government Staff Training

The project will continue providing basic knowledge on alternative options for climate-resilient agriculture development and /or livelihood activities, including safe use of pesticides and other toxic chemicals. Budget is allocated under Component 2 and 3 to government/extension and project staff training to understand: 1) overall policy on Pest Management (government and FAO policy); 2) basic knowledge on possible negative impacts on the environment and health from the use of pesticides and chemical fertilizers; and 3) basic knowledge on how to prevent these impacts, including an overview of the prohibited items in the country for pesticide and chemical fertilizers, how to prevent or mitigate the negative impacts from their use etc. (staff training could be done jointly with other topics). This training would be provided for sub-activities that involve the use of fertilizer and/or pesticides.

(c) Providing Training and Knowledge to Farmers

Prior consultation would be provided to project Union Councils (UCs). Pest management will be included as one topic for village consultation meeting at the UC level. If it is identified through a screening by PMU safeguards specialist that the project area is an area where pesticides are being used, then training on pest management should be provided on the following areas:

- Pest management training: The objective is to provide basic knowledge to the target farmer on prohibited pesticides, the negative impacts of the use of pesticides and chemical fertilizers both on environmental and human health, and how to mitigate their negative impacts if there is a need for using them. It is also to inform farmers that the project is not intended to support the use of any pesticides and chemical fertilizers in any agricultural productivity but promote climate resilient agriculture and conservation agriculture instead. However, the country has experienced severe pest invasions, and could lead to the usage of pesticides and chemical fertilizers in some cases to limit losses and damages to the agriculture products. The procurement of pesticide and chemical fertilizer will not be funded under the project budget, though proper training will be offered to farmers in instances where special circumstances (e.g. insect invasion) demand use of some pesticides.

- Training on Government of Pakistan regulations: The project will train target farmers on national rules/regulations pertaining to pesticide use before any sub-activities are implemented, subject to compliance with ESS5.

- Technical training: This training would aim at enabling target farmers to clearly understand the technical aspects of pesticides, and skills in using them (e.g. what are the eligible and prohibited items of pesticides in Pakistan, the level of negative impacts for each eligible item, how to properly use them, how to protect and minimize the negative impacts while using them, how to keep them before and after use, etc.). Trainers would be someone from FAO or relevant specialists from the Department of Plant Protection who is knowledgeable on the topic.

- Procurement, storage, and usage of pesticides: the project will not involve procurement of pesticides. That said, any pesticides currently used in the project areas would require proper storage and usage monitoring throughout the course of the project, and this responsibility will lie fully with FAO and/or contracted parties at the village level (when/where applicable). FAO and any contracted parties should strictly follow the existing Agricultural Pesticides Ordinance (1971), particularly concerning transportation, storage, trans-boundary transportation of pesticides, and the safe use of pesticides.

- Continued monitoring of pesticide use: As part of the regular monitoring of project activity, the PMU safeguard specialist will delegate monitoring responsibilities to one member of the project team at the local level. These delegates will monitor changes in pesticides, insecticides and chemical fertilizers use in all project related activities. Programs and trainings will be specifically amended to address any such changes.

(d) Promotion of non-chemical agriculture:

The project has been designed also to promote good agricultural practices and conservation of natural resources based on expected climate changes. It is anticipated that linking the climate-resilient agriculture activities with conservation agriculture techniques will be important for improving quality of life and climate-resiliency among farmers. Sustainable use of natural resources would be critical for farmers' livelihoods development and poverty reduction. If protected areas or critical natural habitats are located nearby, it is necessary to also take measures to minimize potential negative impacts and/or enhance positive impacts through community-driven processes. In this context, a "conservation agriculture technique" should be introduced for target communities, if and when applicable. During the planning process, actions will be carried out by FAO and any contracted implementation parties to plan and train farmers.

Implementation arrangement and budget

(a) Planning and implementation

In close cooperation with the Department of Plant Protection, the PMU-level project staff will be responsible for providing training to project staff at the provincial and local levels, including any UC-level facilitators that may be used for the purposes of consultation and planning. Budget for training will be included in the sub-activity cost or capacity building as appropriate, under Components 2 and 3.

(b) Monitoring

Project staff at the local level will work with Plant Protection staff for the monitoring of the use of pesticides in target communities including: a) ensuring pesticides are not listed in the non-eligibility list provided in Annex 1; b) ensuring pesticides are properly kept and transported to the target areas; c) ensuring training delivery to the user before distribution; and d) monitoring compliance and usage of pesticide according to the Government of Pakistan's regulations. The safeguard specialist in the PMU will carry out periodic review missions (e.g. every six months) to check for compliance. FAO will draw from its technical expertise on Pest Management as a standard to monitor compliance of the use of pesticide used under the project.

ANNEX 4: CHANCE FIND PROCEDURES

The following *"chance find"* procedures must be included in all third-party contracts (e.g. Letters of Agreement), in instances where the contracted party is assisting with implementation of Component 1 or Component 2:

If the Contractor discovers archeological sites, historical sites, remains and objects, including graveyards and/or individual graves during project implementation, the Contractor shall:

- Stop the activities in the area of the chance find;
- Delineate the discovered site or area;
- Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible local authorities or the National Culture Administration take over;
- Notify the supervisory Safeguards Specialist within the PMU who, in turn, will notify the responsible local and provincial authorities immediately (within 24 hours or less);
- Responsible local and/or provincial authorities would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. This would require a preliminary evaluation of the findings to be performed by government approved archeologists. The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage; those include the aesthetic, historic, scientific or research, social and economic values;
- Decisions on how to handle the finding shall be taken by the responsible local and provincial authorities. This could include changes in the layout (such as when finding an irremovable remain of cultural or archeological importance) conservation, preservation, restoration and salvage;
- Implementation for the authority decision concerning the management of the finding shall be communicated in writing by relevant local authorities; and
- Project activities could resume only after permission is given from the responsible local or provincial authorities concerning safeguard of the heritage.

Note that the reporting of chance finds only occurs when an item/area/etc. of cultural significance is found, and is only carried out insofar as what is detailed above (i.e. reporting the find, reporting how the item/area will be treated moving forward). Reporting begins with the local level implementer (e.g. staff tasked to the implement the project within a village) notifying the Safeguards Specialist, after which, the Safeguards Specialist guides the process according to the instructions above (e.g. notifying the relevant government authorities).

ANNEX 5: ENVIRONMENTAL AND SOCIAL SCREENING FORM

Every sub-activity will must undergo an initial screening, utilizing FAO's Safeguards Screening Checklist, found at the end of this annex. Based on the screening, sub-activities will be categorized as low, moderate, or high risk. Based on the screening, sub-activities will either be approved for implementation, or will be amended to meet the requirements detailed within this ESMF (specifically, all sub-activities must have low-to-moderate impact; high risk sub-activities will not be allowed under the project, nor will sub-activities which involve elements listed in the Annex 1 Non-Eligibility List of this document).

Guidance and Examples for Sub-Activity Categorization

Categorization: To ensure that the extent of the review is commensurate with the nature of risk, categorization is a useful step in procedures where based on basic information about a project such as sector and scale, the level of E&S risk the project could pose is determined. This also enables the PMU Safeguards Specialist to determine the extent and sophistication of the E&S review required. Categorization may be low, moderate or high. For the purposes of this project, all sub-activities are expected to be Category B (Medium) or Category C (Low) risk.

High Risk (Category A) Sub-Activity

The location of the farmers/project enterprise or activity may be:

- Near sensitive and valuable ecosystems, protected areas and habitat of endangered species;
- Near sensitive receptor such as hospital, school, temple, etc.;
- Near areas with archaeological and/or historic sites or existing cultural and social institutions;
- Near or in areas occupied by vulnerable ethnic minorities or indigenous peoples, or lands to which they are collectively attached, where negative impacts are expected and/or have not involved prior consultation;
- In densely populated areas, where resettlement may be required or potential pollution impacts and other disturbances may significantly affect communities;
- In regions where there are conflicts in natural resources allocation;
- Near watercourses, aquifer recharge areas or in reservoirs used for potable water supply; or in or close to lands or waters containing valuable resources.

Examples of sensitivity issues are those where the sub-activity can:

- Cause adverse global or regional environmental impacts;
- Concern the rights of indigenous people or vulnerable ethnic minorities;
- Require large scale land acquisition or subsequent change in land use that produces loss or damage of assets or income for local residents;
- Lead to involuntary settlements or displacement of people from their livelihoods;
- Impact protected or otherwise recognized areas of high biodiversity or cultural value; or
- Lead to toxic waste disposal.

Acquisition of small parcels of land, even if obtained on a negotiated basis with property owners or those with recognized rights to the land, should be considered as sensitive if expropriation or other compulsory measures would have resulted upon the failure of negotiation.

Examples where the nature of the sub-activity may:

- Cause irreversible degradation or unsustainable exploitation of natural resources; or
- Pose serious risks of significant harm to human health and safety.

Examples of the magnitude of the sub-activity where:

- A high amount of scarce resources may be put at risk;
- The timing and duration of the negative impacts are long; or
- The cumulative effects of many similar, but individually small transactions together lead to serious impacts.

Category A sub-activities are perceived to have significant adverse environmental and/or social impacts, and are not permitted to form part of the target portfolio.

4.2 Medium Risk (Category B) Sub-Activity

Transactions with a limited number of potentially adverse environmental or social impacts that are generally site-specific, largely reversible, and readily addressed through mitigation measures that reduce the risk to moderate or low levels are normally classified as Category B. The following characteristics indicate a Category B:

- Environmental and social risks for the most part are mostly limited to and readily mitigated through application of good industry practice as described in relevant Environmental, Health and Safety Guidelines;
- Labor and working conditions are unlikely to include harmful child labor, involuntary or compulsory labor, or significant occupational health and safety issues;
- Significant land acquisition or significant land use change is not expected, nor is there expectation of displacement of people or significant loss of livelihoods due to project activities; and
- Socially or economically disadvantaged groups, such as tribal or ethnic groups or similar communities, are not known to occur in the project's area of direct impact, nor does the activity involve use of lands to which they are collectively attached, or where those communities are present but consultation has indicated Free Prior and Informed Consent (FPIC).

3.3 Low Risk (Category C) Sub-Activity: Sub-activity proposals that are perceived to have minimal or no adverse environmental or social impacts are classified as Category C, and no further environmental or social assessment work needs to be done after initial screening and categorization.

Environmental and Social Risk Identification – Screening Checklist

TRIGGER QUESTIONS:

	Question	YES	NO
1	Would this project: • result in the degradation (biological or physical) of soils or undermine sustainable land management practices; or • include the development of a large irrigation scheme, dam construction, use of waste water or affect the quality of water; or • reduce the adaptive capacity to climate change or increase GHG emissions significantly; or • result in any changes to existing tenure rights[89] (formal and informal[90]) of individuals, communities or others to land, fishery and forest resources?		
2	Would this project be executed in or around protected areas or natural habitats, decrease the biodiversity or alter the ecosystem functionality, use alien species, or use genetic resources?		
3	Would this project: • Introduce crops and varieties previously not grown, and/or; • Provide seeds/planting material for cultivation, and/or; • Involve the importing or transfer of seeds and or planting material for cultivation or research and development; • Supply or use modern biotechnologies or their products in crop production, and/or • Establish or manage planted forests?		
4	Would this project introduce non-native or non-locally adapted species, breeds, genotypes or other genetic material to an area or production system, or modify in any way the surrounding habitat or production system used by existing genetic resources?		
5	Would this project: • result in the direct or indirect procurement, supply or use of pesticides[91]: ▪ on crops, livestock, aquaculture, forestry, household; or ▪ as seed/crop treatment in field or storage; or ▪ through input supply programmes including voucher schemes; or ▪ for small demonstration and research purposes; or ▪ for strategic stocks (locust) and emergencies; or ▪ causing adverse effects to health and/or environment; or • result in an increased use of pesticides in the project area as a result of production intensification; or		

[89] *Tenure rights are rights to own, use or benefit from natural resources such as land, water bodies or forests*

[90] *Socially or traditionally recognized tenure rights that are not defined in law may still be considered to be 'legitimate tenure rights'.*

[91] *Pesticide means any substance, or mixture of substances of chemical or biological ingredients intended for repelling, destroying or controlling any pest, or regulating plant growth.*

	Question	YES	NO
	• result in the management or disposal of pesticide waste and pesticide contaminated materials; or • result in violations of the Code of Conduct?		
6	Would this project permanently or temporarily remove people from their homes or means of production/livelihood or restrict their access to their means of livelihood?		
7	Would this project affect the current or future employment situation of the rural poor, and in particular the labour productivity, employability, labour conditions and rights at work of self-employed rural producers and other rural workers?		
8	Could this project risk overlooking existing gender inequalities in access to productive resources, goods, services, markets, decent employment and decision-making? For example, by not addressing existing discrimination against women and girls, or by not taking into account the different needs of men and women.		
9	Would this project: • have indigenous peoples* living outside the project area[1] where activities will take place; or • have indigenous peoples living in the project area where activities will take place; or • adversely or seriously affect on indigenous peoples' rights, lands, natural resources, territories, livelihoods, knowledge, social fabric, traditions, governance systems, and culture or heritage (physical[2] and non-physical or intangible[3]) inside and/or outside the project area; or • be located in an area where cultural resources exist? * FAO considers the following criteria to identify indigenous peoples: priority in time with respect to occupation and use of a specific territory; the voluntary perpetuation of cultural distinctiveness (e.g. languages, laws and institutions); self-identification; an experience of subjugation, marginalization, dispossession, exclusion or discrimination (whether or not these conditions persist). [1]The phrase "Outside the project area" should be read taking into consideration the likelihood of project activities to influence the livelihoods, land access and/or rights of Indigenous Peoples' irrespective of physical distance. In example: If an indigenous community is living 100 km away from a project area where fishing activities will affect the river yield which is also accessed by this community, then the user should answer "YES" to the question. [2]Physical defined as movable or immovable objects, sites, structures, group of structures, natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic or other cultural significance located in urban or rural settings, ground, underground or underwater. [3]Non-physical or intangible defined as "the practices, representations, expressions, knowledge and skills as well as the instruments, objects, artifacts and cultural spaces associated therewith that communities, groups, and in some cases individuals, recognize as part of their spiritual and/or cultural heritage"		

Second Level Questions

SAFEGUARD 1 NATURAL RESOURCES MANAGEMENT

Question	Management of soil and land resources	No	Yes	Comments
1.1	Would this project result in the degradation (biological or physical) of soils	LOW RISK	MODERATE RISK Demonstrate how the project applies and adheres to the principles of the World Soil Charter	
1.2	Would this project undermine sustainable land management practices?	LOW RISK	HIGH RISK A full environmental and social impact assessment is required. Please contact the ESM unit for further guidance.	

	Management of water resources and small dams	No	Yes	Comments
1.3	Would this project develop an irrigation scheme that is more than 20 hectares or withdraws more than 1000 m3/day of water?	LOW RISK	MODERATE RISK Specify the following information: a) implementation of appropriate efficiency principles and options to enhance productivity, b) technically feasible water conservation measures, c) alternative water supplies, d) resource contamination mitigation or/and avoidance, e) potential impact on water users downstream, f) water use offsets and demand management options to maintain total demand for water resources within the available supply. g) The ICID-checklist will be included, as well as appropriate action within the project to mitigate identified potential negative impacts. h) Projects aiming at improving water efficiency **will carry out thorough water accounting** in order to avoid possible negative impacts such as waterlogging, salinity or reduction of water availability downstream.	

	Management of water resources and small dams	No	Yes	Comments
1.4	Would this project develop an irrigation scheme that is more than 100 hectares or withdraws more than 5000 m3/day of water?	LOW RISK	HIGH RISK A full environmental and social impact assessment is required. Please contact the ESM unit for further guidance.	
1.5	Would this project aim at improving an irrigation scheme (without expansion)?	LOW RISK	MODERATE RISK The ICID-checklist will be included, as well as appropriate action within the project to mitigate identified potential negative impacts. Projects aiming at improving water efficiency **will carry out thorough water accounting** in order to avoid possible negative impacts such as waterlogging, salinity or reduction of water availability downstream.	
1.6	Would this project affect the quality of water either by the release of pollutants or by its use, thus affecting its characteristics (such as temperature, pH, DO, TSS or any other?	LOW RISK	HIGH RISK A full environmental and social impact assessment is required. Please contact the ESM unit for further guidance.	
1.7	Would this project include the usage of wastewater?	LOW RISK	MODERATE RISK Demonstrate how the project applies and adheres to applicable national guidelines or, if not available, the WHO/FAO/UNEP Guidelines on Safe Usage of Waste Water in Agriculture	
1.8	Would this project involve the construction or financing of a dam that is more than 15 m. in height?	LOW RISK	CANNOT PROCEED	
1.9	Would this project involve the construction or financing of a dam that is more than 5 m. in height?	LOW RISK	HIGH RISK A full environmental and social impact assessment is required. Please contact the ESM unit for further guidance.	

	Tenure		No	Yes	Comments
1.10	Would this project permanently or temporarily remove people from their homes or means of production/livelihood or restrict their access to their means of livelihood?		LOW RISK	HIGH RISK A full environmental and social impact assessment is required. Please contact the ESM unit for further guidance.	
1.11	Would this project permanently or temporarily deny or restrict access to natural resources to which they have rights of access or use		LOW RISK	PROCEED TO NEXT Q	
	1.11.1	Would the denial or restriction of access be voluntary and with the agreement of the affected people?	CANNOT PROCEED	MODERATE RISK Demonstrate how the project applies and adheres to the principles/framework of the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (VGGT)	
1.12	Would the project bring about consolidation or adjustment of tenure rights?		LOW RISK	PROCEED TO NEXT Q	
	1.12.1	Would the consolidation or adjustment of tenure rights be voluntary and with the agreement of the affected people?	CANNOT PROCEED	MODERATE RISK Demonstrate how the project applies and adheres to the principles/framework of the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (VGGT)	

	Climate	No	Yes	Comments
1.13	Would this project result in a reduction of the adaptive capacity to climate change for any stakeholders in the project area?	LOW RISK	HIGH RISK A full environmental and social impact assessment is required. Please contact the ESM unit for further guidance.	
1.14	Would this project result in a reduction of resilience against extreme weather events?	LOW RISK	HIGH RISK A full environmental and social impact assessment is required. Please contact the ESM unit for further guidance.	

	Climate		No	Yes	Comments
1.15	Would this project result in a net increase of GHG emissions beyond those expected from increased production?		LOW RISK	PROCEED TO NEXT Q	
	1.15.1	Is the expected increase below the level specified by FAO guidance or national policy/law (whichever is more stringent)?	HIGH RISK A full environmental and social impact assessment is required. Please contact the ESM unit for further guidance.	LOW RISK	
	1.15.2	Is the expected increase above the level specified by FAO guidance or national policy/law (whichever is more stringent)?	LOW RISK	HIGH RISK A full environmental and social impact assessment is required. Please contact the ESM unit for further guidance.	

SAFEGUARD 2 BIODIVERSITY, ECOSYSTEMS AND NATURAL HABITATS

	Protected areas, buffer zones or natural habitats	No	Yes	Comments
2.1	Would this project be implemented within a legally designated protected area or its buffer zone?	LOW RISK	HIGH RISK A full environmental and social impact assessment is required. Please contact the ESM unit for further guidance.	

	Biodiversity Conservation	No	Yes	Comments
2.2	Would this project change a natural ecosystem to an agricultural/aquacultural/forestry production unit with a reduced diversity of flora and fauna?	LOW RISK	HIGH RISK A full environmental and social impact assessment is required. Please contact the ESM unit for further guidance.	

	Biodiversity Conservation	No	Yes	Comments
2.3	Would this project increase the current impact on the surrounding environment for example by using more water, chemicals or machinery than previously?	LOW RISK	MODERATE RISK Demonstrate in the project document what measures will be taken to minimize adverse impacts on the environment and ensure that implementation of these measures is reported in the risk log during progress reports.	

	Use of alien species	No	Yes	Comments
2.4	Would this project use an alien species which has exhibited an invasive* behavior in the country or in other parts of the world or a species with unknown behavior? *An invasive alien species is defined by the Convention on Biological Diversity as "an alien species whose introduction and/or spread threaten biological diversity" (see https://www.cbd.int/invasive/terms.shtml).	LOW RISK	HIGH RISK A full environmental and social impact assessment is required. Please contact the ESM unit for further guidance.	

	Access and benefit sharing for genetic resources	No	Yes	Comments
2.5	Would this project involve access to genetic resources for their utilization and/or access to traditional knowledge associated with genetic resources that is held by indigenous, local communities and/or farmers?	LOW RISK	MODERATE RISK Ensure that the following issues are considered and appropriate action is taken. The issues identified and the action taken to address them must be included in the project document and reported on in progress reports. For **plant genetic resources for food and agriculture (PGRFA) falling under the Multilateral System of Access and Benefit-sharing** (MLS) of the International Treaty on Plant Genetic Resources for Food and Agriculture (Treaty), ensure that Standard Material Transfer Agreement (SMTA) has been signed and comply with SMTA provisions.	

	Access and benefit sharing for genetic resources	No	Yes	Comments
			For **genetic resources, other than PGRFA falling under the MLS of the Treaty**: 1. Ensure that, subject to domestic access and benefit-sharing legislation or other regulatory requirements, prior informed consent has been granted by the country providing the genetic resources that is the country of origin of the resources or that has acquired the resources in accordance with the Convention on Biological Diversity, unless otherwise determined by that country; and 2. Ensure that benefits arising from the utilization of the genetic resources as well as subsequent applications and commercialization are shared in a fair and equitable way with the country providing the genetic resources that is the country of origin of the resources or that has acquired the resources in accordance with the Convention on Biological Diversity; and 3. Ensure that, in accordance with domestic law, prior informed consent or approval and involvements of indigenous and local communities is obtained for access to genetic resources where the indigenous and local communities have the established right to grant such resources; and 4. Ensure that, in accordance with domestic legislation regarding the established rights of these indigenous and local communities over the genetic resources, are shared in a fair and equitable way with the communities concerned, based on mutually agreed terms. For **traditional knowledge associated with genetic resources** that is held by indigenous and local communities:	

	Access and benefit sharing for genetic resources	No	Yes	Comments
			1. Ensure, in accordance with applicable domestic law, that knowledge is accessed with the prior and informed consent or approval and involvement of these indigenous and local communities, and that mutually agreed terms have been established; and 2. Ensure that, in accordance with domestic law, benefits arising from the utilization of traditional knowledge associated with genetic resources are shared, upon mutually agreed terms, in a fair and equitable way with indigenous and local communities holding such knowledge. Ensure that the project is aligned with the Elements to Facilitate Domestic Implementation of Access and Benefit Sharing for Different Subsectors of Genetic Resources for Food and Agriculture when it is the case	

SAFEGUARD 3 PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE

	Introduce new crops and varieties	No	Yes	Comments
3.1	Would this project Introduce crops and varieties previously not grown?	LOW RISK	MODERATE RISK • Follow appropriate phytosanitary protocols in accordance with IPPC • Take measures to ensure that displaced varieties and/or crops, if any, are included in the national or international *ex situ* conservation programmes	

	Provision of seeds and planting materials		No	Yes	Comments
3.2	Would this project provide seeds/planting material for cultivation?		LOW RISK	PROCEED TO NEXT Q	
	3.2.1	Would this project involve the importing or transfer of seeds and/or planting materials for cultivation?	LOW RISK	MODERATE RISK • Avoid undermining local seed & planting material production and supply systems through the use of seed voucher schemes, for instance • Ensure that the seeds and planting materials are from locally adapted crops and varieties that are accepted by farmers and consumers • Ensure that the seeds and planting materials are free from pests and diseases according to agreed norms, especially the IPPC • Internal clearance from AGPMG is required for all procurement of seeds and planting materials. Clearance from AGPMC is required for chemical treatment of seeds and planting materials • Clarify that the seed or planting material can be legally used in the country to which it is being imported • Clarify whether seed saving is permitted under the country's existing laws and/or regulations and advise the counterparts accordingly. • Ensure, according to applicable national laws and/or regulations, that farmers' rights to PGRFA and over associated traditional knowledge are respected in the access to PGRFA and the sharing of the benefits accruing from their use. Refer to ESS9: Indigenous peoples and cultural heritage.	
	3.2.2	Would this project involve the importing or transfer of seeds and/or planting materials for research and development?	LOW RISK	MODERATE RISK Ensure compliance with Access and Benefit Sharing norms as stipulated in the International Treaty on Plant Genetic Resources for Food and Agriculture and the Nagoya Protocol of the Convention on Biodiversity as may be applicable. Refer also to ESS2: Biodiversity, Ecosystems and Natural Habitats.	

	Modern biotechnologies and the deployment of their products in crop production	No	Yes	Comments
3.3	Would this project supply or use modern plant biotechnologies and their products?	LOW RISK	MODERATE RISK • Adhere to the Cartagena Protocol on Biosafety of the Convention on Biological Diversity to ensure the safe handling, transport and use of Living Modified Organisms (LMOs) resulting from modern biotechnology that may have adverse effects on biological diversity, taking also into account risks to human health. • Adhere to biosafety requirements in the handling of Genetically Modified Organisms (GMOs) or Living Modified Organisms (LMOs) according to national legislation or[92] • Take measures to prevent geneflow from the introduced varieties to existing ones and/or wild relatives	

	Planted forests	No	Yes	Comments
3.4	Would this project establish or manage planted forests?	LOW RISK	MODERATE RISK • Adhere to existing national forest policies, forest programmes or equivalent strategies. • The observance of principles 9, 10, 11 and 12 of the Voluntary Guidelines on Planted Forests suffice for indigenous forests but must be read in full compliance with ESS 9- Indigenous People and Cultural Heritage. • Planners and managers must incorporate conservation of biological diversity as fundamental in their planning, management, utilization and monitoring of planted forest resources. • In order to reduce the environmental risk, incidence and impact of abiotic and biotic damaging agents and to maintain and improve planted forest health and productivity, FAO will work together with stakeholders to develop and derive appropriate and efficient response options in planted forest management.	

[92] *Food and Agriculture Organization of the United Nations. 2011. Biosafety Resource Book. Rome, http://www.fao.org/docrep/014/i1905e/i1905e00.htm*

SAFEGUARD 4 ANIMAL (LIVESTOCK AND AQUATIC) GENETIC RESOURCES FOR FOOD AND AGRICULTURE

	Introduce new species/breeds and change in the production system of locally adapted breeds		No	Yes	Comments
4.1	Would this project introduce non-native or non-locally adapted species, breeds, genotypes or other genetic material to an area or production system?		LOW RISK	PROCEED TO NEXT Q	
	4.1.1	Would this project foresee an increase in production by at least 30% (due to the introduction) relative to currently available locally adapted breeds and can monitor production performance?	CANNOT PROCEED	LOW RISK	
	4.1.2	Would this project introduce genetically altered organisms, e.g. through selective breeding, chromosome set manipulation, hybridization, genome editing or gene transfer and/or introduce or use experimental genetic technologies, e.g. genetic engineering and gene transfer, or the products of those technologies?	LOW RISK	HIGH RISK A full environmental and social impact assessment is required. Please contact the ESM unit for further guidance.	
4.2	Would this project introduce a non-native or non-locally adapted species or breed for the first time into a country or production system?		LOW RISK	MODERATE RISK A genetic impact assessment should be conducted prior to granting permission to import (cover the animal identification, performance recording and capacity development that allow monitoring of the introduced species/ breeds' productivity, health and economic sustainability over several production cycles) • http://www.fao.org/docrep/012/i0970e/i0970e00.htm • ftp://ftp.fao.org/docrep/fao/012/i0970e/i0970e03.pdf	
4.3	Would this project introduce a non-native or non-locally adapted species or breed, independent whether it already exists in the country?		LOW RISK	MODERATE RISK • If the project imports or promotes species/breeds with higher performance than locally adapted ones, ensure: feed resources, health	

	Introduce new species/breeds and change in the production system of locally adapted breeds	No	Yes	Comments
			management, farm management capacity, input supply and farmer organization to allow the new species/breeds to express their genetic potential • Follow the OIE terrestrial or aquatic code to ensure the introduced species/breed does not carry different diseases than the local ones • Include a health risk assessment and farmer/veterinary capacity development in the project to ensure the introduced species/breed do not have different susceptibility to local diseases including ecto-and endo-parasites than the locally adapted/native species/breeds.	
4.4	Would this project ensure there is no spread of the introduced genetic material into other production systems (i.e. indiscriminate crossbreeding with locally adapted species/breeds)?	MODERATE RISK Introduce a) animal identification and recording mechanism in the project and b) develop new or amend existing livestock policy and National Strategy and Action Plan for AnGR	LOW RISK	

	Collection of wild genetic resources for farming systems	No	Yes	Comments
4.5	Would this project collect living material from the wild, e.g. for breeding, or juveniles and eggs for ongrowing?	LOW RISK	MODERATE RISK Guidance to be provided	

	Modification of habitats		No	Yes	Comments
4.6		Would this project modify the surrounding habitat or production system used by existing genetic resources?	LOW RISK	MODERATE RISK Guidance to be provided	
4.7		Would this project be located in or near an internationally recognized conservation area e.g. Ramsar or World Heritage Site, or other nationally important habitat, e.g. national park or high nature value farmland?	LOW RISK	MODERATE RISK Guidance to be provided	
4.8	AQGR	Would this project block or create migration routes for aquatic species?	LOW RISK	MODERATE RISK Guidance to be provided	
4.9	AQGR	Would this project change the water quality and quantity in the project area or areas connected to it?	LOW RISK	MODERATE RISK Guidance to be provided	
4.10		Would this project cause major habitat / production system changes that promote new or unknown chances for geneflow, e.g. connecting geographically distinct ecosystems or water bodies; or would it disrupt habitats or migration routes and the genetic structure of valuable or locally adapted species/stocks/breeds?	LOW RISK	HIGH RISK A full environmental and social impact assessment is required. Please contact the ESM unit for further guidance.	
4.11		Would this project involve the intensification of production systems that leads to land- use changes (e.g. deforestation), higher nutrient inputs leading to soil or water pollution, changes of water regimes (drainage, irrigation)?	LOW RISK	MODERATE RISK Guidance to be provided	

SAFEGUARD 5 PEST AND PESTICIDES MANAGEMENT

	Supply of pesticides by FAO	No	Yes	Comments
5.1	Would this project procure, supply and/or result in the use of pesticides on crops, livestock, aquaculture or forestry?	LOW RISK	MODERATE RISK • Preference must always be given to sustainable pest management approaches such as Integrated Pest Management (IPM), the use of ecological pest management approaches and the use of mechanical/cultural/physical or biological pest control tools in favour of synthetic chemicals; and preventive measures and monitoring, • When no viable alternative to the use of chemical pesticides exists, the selection and procurement of pesticides is subject to an internal clearance procedure http://www.fao.org/fileadmin/templates/agphome/documents/Pests_Pesticides/Code/E_SS5_pesticide_checklist.pdf • The criteria specified in FAO's ESM Guidelines under ESS5 must be adhered to and should be included or referenced in the project document. • If large volumes (above 1,000 litres of kg) of pesticides will be supplied or used throughout the duration of the project, a Pest Management Plan must be prepared to demonstrate how IPM will be promoted to reduce reliance on pesticides, and what measures will be taken to minimize risks of pesticide use. • It must be clarified, which person(s) within (executing) involved institution/s, will be responsible and liable for the proper storage, transport, distribution and use of the products concerned in compliance with the requirements.	
5.2	Would this project provide seeds or other materials treated with pesticides (in the field and/or in storage)?	LOW RISK	MODERATE RISK The use of chemical pesticides for seed treatment or storage of harvested produce is subject to an internal clearance procedure [http://www.fao.org/fileadmin/templates/agphome/documents/Pests_Pesticides/Code/E_SS5_pesticide_checklist.pdf]. The criteria specified in FAO's ESM Guidelines under ESS5 for both pesticide supply and seed treatment must be adhered to and should be included or referenced in the project document.	

	Supply of pesticides by FAO	No	Yes	Comments
5.3	Would this project provide inputs to farmers directly or through voucher schemes?	LOW RISK	MODERATE RISK • FAO projects must not be responsible for exposing people or the environment to risks from pesticides. The types and quantities of pesticides and the associated application and protective equipment that users of a voucher scheme are provided with must always comply with the conditions laid out in ESS5 and be subject to the internal clearance procedure [link]. These must be included or referenced in the project document. • Preference must always be given to sustainable pest management approaches such as Integrated Pest Management (IPM), the use of ecological pest management approaches and the use of mechanical or biological pest control tools in favour of synthetic chemicals	
5.4	Would this project lead to increased use of pesticides through intensification or expansion of production?	LOW RISK	MODERATE RISK Encourage stakeholders to develop a Pest Management Plan to demonstrate how IPM will be promoted to reduce reliance on pesticides, and what measures will be taken to minimize risks of pesticide use. This should be part of the sustainability plan for the project to prevent or mitigate other adverse environmental and social impacts resulting from production intensification.	
5.5	Would this project manage or dispose of waste pesticides, obsolete pesticides or pesticide contaminated waste materials?	LOW RISK	HIGH RISK A full environmental and social impact assessment is required. Please contact the ESM unit for further guidance.	

SAFEGUARD 6 INVOLUNTARY RESETTLEMENT AND DISPLACEMENT

		No	Yes	Comments
6.1	Would this removal* be voluntary? *temporary or permanent removal of people from their homes or means of production/livelihood or restrict their access to their means of livelihoods	CANNOT PROCEED	HIGH RISK A full environmental and social impact assessment is required. Please contact the ESM unit for further guidance.	

SAFEGUARD 7 DECENT WORK

		No	Yes	Comments
7.1	Would this project displace jobs? (e.g. because of sectoral restructuring or occupational shifts)	LOW RISK	HIGH RISK A full environmental and social impact assessment is required. Please contact the ESM unit for further guidance.	
7.2	Would this project operate in sectors or value chains that are dominated by subsistence producers and other vulnerable informal agricultural workers, and more generally characterized by high levels "working poverty"?	LOW RISK	MODERATE RISK Take action to anticipate the likely risk of perpetuating poverty and inequality in socially unsustainable agriculture and food systems. Decent work and productive employment should appear among the priorities of the project or, alternatively, the project should establish synergies with specific employment and social protection programmes e.g. favouring access to some social protection scheme or form of social insurance. Specific measures and mechanisms should be introduced to empower in particular the most vulnerable /disadvantaged categories of rural workers such as small-scale producers, contributing family workers, subsistence farmers, agricultural informal wage workers, with a special attention to women and youth who are predominantly found in these employment statuses. An age- and gender-sensitive social value chain analysis or livelihoods/employment assessment is needed for large-scale projects.	
7.3	Would this project operate in situations where youth work mostly as unpaid contributing family workers, lack access to decent jobs and are increasingly abandoning agriculture and rural areas?	LOW RISK	MODERATE RISK Take action to anticipate likely risk of unsustainably ageing agriculture and food systems by integrating specific measures to support youth empowerment and employment in agriculture. A youth livelihoods/employment assessment is needed. Complementary measures should be included aiming at training youth, engaging them and their associations in the value chain, facilitating their access to productive resources, credit and markets, and stimulating youth-friendly business development services.	
7.4	Would this project operate in situations where major gender inequality in the labour market prevails? (e.g. where women tend to work predominantly as unpaid contributing family members or subsistence farmers, have lower	LOW RISK	MODERATE RISK Take action to anticipate likely risk of socially unsustainable agriculture and food systems by integrating specific measures to reduce gender inequalities and promote rural women's social and economic empowerment. A specific social value chain analysis or livelihoods/employment assessment is needed for large-scale projects.	

		No	Yes	Comments
	skills and qualifications, lower productivity and wages, less representation and voice in producers' and workers' organizations, more precarious contracts and higher informality rates, etc.)		Facilitation should be provided for women of all ages to access productive resources (including land), credit, markets and marketing channels, education and TVET, technology, collective action or mentorship. Provisions for maternity protection, including child care facilities, should be foreseen to favour women participation and anticipate potential negative effects on child labour, increased workloads for women, and health related risks for pregnant and breastfeeding women.	
7.5	Would this project operate in areas or value chains with presence of labour migrants or that could potentially attract labour migrants?	LOW RISK	MODERATE RISK Take action to anticipate potential discrimination against migrant workers, and to ensure their rights are adequately protected, with specific attention to different groups like youth, women and men.	

		No	Yes	Comments
7.6	Would this project directly employ workers?	LOW RISK	MODERATE RISK FAO projects will supposedly guarantee employees' rights as per UN/FAO standards as regards information on workers' rights, regularity of payments, etc. Decisions relating to the recruitment of project workers are supposed to follow standard UN practices and therefore not be made on the basis of personal characteristics unrelated to inherent job requirements. The employment of project workers will be based on the principle of equal opportunity and fair treatment, and there will be no discrimination with respect to any aspects of the employment relationship, such as recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, promotion, termination of employment or retirement, etc.	
7.7	Would this project involve sub-contracting?	LOW RISK	MODERATE RISK Take action to anticipate likely risk of perpetuating inequality and labour rights violations by introducing complementary measures. FAO projects involving sub-contracting should promote, to the extent possible, subcontracting to local entrepreneurs – particularly to rural women and youth – to maximize employment creation under decent working conditions. Also, FAO should monitor and eventually support contractors to fulfil the standards of performance and quality, taking into account national and international social and labour standards.	

		No	Yes	Comments
7.8	Would this project operate in a sector, area or value chain where producers and other agricultural workers are typically exposed to significant occupational and safety risks[93]?	LOW RISK	MODERATE RISK Take action to anticipate likely OSH risks by introducing complementary provisions on OSH within the project. Project should ensure all workers' safety and health by adopting minimum OSH measures and contributing to improve capacities and mechanisms in place for OSH in informal agriculture and related occupations. For example, by undertaking a simple health and safety risk assessment, and supporting implementation of the identified risk control measures. Awareness raising and capacity development activities on the needed gender-responsive OSH measures should be included in project design to ensure workers' safety and health, including for informal workers. Complementary measures can include measures to reduce risks and protect workers, as well as children working or playing on the farm, such as alternatives to pesticides, improved handling and storage of pesticides, etc. Specific provisions for OSH for pregnant and breastfeeding women should be introduced. FAO will undertake periodic inspections and a multistakeholder mechanism for monitoring should be put in place.	
7.9	Would this project provide or promote technologies or practices that pose occupational safety and health (OSH) risks for farmers, other rural workers or rural populations in general?	LOW RISK	HIGH RISK A full environmental and social impact assessment is required. Please contact the ESM unit for further guidance.	

		No	Yes	Comments
7.10	Would this project foresee that children below the nationally-defined minimum employment age (usually 14 or 15 years old) will be involved in project-supported activities?	LOW RISK	CANNOT PROCEED	
7.11		LOW RISK	MODERATE RISK	

[93] *Major OSH risks in agriculture include: dangerous machinery and tools; hazardous chemicals; toxic or allergenic agents; carcinogenic substances or agents; parasitic diseases; transmissible animal diseases; confined spaces; ergonomic hazards; extreme temperatures; and contact with dangerous and poisonous animals, reptiles and insects.*

		No	Yes	Comments
	Would this project foresee that children above the nationally-defined minimum employment age (usually 14 or 15 years old), but under the age of 18 will be involved in project-supported activities?		Take action to anticipate likely risk of engaging young people aged 14-17 in child labour[94] by changing design or introducing complementary measures. For children of 14 to 17 years, the possibility to complement education with skills-training and work is certainly important for facilitating their integration in the rural labour market. Yet, children under the age of 18 should not be engaged in work-related activities in connection with the project in a manner that is likely to be hazardous or interfere with their compulsory child's education or be harmful to the child's health, safety or morals. Where children under the age of 18 may be engaged in work-related activities in connection with the project, an appropriate risk assessment will be conducted, together with regular monitoring of health, working conditions and hours of work, in addition to the other requirement of this ESS. Specific protection measures should be undertaken to prevent any form of sexual harassment or exploitation at work place (including on the way to and from), particularly those more vulnerable, i.e. girls.	
7.12	Would this project operate in a value chain where there have been reports of child labour?	LOW RISK	HIGH RISK A full environmental and social impact assessment is required. Please contact the ESM unit for further guidance.	
7.13	Would this project operate in a value chain or sector where there have been reports of forced labour[95]?	LOW RISK	HIGH RISK A full environmental and social impact assessment is required. Please contact the ESM unit for further guidance.	

[94] Child labour is defined as work that is inappropriate for a child's age, affects children's education, or is likely to harm their health, safety or morals. Child labour refers to working children below the nationally-defined minimum employment age, or children of any age engaging in hazardous work. Hazardous work is work that is likely to harm the health, safety or morals of a child. This work is dangerous or occurs under unhealthy conditions that could result in a child being killed, or injured and/or made ill as a consequence of poor health and safety standards and working arrangements. Some injuries or ill health may result in permanent disability. Countries that have ratified ILO Convention No.182 are obligated to develop National lists of hazardous child labour under Article 4.

[95] Forced labour is employed, consists of any work or service not voluntarily performed that is exacted from an individual under threat of force or penalty. It includes men, women and children in situations of debt bondage, suffering slavery-like conditions or who have been trafficked. "In many countries, agricultural work is largely informal, and legal protection of workers is weak. In South Asia, there is still evidence of bonded labour in agriculture, resulting in labour arrangements where landless workers are trapped into exploitative and coercive working conditions in exchange for a loan. The low wages associated with high interest rates make it

SAFEGUARD 8 GENDER EQUALITY

		No	Yes	Comments
8.1	Could this project risk reinforcing existing gender-based discrimination, by not taking into account the specific needs and priorities of women and girls?	LOW RISK	MODERATE RISK Take action to anticipate likely risk of perpetuating or reinforcing inequality by conducting a gender analysis to identify specific measures to avoid doing harm, provide equal opportunities to men and women, and promote the empowerment of women and girls.	
8.2	Could this project not target the different needs and priorities of women and men in terms of access to services, assets, resources, markets, and decent employment and decision-making?	LOW RISK	MODERATE RISK Take action to anticipate likely risk of socially unsustainable agriculture practices and food systems by conducting a gender analysis to identify the specific needs and priorities of men and women, and the constraints they may face to fully participate in or benefit from project activities, and design specific measures to ensure women and men have equitable access to productive resources and inputs.	

SAFEGUARD 9 INDIGENOUS PEOPLES AND CULTURAL HERITAGE

		No	Yes	Comments
9.1	Are there *indigenous peoples** living *outside the project area*** where activities will take place?[96]?	LOW RISK	GO TO NEXT QUESTION	

quite difficult for whole families to escape this vicious circle. In Africa, the traditional forms of "vestiges of slavery" are still prevalent in some countries, leading to situations where whole families (adults and children, men and women) are forced to work the fields of landowners in exchange for food and housing. In Latin America, the case of workers recruited in poor areas and sent to work on plantations or in logging camps has been widely documented by national inspection services and other actors." (ILO, Profits and poverty: the economics of forced labour / International Labour Office. - Geneva: ILO, 2014)

** FAO considers the following criteria to identify indigenous peoples: priority in time with respect to occupation and use of a specific territory; the voluntary perpetuation of cultural distinctiveness (e.g. languages, laws and institutions); self-identification; an experience of subjugation, marginalization, dispossession, exclusion or discrimination (whether or not these conditions persist).*

*** The phrase "Outside the project area" should be read taking into consideration the likelihood of project activities to influence the livelihoods, land access and/or rights of Indigenous Peoples' irrespective of physical distance. In example: If an indigenous community is living 100 km away from a project area where fishing activities will affect the river yield which is also accessed by this community, then the user should answer "YES" to the question*

			No	Yes	Comments
	9.1.1	Do the project activities influence the Indigenous Peoples living outside the project area?	LOW RISK	MODERATE RISK A Free, Prior and Informed Consent Process is required Project activities should outline actions to address and mitigate any potential impact Please contact the ESM/OPCA unit for further guidance.	
9.2	Are there indigenous peoples living in the project area where activities will take place?		LOW RISK	MODERATE RISK A Free Prior and Informed Consent process is required. **If the project is for indigenous peoples,** an Indigenous Peoples' Plan is required in addition to the Free Prior and Informed Consent process. Please contact the ESM/OPCA unit for further guidance. **In cases where the project is for both, indigenous and non-indigenous peoples,** an Indigenous Peoples' Plan will be required only if a substantial number of beneficiaries are Indigenous Peoples. project activities should outline actions to address and mitigate any potential impact. Please contact ESM/OPCA unit for further guidance. A Free, Prior and Informed Consent Process is required	
9.3	Would this project adversely or seriously affect on indigenous peoples' rights, lands, natural resources, territories, livelihoods, knowledge, social fabric, traditions, governance systems, and culture or heritage (*physical** and *non-physical or intangible***) inside and/or outside the project area? **Physical defined as movable or immovable objects, sites, structures, group of structures, natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic or other cultural significance located in urban or rural settings, ground, underground or underwater.* ***Non-physical or intangible defined as "the practices, representations, expressions, knowledge and skills as well as the instruments, objects,*		LOW RISK	HIGH RISK A full environmental and social impact assessment is required. Please contact the ESM unit for further guidance.	

		No	Yes	Comments
	artifacts and cultural spaces associated therewith that communities, groups, and in some cases individuals, recognize as part of their spiritual and/or cultural heritage"			
9.4	Would this project be located in an area where cultural resources exist?	LOW RISK	MODERATE RISK To preserve cultural resources (when existing in the project area) and to avoid their destruction or damage, due diligence must be undertaken to: a) verify that provisions of the normative framework, which is usually under the oversight of a national institution responsible for protection of historical and archaeological sites/intangible cultural heritage; and b) through collaboration and communication with indigenous peoples' own governance institutions/leadership, verifying the probability of the existence of sites/ intangible cultural heritage that are significant to indigenous peoples. In cases where there is a high chance of encountering physical cultural resources, the bidding documents and contract for any civil works must refer to the need to include recovery of "chance findings" in line with national procedures and rules.	

ANNEX 6: EDUCATION TABLES

District-wise Educational Profile (Punjab)

District	Number of Schools			Enrollment			Teachers		
	Boys	Girls	**Total**	Boys	Girls	**Total**	Male	Female	**Total**
DG Khan	1 040	637	**1 677**	177 411	109 166	**286 577**	3 929	3 187	**7 116**
Khanewal	729	574	**1 303**	224 817	160 739	**385 556**	5 627	5 450	**11 077**
Lodhran	398	437	**835**	35 377	32 649	**68 026**	1 054	576	**1 630**
Multan	716	715	**1 431**	192 627	171 650	**364 277**	5 272	5 810	**11 082**
Muzaffargarh	1 072	1 002	**2 074**	9 053	4 515	**13 568**	329	177	**506**

Source: http://schoolportal.punjab.gov.pk/census/schoolcensusNew.htm

District-wise Educational Profile (Sindh)

District	Number of schools				Enrollment			Teachers		
	Boys	Girls	Mixed	**Total**	Boys	Girls	**Total**	Male	Female	**Total**
Badin	766	364	1 861	**2 991**	127 427	64 533	**191 960**	5 429	1 376	**6 805**
Sanghar	507	337	2 280	**3 124**	156 871	85 761	**242 632**	6 914	2 066	**8 980**
Umerkot	575	435	1 224	**2 234**	77 493	35 464	**112 957**	3 650	984	**4 634**

Source: Reform Support Unit (2015-2016), Education and Literacy Department, Government of Sindh

ANNEX 7: SOCIAL PROTECTION

Public Provisioned Social Protection Measures[97]

S. No	Program	Financing	Type of Benefit	Target Group	Geographical Coverage	Managed By	Year Established
1	Benazir Income Support, Program (BISP)	Public Funds	Cash as Income Support	Married females belonging to ultra-Poor households	Nationwide	Federal Government	July 2008
2	Microfinance	Donor Funded	Cash as loan for establishing business	Provide financial services, credit to the poor for self-employment and move them out of poverty	Nationwide	RSPs/MFIs	Various Programs
3	Pakistan Poverty Alleviation Fund (PPAF)	Donor Funded and Public Funds	Microcredit, Water and Infrastructure, Education, Health, and Emergency Response	Poor and disadvantaged, especially women	Nationwide	Autonomous Non-Profit Organization set up by the GOP	April 2000
4	Pakistan Bait-ul-Mal	Public Funds	Cash as income support grant for daughters' weddings, food supplement in education	Disabled persons, invalids, widows, orphans and household living below the poverty line	Nationwide	Federal Government	1991
5	People's Works Program	Public Funds	Cash for Work	Provision of electricity, gas, farm to market roads, good, water supply	Nationwide	Federal Government	2009-10 to 2012-13
6	President's Rozgar Scheme/People's Rozgar Scheme, etc.	Commercial Bank Financed	Financing for Selected businesses	Unemployed educated persons	Nationwide	National Bank of Pakistan	2006

[97] *Economic Survey of Pakistan 2012*

7	Subsidy on Wheat, Sugar & Fertilizer	Public Funds	In kind as social welfare	Poor people of the country	Nationwide	Federal Government	Since 1960s
8	Utility Stores	Public Funds	In kind as social welfare	Poor people of the country	Nationwide	Federal Government	July 1971
9	Zakat98& Ushr	Special levy on bank balances & agricultural output	Cash	"Deserving/Needy" among Muslims	Nationwide	Government & Zakat & Ushr Committees	1980
10	Child Labour and Children in Bondage	Public Funds	Protection survival development and rehabilitation services	Working children facing abuse and exploitation	Nationwide	Federal & Provincial Government, FATA GB	Various schemes
11	Employees Old-Age Benefit Scheme	Contributory (Employers)	Cash	Formal Sector Employees	Nationwide	Federal Government	1976
12	Social Health Insurance	Contributory (Employers) (individuals)	Cash	General Population	Nationwide	Federal Government	Various schemes
13	Workers Welfare Fund	Contributory (Employers)	Housing, schools, health facilities	Formal Sector employees	Nationwide	Federal Government	1971

[98] *Disbursement of Zakat for 2014-15 in Punjab was PKR 2,548.91 million and PKR 1,053.6 million in Sindh. Total national disbursement during the same year was PKR 4,778.18 million (Economic Survey of Pakistan 2014-15).*

ANNEX 8: LIST OF CONSULTATIONS

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, *not* 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, *not* 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

Farmer Consultations							
Date	Province	District	Union Council	Village	Consultation Type	Participants	
						Female	Male
					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
					TOTAL:	348	348

CONSULATIONS WITH ORGANIZATIONS, CSOs, AND GOVERNMENT (KEY INFORMANTS)

Other Consultations				
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)

Other Consultations				
Date	Province	Institution		Persons Consulted (TOTAL: 52)
		Name	Description	
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	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 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)

Other Consultations				
Date	Province	Institution		Persons Consulted (TOTAL: 52)
		Name	Description	
		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, Univerity 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),	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),

Other Consultations				
Date	Province	Institution		Persons Consulted (TOTAL: 52)
		Name	Description	
		International Labor Organization (ILO), Hashoo Foundation Pakistan Poverty Alleviation Fund (PPAF)		Naseem Khalid (Project Officer, ILO), Umama Binte Azhar (Deputy Manager-Environment & Climate Change, Hashoo Foundation), Sania Liaqat (PPAF)

SUMMARY OF ALL CONSULATIONS DURING PROJECT FORMULATION
(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

Timings/Duration	Type of Consultation	Departments and Institutions involved	No of participants	Locations
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
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

Timings/Duration	Type of Consultation	Departments and Institutions involved	No of participants	Locations
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)
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

Timings/Duration	Type of Consultation	Departments and Institutions involved	No of participants	Locations
April 15 -27, 2018	Appraisal Mission from TCI, RAP and FAO Pakistan - 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	

ANNEX 9: ESMF TIMELINE AND BUDGET

As outlined in ESMF Chapter 9, the day-to-day implementation of the ESMF for the project, *Transforming the Indus Basin with Climate Resilient Agriculture and Water Management,* will be led by a full-time project-recruited Lead Safeguards Specialist. This individual will be supported by three other Safeguards Specialists, namely: (i) a part-time Provincial Safeguards Specialist to develop ESMPs and conduct subsequent capacity building and monitoring within the province; (ii) a part-time Ethnic Minorities Specialist to conduct FPIC and prepare the Social Inclusion Management Plans, as well as assist with monitoring/reporting of the SIMPs, build capacity of project staff on ethnic minority needs and other tasks described in Annex 10 (below); and (iii) a part-time Land Tenure Specialist to provide inputs to the ESMPs specifically in relation to any land tenure issues, and to promote the VGGT in relevant areas of Sindh. 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 these Safeguard Specialists will coordinate the implementation of the ESMF, 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 Safeguards 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. In so doing, the Safeguards Specialists will play a key role in mainstreaming environmental and social risk management (in line with the ESMF) into the day-to-day delivery of project activities, and in building the capacity of other project personnel to account for (and manage) environmental and social risks in all aspects of the project.

The ESMF Timeline and Budget on the following pages includes two types of actions/functions (and associated costs): (i) those that are supplementary to other project activities/actions and as such can be quantified in terms of ESMF-specific costs; and (ii) those that mainstream E&S risk management into other project activities/actions. For actions/functions that are supplementary to other project activities/actions, the Timeline and Budget includes specific budget figures for these actions/functions. These costs are integrated into the detailed project budget (as outlined in Annex 3.1), and can be clearly differentiated from other project costs and thus quantified in the ESMF. With regards to support that seeks to mainstream proper environmental and social risk management into other project activities/actions (e.g. stakeholder consultations), the costs associated with this mainstreaming are embedded in the detailed project budget but cannot be isolated from the broader costs of delivering the relevant activities/actions into which this support is mainstreamed.[99] In such instances, the ESMF Timeline and Budget does not indicate a specific cost while also stating that the costs of this mainstreaming are included as part of the 'regular budget' of the project.

[99] In such instances, the main costs that are directly attributable to the ESMF are often the time of the project-recruited Safeguards Specialists who will bear primary responsibility for the envisaged mainstreaming. However, because these individuals are budgeted under specific Activities and budget lines, the costs associated with their work are not repeated throughout the ESMF Timeline and Budget.

	ACTIVITY	INDICATOR	YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5				YEAR 6				COST US$	Comments	RESPONSIBILITY
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4			
LFM	**CAPACITY BUILDING**																												
2.1.13	1. Capacity Building of project staff on E&S Safeguards	Training of Project Implementation staff on E&S Safeguards during the project's start-up workshop.																									$ 500	Included as part of the regular budget. The initial training on safeguards will occur for the two safeguards specialists and identified project staff at the project start-up workshop (safeguards will comprise a specific session wihin the workshop).	ESM Unit FAO
2.1.13	2. Refresher training for project staff/implementing partners on E&S Safeguards	Training of Project Implementation staff on E&S Safeguards at the annual implementation workshops.																									$ 2,500	Included as part of the regular budget. The Project's two Safeguards Specialists will conduct the refresher courses for new staff working on safeguards at the annual implementation workshops (these will be covered for all relevant staff during a breakout session focused on safeguards).	Project Safeguards Specialists
	E&S SCREENING AND ASSESSMENT																												
2.1.2	1. Identification of sub-activities	List of Sub-Activities																									$ -	Included under the regular budget as part of the required tasks for the Project Safeguards Specialists	Project Safeguards Specialists/ESM Unit
2.1.2	2. Environmental and Social screening of sub-activities	E&S Screening Checklists																									$ -		Project Safeguards Specialists/ESM Unit
2.1.2	3. E&S Assessment and drafting of safeguards related documentation for compliance per sub-activity (e.g.	Pre-implementation documents per sub-activity																									$ -		Project Safeguards Specialists/ESM Unit
	MONITORING AND REPORTING																												
2.1.2	1. Monitoring and reporting on Safeguards Performance and Stakeholder Engagement	Semi-Annual Progress reports on Stakeholder Engagement & ESMPs for sub-activities																									$ 325,594	Cost of Lead Safeguards Specialist (Based in Multan Office)	Project Safeguards Specialists with selected IPs/women to ensure participatory monitoring
2.1.2/ 2.1.6		Annual Compilation of E&S safeguards performance																									$ -	Included as part of the regular budget. Cost for two National Monitoring and Evaluation Specialists (one in Multan, one in Hyderabad)	Lead Safeguards Specialist/National Monitoring and Evalutation Specialist/ESM Unit
	STAKEHOLDER ENGAGEMENT																												
	1.1 Union Council Characterization and Consultation Process Planning	Consultation Reports																									$ -	Included as part of regular budget, mainstreamed with project consultations	FAO/Implementing Partners
	1.2 Union Council level Consultations	Consultation Reports																									$ -		FAO/Implementing Partners
	1.3 Village Level Consultations	Consultation Reports																									$ -		FAO/Implementing Partners
2.1.2	1.3.1 Consultations with Ethnic Minority Groups	Consultation Reports																									$ -	Counted under the cost of Ethnic Minority Specialist (listed below)	Ethnic Minorities Specialist
2.3.4	1.3.2 Consultations with Women	Consultation Reports																									$ -	Accounted for in the Gender Action Plan Budget	Gender Specialist
	1.4 Consultation with Implementing Partners	Consultation Reports																									$ -	Included in regular budget, mainstreamed with project consultations/information validation	FAO/Implementing Partners
	1.5 Validation of Information	Consultation Reports																									$ -		FAO/Implementing Partners

	TENURE																												
2.1.7/ 4.1.13	1. Survey to determine the type of access to land for farmers	Baseline Survey Results in Year 1, 3, and 6																									$ -	Included as part of the regular budget.	(3 enumerators per district, $50 daily rate, 2 days)
2.1.2	2. Land tenure legal framework review to identify gaps to promote sustainable agricultural practices and adaptation to climate change	Review Report																									$ 13,566	**Cost of Land Tenure Specialist**	Land Tenure Specialist
2.1.2	3. Action plan to support landless farmers with adoption of climate resilient agriculture practices, based on the Voluntary Guidelines for the Responsible Governance of Tenure of Land, Fisheries, and Forests (VGGT)	Action Plan																									$ 13,566	**Cost of Land Tenure Specialist**	Land Tenure Specialist
2.1.2/ 3.2.1.2	4. Implementation of action plan to support landless farmers with adoption of CRA practices	Safeguards progress reports (as listed for M&E)																									$ -	Complemented within extension work. Included as part of regular budget.	Safeguards Specialists/Institutional Development Expert/FAO/Implementing Partners
	ETHNIC MINORITY PLAN																												
2.1.2	1. Free, Prior, and Informed Consent finalized for communities identified as part of the project.	Signed agreement from heads of the ethnic minorities with whom the project will engage																									$ 135,664	**Cost of Ethnic Minority Specialist (for entire project)**	Ethnic Minorities Specialist
2.1.2/ 2.1.6	2. Participatory development of a workplan with ethnic minorities, including confirmation of greivance redress mechanism and participatory monitoring system	Ethnic Minority workplan is written & implemented																									$ -	Cost of Ethnic Minority Specialist already counted above	Ethnic Minority Specialist/National M&E Specialist
2.1.6/ 2.1.19/ 2.1.21	3. Incorporation of the traditional Indigenous Peoples' (IP) practices found to be climate resilient within Farmer Field Schools and Women's Open Schools, incorporating ancestral knowledge where applicable	FFS and WOS curricula to be tailored to ethnic minority communities, in applicable areas																									$ -	Including in regular budget.	Farmer Field School Specialist (with support from the Ethnic Minority Specialist)
2.1.20	4. Development of a capacity building plan for extension agents on the traditional IP practices which are climate resilient	All extension agents working in areas with ethnic minorities are trained in issues relevant to those minorities																									$ -	Including in regular budget.	Farmer Field School Curriculum Specialist (with support from the Ethnic Minority Specialist)
2.1.2	5. Engagement process with ethnic minorities (linked to activities 1.3.1) for feedback into FFS and WOS, as	Annual consultations with ethnic minorities																									$ -	Cost of Ethnic Minority Specialist already counted above	Ethnic Minority Specialist
2.1.2/ 2.1.6	6. Use of a participatory monitoring system with ethnic minorities for the monitoring of ESMP implementation and Stakeholder Engagement Activities (including FPIC commitments)	Participatory M&E reports																									$ -	Cost of Ethnic Minority Specialist already counted above	Ethnic Minority Specialist/National Monitoring and Evalutation Specialist
	BIODIVERSITY MANAGEMENT																												
2.1.7/ 4.1.13	1.Survey of protected area proximity with project areas	Baseline Survey Result																									$ -	Included as part of the regular budget (already counted above)	(3 enumerators per district, $50 daily rate, 2 days)
2.1.2	2.Monitoring to ensure no encroachment of project activities on	Report																									$ 162,797	**Cost of Provincial Safeguard Specialist (Biodiversity Background)**	Provincial Safeguard Specialist (Biodiversity Background)
	GENDER ACTION PLAN (GAP)																												
	Details in Gender Action Plan	Consult GAP for Indicators																									$ 8,595,987	**Detailed in Gender Action Plan**	Executing Agency (FAO)
																											$ 9,250,174	**TOTAL COST**	

Position	Approximate Person Months	Corresponding Activity/Budget Line (LFM)	Cost (USD)
Lead Safeguards Specialist (Based in Multan Office)	72	2.1.1	$ 325,593.72
Provincial Safeguards Specialist with Biodiversity Background (Based in Hyderabad Office)	36	2.1.1	$ 162,796.86
Land Tenure Specialist*	6	2.1.1	$ 27,132.81
Ethnic Minority Specialist*	30	2.1.1	$ 135,664.05
Gender Specialist	72	2.1.3	$ 325,593.72
TOTAL	216	n/a	$ 976,781.16

*In the regular budget, these are included as part of the "safeguards specialist" line in 2.1.1 budget note B7

ANNEX 10: SOCIAL INCLUSION PLANNING FRAMEWORK

I. Ethnic minority groups in Pakistan

I-I – Ethnic minority groups in Punjab and Sindh

274. Pakistan is home to a significant number of smaller ethnic communities. In Sindh, two groups of people may be considered as indigenous. These are the Mohanas (boat people) of Manchar Lake and the original Thari people living in Tharparkar District, who have a distinctive culture and lifestyle, conditioned to living in almost perpetual drought. Neither of these indigenous communities are living within the project districts. In contrast, the non-indigenous, smaller ethnic communities are comprised of Hindus belonging to what are termed as the 'scheduled castes'. The total Scheduled Cast population in Sindh was around 300 000 as per the 1998 Census. Out of these, 93% were amongst the rural population of Sindh and out of this rural population, about 87% were residing in the Tharparkar District (most are not within the project districts). The Hindu Schedule Cast tribes in Sindh that may be termed as 'ethnic minorities' are mainly Bheels, Kolhi's, Oads and Menghwar. Some Muslim tribes of Tharparkar can also be considered as ethnic minorities, given that their culture and lifestyle is very similar to the Hindu tribes. The Bheels are mostly nomads, while the Kolhi's and Menghwar (who migrate seasonally) are engaged largely in non-farming work (e.g. road construction and house building). Large numbers of women also work on construction sites. Women of these tribes are well known for their hard work and put in long hours of physical labour whether in Thar or outside. While the Mohanas of Manchar Lake do not live within the project area, some groups of scheduled castes, mainly Tharis and Bheels, are known to migrate seasonally to work as haris and temporary wage labourers in barrage-irrigated agricultural areas bordering Thar (Mirpurkhas, Badin and Sanghar districts). However, none of these ethnic groups appear to have any collective interest in any ancestral land within the project area, and thus do not fall within the definition of indigenous peoples (i.e. they do not have ancestral land or historical ties to land within the project areas).

275. In Punjab, the tribal fishing peoples, Kihals and Mors, may be considered as indigenous. The Kihals and Mors inhabit the Middle Indus Basin between two barrages, the Chashma Barrage and the Taunsa Barrage. They estimate their own population to be between 40 000 and 45 000 families in the two barrages. A sizeable number of these tribes are settled in the project district of Dera Ghazi Khan (South Punjab), Pakistan, however it is not expected that the project will be working in (or near) their areas of residence. Kihals and Mors live by weaving baskets and birdcages from kanb, fishing and providing seasonal harvesting labor[100].

I-II – Ethnic minority groups in (or near) the targeted districts

276. Although some ethnic minority groups reside within Punjab and Sindh provinces, only a small proportion of them reside (throughout the year, or sporadically during the year due to their nomadic migratory patterns) within the eight districts targeted by this project. These are briefly summarized below.

[100] *Country Technical Note on Indigenous Peoples' Issues Pakistan, IFAD*

Table 1: Ethnic Minority Groups by Province

Province and districts	Ethnic minorities[101]	Common characteristics
Punjab • Dera Ghazi Khan • Khanewal • Lodhran • Multan • Muzzafargarh	Kihals	• Tribal fishing peoples. • Within project area, most likely to be located in Dera Ghazi Kahn district. • Livelihoods often tied to weaving baskets and birdcages, fishing and providing seasonal harvesting labour. • Kihals and Mors in Punjab collectively reported their population to be 40,000-45,000 in 2012.
	Mors	
Sindh • Badin • Sanghar • Umer Kot	Bheels	• Livelihoods are often based on farming, including as migrant farm labour (for which they may go to Badin and Sanghar districts). • Mostly (but not exclusively) living in Tharparkar District, which is not among those selected for the project.
	Tharis	
	Kolhis	• Livelihoods traditionally derived from farming/sharecropping and fishing, but increasingly engaged in non-farming work (e.g. construction) – both in their places of residence and as migrant labourers.
	Menghwar	

II. Relevant polices, laws, and treaties

277. A full list of social and environmental laws relevant to the project can be found in chapter four of the main Environmental and Social Management Framework (ESMF), "Legal Frameworks and Applicable Safeguard Policies." When considering only those which are focused on social rights and inclusion, the following are applicable:

- On-Farm Water Management and Water Users' Associations Ordinance, 1981 (and subsequent Water Users Associations Rules)
- Plant Breeders Rights Act, 2016
- Transfer of Property Act, 1882
- The Employment of Children Act, 1991
- The Bonded Labour System Abolition Act, 1992
- The Punjab Compulsory Education Act, 1994
- Sindh Right of Children to Free and Compulsory Education Act, 2013
- Sindh Irrigation Water User Association Ordinance (1982, amended in 1984)
- Antiquities Act, 1975 (insofar as it discusses the protection of places of worship, sacred spaces, and antiquities)

[101] This constitutes a non-exhaustive list of ethnic minority groups who may be living (in some cases permanently, and in some cases temporarily as migrant labourers) in some parts of the eight districts in which this project will intervene. These groups have been listed here due to the higher likelihood (relative to other groups) that they may be living in the final sites selected (within the eight project districts) for field activities during the implementation of this project.

278. Pakistan has also signed and ratified a number of socially relevant international treaties and convention. The country has been a member of the International Labour Organization (ILO) since 1964 and has ratified a total of 36 ILO Conventions, including all of the eight ILO core Conventions and Indigenous and Tribal Peoples' Convention.

Table 2. International treaties and conventions in Pakistan relevant to social safeguards

No	Name of Convention	Date of Signature	Date of Ratification/Accession
1	International Covenant on Civil and Political Rights	2008	2010
2	Convention Concerning the Abolition of Forced Labour, 1957	1960	In Force (date unknown)
3	Minimum Age Convention: 1973 (No. 138)	2006	In Force (date unknown)
4	Worst Forms of Child Labour Convention: 1999 (No. 182)	2001	In Force (date unknown)
5	Convention on the Rights of Persons with Disabilities	2008	2011
6	Vocational Rehabilitation and Employment (Disabled Persons) Convention, 1983	1994	In Force (date unknown)
7	International Convention for the Protection of All Persons from Enforced Disappearance	Not yet signed	Not yet ratified
8	International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families	Not yet signed	Not yet ratified
9	Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment	2008	2010
10	Convention on the Rights of the Child	1990	1990
11	Optional Protocol to the Convention on the Rights of the Child on the involvement of children in armed conflict: 2002	2001	2016
12	Optional Protocol to the Convention on the Rights of the Child on the sale of children, child prostitution, and child pornography: 2002	2001	2011
13	Convention on the Elimination of All Forms of Discrimination against Women	N/A	1996
14	International Covenant on Economic, Social and Cultural Rights	2004	2008
15	International Convention on the Elimination of All Forms of Racial Discrimination	1966	1966
16	Right of Association (Agriculture) Convention, 1921	1923	In Force (date unknown)
17	Indigenous and Tribal Populations Convention, 1957	1960	In Force (date unknown)
18	UN Convention Against Corruption	2003	2007
19	UN Declaration on the Rights of Indigenous Peoples	2007	2007

279. As evidenced in the above policies, laws, and treaties, Pakistan legally affords protection and rights to groups that may be considered socially vulnerable populations (children, youth, indigenous peoples, etc.), thus the issue is not with the legal framework but, rather, with enforcement. Given this, the Social

Inclusion Planning Framework (as part of the ESMF) details how the project will ensure adequate inclusion, risk management/mitigation, and monitoring/reporting.

III. Potential risks and impacts on ethnic minorities from the project

280. Due to the nature of the proposed project and its underlying activities, it is not anticipated that the ethnic minority groups described in Section I (above) will be exposed to any additional negative impacts or risks arising from the project beyond those described in the Environmental and Social Management Framework (ESMF). For more information on the overall potential negative impacts and risks arising from the project, see Sections 6 and 7 of the ESMF.

281. Ethnic minority groups living in the targeted districts and selected sites may, however, experience particular difficulties in accessing project support. There are a number of unique factors that may shape their ability to benefit from the project, including:

a. their often more limited literacy and education levels relative to other segments of the population within the targeted districts;
b. social and/or cultural norms within the targeted districts that may make it difficult for farmers from these ethnic minority backgrounds to participate in farmer trainings (i.e. those delivered under sub-component 2.3 of the project) along with farmers from other segments of the population;
c. their often remote rural residences and occasionally more limited access to transportation and/or transport infrastructure, which may make it difficult for them to reach demonstration plots on which project trainings will be organized;
d. the relevance of their income-generating activities to the farming systems and practices promoted by the project (i.e. fishing practices and non-farm work are not among the livelihood options to be covered during project trainings); and
e. their (often) more limited incomes and savings, potentially more limited access to financial services, and potential lack of access to arable land, which may inhibit them from adopting/transitioning to project-promoted practices and livelihood options even if they participate in project trainings.

282. The aforementioned challenges and constraints will be factored into any eventual Social Inclusion Management Plan (SIMP) developed under this project, as will results from consultations already undertaken thus far with ethnic minority communities, including scheduled castes and Christian communities. The anticipated process for developing and implementing such SIMPs is outlined in Section VI of this document.

IV. Guiding principles

283. This SIPF and any subsequent SIMPs developed under the project are based on the same guiding principles as the ESMF, with specific emphasis on the following:

284. **Human rights-based approach**, recognizing the centrality of human rights to sustainable development, poverty alleviation and ensuring fair distribution of development opportunities and benefits; supporting the universal respect for, and observance of, human rights and fundamental freedoms for all. All project activities shall respect the rights and responsibilities set forth in the Universal Declaration of

Human Rights, the Committee on the Elimination of Discrimination against Women, the Beijing Declaration and Platform for Action and other applicable international instruments relating to human rights, including the ICCPR, the ICESCR, the Indigenous and Tribal Peoples Convention (ILO Convention No.169), the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), and the International Convention on the Elimination of All Forms of Racial Discrimination.

285. The project will uphold the principles of accountability and rule of law, participation and inclusion, and equality and non-discrimination, noting that prohibited grounds of discrimination include race, ethnicity, gender and gender identity, age, language, disability, sexual orientation, faith, political or other opinion, national or social or geographical origin, birth or other status, including as a member of a minority.

286. **Country ownership**, aligning with national policies and priorities on social inclusion, including any national commitments to international human and women's rights agreements and/or treaties.

287. **Stakeholder engagement and consultation,** ensuring that women, men, and members of marginalized and vulnerable groups and communities shall be provided with an equal and equitable opportunity to be fully and effectively engaged in meaningful consultations and decision-making throughout the project cycle – including the right to refuse participation if desired and the right to accept with conditions.

288. **Disclosure of information,** standard for all safeguards-related documents, with local language translations available. Disclosed information must be accurate, timely, and relevant/responsive to stakeholders, especially any marginalized individuals and communities.

V. Engagement Process with Ethnic Minorities and Vulnerable Populations

During Project Design:

289. In depth consultations with stakeholders in the eight project districts took place over a period of 10 days in February-March 2018 in order to assess possible environmental and social safeguard issues related to proposed project activities. The consultations involved separate meetings with different minority groups, including communities of scheduled castes and Christian communities. The consultations were conducted to provide information on the: a) purposes of the project; b) overview of potential impacts; and c) project implementation plan. They were also used as forums to determine: (i) preferences on how a project-level grievance redress mechanism could be established; and (ii) broad scale community support for the project. Care was given to ensure that these vulnerable communities, specifically women, youth, and ethnic and religious minorities, were met with in each project district to determine their unique needs, sensitivities, and potential risks.

290. Based on consultations, ethnic minorities from all districts preferred that the project use a GRM that is managed directly by FAO or by an established local community organization (e.g. in the case of DG Khan), in order to avoid concerns with grievance redress established within the government departments/line agencies themselves. This is particularly crucial in instances where ethnic minorities are explicitly involved. Preference was given to a hotline that could be established. The ethnic minorities met

with in every district described how they typically lodge complaints for existing projects and within their communities more generally, including in mixed-religion communities. Most preferred using the village elder and to keep disputes outside of the official government system, and they expressed that a hotline and/or complaints box from existing community organizations (or the project more specifically) would be welcome.

291. Consultations also helped discern ways in which women and ethnic minorities could be encouraged to participate in project activities, based on activities that were/are appropriate to them in terms of culture and farming practices. Feedback from this was provided directly to the project design team and incorporated within the full Funding Proposal and Feasibility Study.

During Project Implementation:

292. Given that Free Prior and Informed Consent (FPIC) can be considered a positive engagement practice, even when indigenous peoples are not present, this project will utilize the FPIC process in instances where ethnic and religious minorities are present, ensuring that minority communities are: (i) engaged with material in their relevant language/dialect(s); (ii) understand that benefits accrued under the project are shared with all participants and community members; and (iii) given opportunity to confirm their respectively preferred Grievance Redress Mechanisms. As detailed in this Annex and in section 5.4 of the ESMF, the community-specific GRM will likely include additional representation of minority groups to ensure fair and transparent redress.

293. In order to effectively consult and engage with ethnic minority communities during implementation, the following process will be followed:

a. Once project sites have been identified through the process detailed in appendix 5 of the full project funding proposal ("Project Area"), project activities will be grouped into sub-activities (see ESMF Chapter 8.1, "Defining Sub-Activities"). Considering the activities to be implemented in each implementing site will be very similar in nature and scale across the implementation area, it is proposed that screening for potential risks is undertaken at sub-activity level. Sub-activities constitute a valid tool to identify expected impacts and mitigation and monitoring measures. Identification of sub-activities will take place during the inception phase in Year 1. For each sub-activity, implementing sites will be identified along with activities, including capacity building/training and stakeholder engagement information specific to each site.

b. Safeguards screenings will be conducted (as detailed in the main ESMF and ESMF Annex 5, "Environmental and Social Screening Form").

c. FPIC consultations will commence in instances where ethnic minorities are present. FPIC will be conducted following the process detailed by FAO in the FPIC Manual for Project Practitioners.[102] It is understood that this will involve:
    i. Consultation and consent prior to commencement of any project activities. This

[102] http://www.fao.org/3/a-i6190e.pdf

involves providing ethnic minorities with the time needed to discuss based on a decision-making timeline identified by the respective communities.

ii. Consent must be **free** – i.e. given voluntarily and without coercion, intimidation, or manipulation. It will also be obtained through a process which is sensitive and relevant to the ethnic minority community/communities involved.

iii. Provision of **information** to ethnic minority communities in their relevant language, in a clear, consistent, accurate, transparent, and accessible way that is culturally sensitive. Information will also be given on an ongoing basis throughout the project, thus it is not a one-time transfer of communication, rather, an ongoing relationship between communities and project implementers/practitioners.

iv. **Consent**, which refers to the collective decision made by the ethnic minority community (including women, youth, elderly peoples, and peoples with disabilities) reached through their own customary decision-making processes. The consent must be sought and granted (or withheld) according to the unique formal or informal political-administrative dynamic of each community.

d. **Social Inclusion Management Plans will be developed** for areas with ethnic minorities, incorporating details obtained through the FPIC process and baseline social and economic information about the relevant ethnic minority group(s). The SIMPs will: (i) identify and assess potential impacts on the communities; (ii) identify and assess potential barriers to the ethnic minority groups' ability to engage in (and benefit from) the project; (iii) specify the mitigation measures to be taken to address the risks identified and/or the additional actions/measures to be taken to overcome barriers to ethnic minorities' participation; and (iv) specify the monitoring/reporting plan. Development of the SIMPs are further detailed under section V of this SIPF.

294. To ensure adequate and ongoing consultations, monitoring, and reporting for safeguards – including ethnic minority engagement – the project already provisions for (as detailed further under ESMF Chapter 9 and ESMF Annex 9): (i) annual refresher trainings on safeguards; (ii) annual consultations with participants to identify changes in status, potential concerns, etc.; and (iii) monitoring and reporting on ESMPs (including SIMPs) every six months. The project-recruited Ethnic Minority Specialist will be responsible for consultations related to the FPIC process, and will provide ongoing engagement and support for monitoring and reporting insofar as it is related to ethnic minority communities.

V. Development of Social Inclusion Management Plans

295. In instances where sub-activity safeguards screenings indicate the presence of ethnic minorities, Social Inclusion Management Plans (SIMPs) must be prepared. The SIMPs will be drafted by the project-recruited safeguards specialists, under the overall leadership of the project-recruited Ethnic Minority Specialist. SIMPs must practically explain how social inclusion will be ensured in the project area, as it relates to the ethnic minority/minorities present. In instances where SIMPs will be developed, the Ethnic Minority Specialist will bear overall responsibility for: (i) screening activities and assessing (a) potential negative impacts on the relevant ethnic minority groups and (b) potential barriers that may inhibit relevant ethnic minorities from participating in (and benefiting from) the activities; (ii) developing SIMPs that include

risk mitigation measures to address potential negative impacts identified, as well as other measures to overcome barriers to exclusion and promote inclusion; (iii) overseeing the timely and effective delivery of the SIMPs, the day-to-day implementation of which will be led by a range of project staff (in close consultation with the Ethnic Minority Specialist) as per the general working arrangements between the project-recruited safeguards specialists and other project staff described in Annex 9 of the ESMF; (iv) overseeing responses to grievances from ethnic minorities to ensure they are properly addressed, either in accordance with the general GRM to be established for this project (as outlined in Section 5.6 of the ESMF) or in line with a separate GRM established for the ethnic minorities if this is expressed as their preference during SIMP development (as outlined below); and (v) ensuring effective monitoring of the implementation of SIMPs in collaboration with the project-recruited monitoring specialists, and ensuring timely and informative reporting on SIMP implementation is prepared for review by the Lead Safeguard Specialist and PMU staff. As with all project-recruited safeguards specialists, the Ethnic Minority Mention specialist will perform his/her duties in close collaboration with other project-recruited staff working in the PMU, PPIUs and DPIUs (as described in Annex 9 of the ESMF). These institutional arrangements will enable (and build the capacity of) other project-recruited staff to deliver and monitor the implementation of SIMPs with support, guidance and oversight provided by the Ethnic Minority Specialist. These other project staff will also benefit from an initial training (in PY1) and annual refresher trainings on environmental and social safeguards (as outlined in Annex 9). These annual trainings will include content on identifying, understanding and (as appropriate) responding to the needs and challenges of ethnic minorities in the project area. The Ethnic Minority Specialist will bear overall responsibility for delivering this element of the initial training and annual refresher trainings.

296. All safeguards-related documentation will be reviewed/approved by the Lead Safeguards Specialist. For documentation that is specifically related to the development and delivery of SIMPs, the Ethnic Minority Specialist will first be responsible for reviewing/approving such documentation before it is submitted to the Lead Safeguards Specialist.

297. The following information must be detailed in the SIMPs:

- Description of ethnic minorities present, including any relevant social/political arrangements, unique decision making processes, and baseline information about their social and economic conditions.
- Description of activities to be conducted in the area.
- Detail the FPIC process which was followed for that community, and include proof of iterative discussions and (if obtained) consent – including conditional consent – or proof of refusal to participate in the project.
- Results of the consultations/FPIC, including:
    - Positive and negative impacts expected based on the sub-project activities;
    - Preferred Grievance Redress Mechanism or any instances in which project activity implementation will differ as a result of the preferences of the minority community; and
- Description of how consultations will continue being held throughout implementation.
- If applicable, SIMPs will: identify mitigation measures to address potential negative impacts identified, as well as additional actions/measures geared toward promoting greater social inclusion to ensure ethnic minorities can benefit from project activities/support; indicators to be used to monitor implementation of the SIMPs; roles and responsibilities for implementing specific actions/measures included in the SIMPs, as well as monitoring and reporting; and timeframes for the implementation of the SIMPs. These will be added to the monitoring plan of the overall project

to ensure the safeguards performance is regularly reported upon, along with regular stakeholder engagement per site.

- **Clearly describe how participatory monitoring and reporting will be conducted at that site,** following the timeline provided in the overall ESMF and detailing any additional requested monitoring measures needed for the respective minority community.

VI. Budgetary allocation

298. Budgetary allocations for the development of and monitoring/reporting on SIMPs is already included as part of the broader project budget (see ESMF Annex 9). The costs of an Ethnic Minority Specialist have also been included in the project budget for a total of 30 person months at a total of USD 135,664.05 in order to address ethnic minority inclusion more specifically. The Ethnic Minority Specialist will ensure that SIMPs include provisions to minimize any negative risks/impacts on minority communities whilst also maximizing the extent to which these communities benefit from the project.

ANNEX 11: CONSULTATION ATTENDANCE SHEETS

299. Annex 11 includes the completed attendance sheets for consultations that were convened as part of the project design stage for this proposal. Additional information about the consultations themselves is available in Section 5 of this ESMF.

300. Of the 348 people consulted, 38 did not provide a signature or thumb impression on the relevant attendance sheets below. This is not an indication that these individuals were not adequately consulted or did not consent to the project (or its contents). This is rather attributable to a simple administrative oversight during the consultations.

Link to Annex 11 (full scanned version of the attendance sheets) http://www.fao.org/3/CA2888EN/Annex11.pdf