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Report No: PAD00129

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT
ON A
PROPOSED CREDIT

IN THE AMOUNT OF US$135 MILLION
(SDR 102.3 MILLION EQUIVALENT)

TO THE

ISLAMIC REPUBLIC OF PAKISTAN

FOR A

SINDH LIVESTOCK AND AQUACULTURE SECTORS TRANSFORMATION PROJECT

May 28, 2024

Agriculture and Food Global Practice
South Asia

CURRENCY EQUIVALENTS

(Exchange Rate Effective April 30, 2024)

Currency Unit =	Pakistan Rupee (PKR)
PKR 1 =	US$0.0036
SDR 1 =	US$1.3179

FISCAL YEAR
July 1 – June 30

Regional Vice President:	Martin Raiser
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ABBREVIATIONS AND ACRONYMS

AFOLU	Agriculture, Forestry and Other Land Use
AGP	Auditor General of Pakistan
AI	Artificial Insemination
AM	Accountability Mechanism
AWPB	Annual Work Plan and Budget
BP	Business Plan
CPF	Country Partnership Framework
CPS	Country Partnership Strategy
CSP	Climate-Smart Practice
D&SC	Design and Supervision Consultant
DA	Designated Account
DCC	District Coordination Committee
E&S	Environmental and Social
EFF	Extended Fund Facility
EIRR	Economic Internal Rate of Return
ESCP	Environmental and Social Commitment Plan
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standards
EX-ACT	Ex-Ante Carbon Balance Tool
FAO	Food and Agriculture Organization of the United Nations
FDir	Sindh Livestock and Fisheries Department Directorate for Inland Fisheries
FI	Financial Institution
FIRR	Financial Internal Rate of Return
FM	Financial Management
FMD	Foot-and-Mouth Disease
FY	Fiscal Year
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIS	Geographical Information System
GLEAM-i	Global Livestock Environmental Assessment Model – interactive
GoP	Government of Pakistan
GoS	Government of Sindh
GRS	Grievance Redress Service
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
IFC	International Finance Corporation
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
IPF	Investment Project Financing
kg	Kilograms
L&FD	Livestock and Fisheries Department
LDir	Livestock and Fisheries Department Directorate for Livestock
LIVAQUA	Sindh Livestock and Aquaculture Sectors Transformation Project

LMP	Labor Management Procedures
LSD	Lumpy Skin Disease
LSP	Local Service Provider
M&E	Monitoring and Evaluation
M&EC	Monitoring and Evaluation Consultant
MCC	Milk Collecting Center
MFD	Maximizing Finance for Development
MIS	Management Information System
MPG	Milk Producers Group
NDC	Nationally Determined Contributions
P&D	Planning and Development Board
PA	Productive Alliance
PC	Project Coordinator
PCU	Project Coordination Unit
PD	Project Director
PDO	Project Development Objective
PG	Producer Group
PIC	Project Implementation Consultant
PIM	Project Implementation Manual
PIU	Project Implementation Unit
PKR	Pakistan Rupee
PPP	Public-Private Partnership
PPR	Peste des Petits Ruminants
PPSD	Project Procurement Strategy for Development
PSC	Project Steering Committee
PTC	Project Technical Committee
RF	Results Framework
SAGP	Sindh Agriculture Growth Project
SBA	Stand-By Arrangement
SEP	Stakeholder Engagement Plan
SFA	Sindh Food Authority
SMP	Small and Medium Producer
SWAT	Sindh Water and Agriculture Transformation Project
TA	Technical Assistance
tCO2e	Tons of Carbon Dioxide Equivalent
VC	Value Chain
WP	With Project
WOP	Without Project

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DATASHEET

BASIC INFORMATION

Project Beneficiary(ies)	Operation Name		
Pakistan	Sindh Livestock and Aquaculture Sectors Transformation Project		
Operation ID	Financing Instrument	Environmental and Social Risk Classification	
P179003	Investment Project Financing (IPF)	Substantial	

Financing & Implementation Modalities

[ ] Multiphase Programmatic Approach (MPA)	[✓] Contingent Emergency Response Component (CERC)
[ ] Series of Projects (SOP)	[ ] Fragile State(s)
[ ] Performance-Based Conditions (PBCs)	[ ] Small State(s)
[ ] Financial Intermediaries (FI)	[ ] Fragile within a non-fragile Country
[ ] Project-Based Guarantee	[ ] Conflict
[ ] Deferred Drawdown	[ ] Responding to Natural or Man-made Disaster
[ ] Alternative Procurement Arrangements (APA)	[ ] Hands-on Expanded Implementation Support (HEIS)

Expected Approval Date	Expected Closing Date
20-Jun-2024	31-Dec-2029
Bank/IFC Collaboration	
No	

Proposed Development Objective(s)

To promote climate-smart and competitive small and medium producers in the livestock and aquaculture sectors in Sindh.

Components

Component Name	Cost (US$)

Component 1. Strengthening the Enabling Environment for Sectoral Growth	77,000,000.00
Component 2. Promotion of Climate-Smart Production, Value Addition, and Inclusive Access to Markets	48,000,000.00
Component 3. Project Management, Monitoring, and Learning	10,000,000.00
Component 4: Contingent Emergency Response	0.00

Organizations

Borrower:	Islamic Republic of Pakistan
Implementing Agency:	Livestock and Fisheries Department, Sindh Province

PROJECT FINANCING DATA (US$, Millions)

Maximizing Finance for Development

Is this an MFD-Enabling Project (MFD-EP)?	Yes
Is this project Private Capital Enabling (PCE)?	Yes

SUMMARY

Total Operation Cost	**147.00**
Total Financing	**147.00**
of which IBRD/IDA	**135.00**
Financing Gap	**0.00**

DETAILS

World Bank Group Financing

International Development Association (IDA)	135.00
IDA Credit	135.00

Non-World Bank Group Financing

Commercial Financing	10.00
Unguaranteed Commercial Financing	10.00
Counterpart Funding	2.00

Local Govts. (Prov., District, City) of Borrowing Country	2.00

IDA Resources (US$, Millions)

	Credit Amount	Grant Amount	SML Amount	Guarantee Amount	Total Amount
National Performance-Based Allocations (PBA)	135.00	0.00	0.00	0.00	135.00
Total	**135.00**	**0.00**	**0.00**	**0.00**	**135.00**

Expected Disbursements (US$, Millions)

WB Fiscal Year	2024	2025	2026	2027	2028	2029	2030
Annual	0.00	15.00	18.00	28.00	28.00	28.00	18.00
Cumulative	0.00	15.00	33.00	61.00	89.00	117.00	135.00

PRACTICE AREA(S)

Practice Area (Lead)

Agriculture and Food

Contributing Practice Areas

Environment, Natural Resources & the Blue Economy

CLIMATE

Climate Change and Disaster Screening

Yes, it has been screened and the results are discussed in the Operation Document

SYSTEMATIC OPERATIONS RISK- RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	Substantial

2. Macroeconomic	High
3. Sector Strategies and Policies	Moderate
4. Technical Design of Project or Program	Moderate
5. Institutional Capacity for Implementation and Sustainability	Substantial
6. Fiduciary	Substantial
7. Environment and Social	Substantial
8. Stakeholders	Moderate
9. Other	Substantial
10. Overall	Substantial

POLICY COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

[ ] Yes [✓] No

Does the project require any waivers of Bank policies?

[ ] Yes [✓] No

ENVIRONMENTAL AND SOCIAL

Environmental and Social Standards Relevance Given its Context at the Time of Appraisal

E & S Standards	Relevance
ESS 1: Assessment and Management of Environmental and Social Risks and Impacts	Relevant
ESS 10: Stakeholder Engagement and Information Disclosure	Relevant
ESS 2: Labor and Working Conditions	Relevant
ESS 3: Resource Efficiency and Pollution Prevention and Management	Relevant
ESS 4: Community Health and Safety	Relevant
ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Relevant
ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	Relevant

ESS 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	Not Currently Relevant
ESS 8: Cultural Heritage	Relevant
ESS 9: Financial Intermediaries	Not Currently Relevant

NOTE: For further information regarding the World Bank's due diligence assessment of the Project's potential environmental and social risks and impacts, please refer to the Project's Appraisal Environmental and Social Review Summary (ESRS).

LEGAL

Legal Covenants

Sections and Description
Project Steering Committee: (PA, Section I.A.2(a) of Schedule) The Project Implementing Entity shall establish by no later than three (3) months after the Effective Date, and thereafter maintain throughout the period of implementation of the Project, a Project Steering Committee composed of members from all concerned Departments of Sindh and other stakeholders.
Project Technical Committee: (PA, Section I.A.2(b) of Schedule) The Project Implementing Entity shall establish by no later than three (3) months after the Effective Date, and thereafter maintain throughout the period of implementation of the Project, a Project Technical Committee composed of technical staff (specialists) from the Sindh Livestock and Fisheries Department and members of all relevant technical stakeholders.
Project Coordination Unit and Project Implementation Unit: (PA, Section I.A.2(c) of Schedule) The Project Implementing Entity shall establish by no later than three (3) months after the Effective Date, and thereafter maintain within Sindh Livestock and Fisheries Department throughout the period of implementation of the Project, the Project Coordination Unit and Project Implementation Unit staffed with competent personnel in adequate numbers and with qualification, experience and terms of reference satisfactory to the Association.
Project Implementation Manual: (PA, Section I.B.1 of Schedule) The Project Implementing Entity, through the Sindh Livestock and Fisheries Department, shall, by no later than three (3) months after the Effective Date, prepare, approve and adopt a Project Implementation Manual, in a manner and substance satisfactory to the Association.
Matching Grant: (PA, Section I.D of Schedule) In carrying out Part 2.2 of the Project, the Project Implementing Entity shall: (a) make available the financing to Beneficiaries in grant terms, in accordance with eligibility criteria and procedures acceptable to the Association and set out in the Matching Grant Manual; and (b) make each financing under a Matching Grant Agreement with the respective Beneficiary on terms and conditions approved by the Association.
Data Protection: (PA, Section I.E of Schedule): The Project Implementing Entity shall ensure that the collection, use and processing (including transfers to third parties) of any Personal Data collected under the Project shall be done in accordance with the national law and the best international practice, and ensure legitimate, appropriate and proportionate treatment of such data.

Conditions

Type	Citation	Description	Financing Source

Disbursement	Section III. B.1(b) of Schedule 2	No withdrawal shall be made under Category (2) for Matching Grants, non-consulting services, consulting services and Incremental Operating Cost under Part 2.2 of the Project, until and unless the Matching Grant Manual, satisfactory to the Association, has been adopted by the Project Implementing Entity.	IBRD/IDA
Disbursement	Section III. B.1(c) of Schedule 2	No withdrawal shall be made under Category (3) for Emergency Expenditures, unless and until all of the following conditions have been met in respect of said expenditures: (i) (A) the Recipient has determined that an Eligible Crisis or Emergency has occurred, and has furnished to the Association a request to withdraw Financing amounts under Category (3); and (B) the Association has agreed with such determination, accepted said request and notified the Recipient thereof; and (ii) the Recipient has adopted the CERC Manual and Emergency Action Plan, in form and substance acceptable to the Association.	IBRD/IDA

I. STRATEGIC CONTEXT

A. Country Context

1. **Poverty reduction has slowed amid recent shocks, while growth has remained volatile and slow.** Pakistan made significant progress towards reducing poverty between 2001 and 2018 with the expansion of off-farm economic opportunities and increased inflow of remittances. However, rapid poverty reduction has not fully translated into improved socioeconomic conditions, as human capital outcomes have remained poor, with high levels of stunting at 40 percent and learning poverty at 77 percent. Critical constraints—including persistent fiscal and current account deficits, protectionist trade policies, unproductive agriculture, a difficult business environment, a heavy state presence in the economy, and a financially unsustainable energy sector, have mostly remained unaddressed, leading to slow and volatile growth. Progress with poverty reduction has recently slowed amid macroeconomic instability, the COVID-19 pandemic, and the catastrophic 2022 floods. The estimated lower-middle income poverty rate is 40.1 percent (US$3.65/day 2017 purchasing power parity) for the year 2023–24, virtually the same as the poverty rate in 2018, but with 7 million more Pakistanis living below the poverty line.

2. **Pakistan experienced heavy monsoon rains in 2022 leading to catastrophic and unprecedented flooding with enormous human and economic impacts**. Roughly 33 million people were impacted, and many permanently displaced. More than 13,000 kilometers of roads were destroyed, 2.2 million houses damaged, around 3.8 million hectares of crops were flooded, and an estimated 1.2 million livestock were killed. Limited access to input and output markets and temporary disruptions to supply chains subsequently drove up food prices and added to existing price pressures resulting from reduced agricultural yields and the global rise of food prices. The government's Post-Disaster Needs Assessment[1] estimated that the need for rehabilitation and reconstruction is at US$16.3 billion.

3. **The country has made recent progress towards macroeconomic stabilization, but risks remain high and faster growth will require substantial reforms.** Real gross domestic product (GDP) growth contracted by 0.2 percent year-on-year in fiscal year (FY) 23, after growing by 6.2 percent in FY22 and 5.8 percent in FY21. Accumulated economic imbalances, including high fiscal deficits, and increasing debt, depleted Pakistan's buffers, which led to high vulnerability to the 2022 floods, increasing world commodity prices, and tightening global financing conditions. Repeated delays in implementing the previous International Monetary Fund (IMF) Extended Fund Facility (EFF) program and the associated decline in external financing inflows saw foreign exchange reserves fall to critically low levels, amid high inflation and sharp depreciation. Following the expiry of the incomplete EFF program, a nine-month Stand-By Arrangement (SBA) was approved by the IMF, with the IMF Board approving the final review in April 2024. Under the SBA, exchange rate flexibility was restored, import controls were eased with some recovery in foreign exchange reserves, and new measures were introduced to contain the budgeted FY24 deficit. Nonetheless, risks remain high. Short-term stability depends on continued fiscal restraint and new external financing inflows. A new IMF program is currently under consideration to support continued sound economic management and structural reforms, with expected concurrent new official inflows. Robust economic recovery over the medium term will require the steadfast implementation of a much broader fiscal, energy and economic reform agenda.

[1] Government of Pakistan (GoP). 2022. *Pakistan Floods 2022 Post-Disaster Needs Assessment.* Ministry of Planning Development & Special Initiatives.

B. Sectoral and Institutional Context

4. **The livestock[2] and aquaculture sectors play a major role in both the national economy and the economy of Sindh province.** The agriculture sector is vital for the nation's food security, accounts for 24 percent of GDP, 40 percent of Pakistan's labor force, and food products account for nearly 17 percent of the total value of Pakistan's exports. Livestock and aquaculture comprise over 55 percent of the agriculture GDP and about 13 percent of the national GDP. In Sindh, agriculture comprises 25 percent of provincial GDP and 70 percent of employment. Livestock and aquaculture account for over 50 percent of the province's agriculture GDP. The province hosts 20 percent of the national cattle and buffalo population, and 19 percent of small ruminants. Despite good agro-climatic conditions, Pakistan lags in aquaculture production compared to its neighbors but has experienced fast growth in the past decade. Cultured production accounted for about one-third of the country's total fish production and increased by 43 percent between 2010 and 2018.

5. **Improving the livestock and aquaculture sectors in Sindh, especially among small and medium-sized farmers, can have a significant impact on reducing poverty and child stunting.** Nationally, rural poverty (28.1 percent in 2018-19) is more than twice as high as urban poverty (10.9 percent). In Sindh, about 24.1 percent of the population lives below the poverty line. The poor derive 46 percent of their household income from livestock and crop production. This share climbs to 54 percent for the rural poor.[3] 1.86 million households (about 9.3 million people), most of them in rural Sindh, are partially dependent on livestock rearing for their livelihood. Livestock also heavily contributes to the farming system, especially for smallholder farmers, as an essential source of resilience, draft power for land preparation and transportation, and crop fertilization. While agriculture is a mainstay for livelihoods and nutrition security of the rural poor in Sindh, there is a very high prevalence of undernourishment and stunting in children under five (34 percent and 45.5 percent respectively—child stunting exceeds 60 percent in the poorest districts). Improving livestock can directly contribute to strengthening nutrition security (milk, meat, and eggs are some of the best sources of high-quality proteins and micronutrients), as does increased consumption of high-quality fish, which provides nutrients and healthy fats.

6. **There are market opportunities for both the domestic and export markets.** With rapid urbanization and a rapidly growing middle class, dietary patterns are changing. Pakistan is seeing an increase in the share of household expenditure on high value food products and a decrease in the share of cereals and other crops (including sugar). It is estimated that domestic livestock production will need to increase considerably to meet projected domestic demand. There is also an untapped potential for the domestic demand for fish products, in a country where average per capita fish consumption was only 2.9 kilograms (kg) in 2021 compared to a global average of 20.5 kg. There is a significant untapped export potential for whole and frozen fish, shrimps, prawns, leather goods, and, to a lesser extent, for live animals and related products (meat, milk, eggs). Greater value addition along the agri-food value chain (VC) will, however, be needed to meet domestic and export market requirements.

7. **On-farm and off-farm constraints are slowing down the modernization of the livestock and aquaculture sectors.** On-farm productivity is low, especially among small and medium-sized producers (SMPs), notably because of: (i) their small scale of production and limited use of farmer aggregation models hindering economies of scale; (ii) low adoption of good production practices; and (iii) insufficient

[2] The definition of the livestock sector used for the purpose of this document is the definition of the Food and Agriculture Organization of the United Nations (FAO), used by most of international organizations, which includes all terrestrial domestic animals including ruminants, as well as monogastric animals including poultry.
[3] GoP. 2020. *Household Integrated Economic Survey 2018-19*. Pakistan Bureau of Statistics.

access to knowledge, inputs (e.g., quality feed, breeds, or fish seed), and services, including extension services, animal health services, and control of animal diseases. Off-farm value addition and commercialization are constrained by high transaction costs, inefficient post-harvest practices, and poor infrastructure (storage, farm-to-market transport, and the cold chain). Post-harvest losses in dairy are estimated at around 20 percent due to poor infrastructure for milk collection and processing.[4] The sectors also face food safety challenges across the VC that limit their growth potential. Poor sanitary and phytosanitary conditions have, for instance, led certain countries to ban imports of fish from Pakistan. While women play a major and growing role in the livestock and aquaculture sectors in Sindh, barriers such as social norms, lack of access to information and credit, low literacy, household and childcare duties, and restricted mobility limit women's participation in both sectors and constrain their productivity. A large income gap between men and women working in livestock persists. This is compounded by the low participation of women in farming-related decision-making processes, further depriving female producers from accessing innovations, extension services, entrepreneurship training, and technologies.

8. **On-farm and off-farm constraints are exacerbated by challenges in access to finance.** Many farmers—especially SMPs—lack the means to access finance to meet working capital requirements and finance investments in productive assets. Commercial banks account for two-thirds of agriculture lending. These institutions, however, are primarily financing food processing, which receives almost three times more funding than what is lent for crop and animal production.[5] In addition, loans to crop and animal production tend to go to larger farmers, which account for more than 70 percent of such disbursements. The market failure in lending to SMPs is particularly acute for the financing of technology investments, development, equipment, and upgradations (less than 7 percent of lending). Micro-finance providers, which accounted for one-third of the lending to the agriculture sector in 2021, have been beset by a liquidity crunch and capital shortfall that have impaired their ability to cater to the financing requirements of the agriculture sector. SMPs access finance predominantly from the informal sector, which can capture up to 80 percent of the farmer's expected profit and provides only short-term seasonal loans often associated with pre-harvest purchase of the farmer's production at a below-market price.[6]

9. **Climate change compounds these challenges to both sectors.** The Global Climate Risk Index ranks Pakistan among the top 10 most climate vulnerable countries in the world. By the end of the century, periodic heatwaves will contribute to more severe, more frequent, and longer drought conditions. Livestock productivity is expected to suffer from reduced water availability, changes in fodder and feed quality and quantity, increased occurrence of vector-borne diseases and emergence of new diseases, increased mortality, and loss of productivity, as well as the increased cost of feed, water, and energy. Lower productivity and increasing desertification of rangelands are expected and—for both livestock and aquaculture—a loss of infrastructure and animals due to increased occurrence of cyclones and floods. Climate change impacts on aquaculture can also include losses of production from increased risks of diseases, parasites, and harmful algal blooms. Reduced precipitation can lead to increasing competition for freshwater. Floods are a principal hazard in Sindh as demonstrated by the floods in 2010, 2011, 2012, 2013, and 2022. During the September 2022 floods, it is estimated that 1.4 million heads of ruminants (3 percent of the total), 7 million heads of poultry (4 percent of total), and over 80 percent of aquaculture ponds were lost in Sindh, resulting in total losses of US$659 million.

[4] International Finance Corporation (IFC). 2021. *Creating Markets in Pakistan: Country Private Sector Diagnostic*. Washington, D.C.: World Bank Group.
[5] State Bank of Pakistan. 2021. *Loans to Private Sector Business (By Type of Finance).*
[6] Bashir, Misbah, and Nasir Iqbal. 2021. *Role of the Middleman & Neglected Aspects*. Pakistan Institute of Development Economics.

10. **Pakistan's agriculture sector is also the single largest contributor to greenhouse gas (GHG) emissions and livestock contributes 49 percent thereof.** While Pakistan contributes less than 1 percent of global emissions, these are growing at over three times the global rate. Agriculture, forestry and other land use (AFOLU) contributed 46 percent of national emissions in 2018, in the form of methane from unsustainable livestock and manure management practices (49 percent of AFOLU emissions), managed agricultural soils (34 percent), land (14 percent) and rice cultivation (3 percent).[7] In addition, livestock waste can pose local environmental threats such as water eutrophication, and overgrazing exacerbates land degradation and deforestation. Considering the increased demand for livestock products, the livestock herd is projected to increase at an estimated 3 percent per annum, which will increase absolute GHG emissions and aggravate environmental impacts. Aquaculture systems are currently mostly extensive with few production inputs and GHG emissions. Moving to intensive systems is expected to increase absolute emissions. Introducing sustainable and climate-smart practices (CSPs) in livestock and aquaculture production has the potential to improve climate resilience and increase productivity, which will in turn decrease livestock's GHG emissions intensity (i.e., the quantity of GHG emissions per unit of output).

C. Relevance to Higher Level Objectives

11. **The Sindh Livestock and Aquaculture Sectors Transformation Project (LIVAQUA) is consistent with the World Bank Country Partnership Strategy (CPS) FY15–19 for the Islamic Republic of Pakistan discussed by the Board of Executive Directors on May 1, 2014 (Report No. 84645-PK) and extended to FY20 by the corresponding Performance and Learning Review dated May 18, 2017 (Report No. 113574).** While the preparation of the new Country Partnership Framework (CPF) was deferred in FY21 due to the COVID-19 crisis and paused in FY23 due to the 2022 floods, the objectives of the CPS remain relevant. The new CPF is expected to be presented to the Board in early FY25. Specifically, LIVAQUA will contribute to the current CPS Outcome 2.2 – "Increased Productivity in Farms in Selected Irrigation Schemes" and CPS Outcome 3.3 – "Increased Resilience to Disasters in Targeted Regions" through activities under Components 1 and 2. All Project activities will contribute to CPS Result Area 3 on addressing inclusion and reducing inequalities for vulnerable groups. LIVAQUA's design is well aligned with the Systematic Country Diagnostic's identified path to achieving growth, poverty reduction, and shared prosperity by promoting the productivity and environmental sustainability of the livestock and aquaculture sectors, and by strengthening their competitiveness. Project design is in line with the Pakistan Country Climate and Development Report in ensuring that promoted practices will support climate resilience and adaptation and reduce GHG emissions intensity as a co-benefit. Lastly, Project activities are consistent with the Maximizing Finance for Development (MFD) approach[8] as they aim to optimize limited public financial resources and support crowding-in private investment in both sectors. LIVAQUA will notably leverage about US$10 million in private capital mobilization from producer groups (PG) or about 7 percent of the public investment. The Project will also enable private capital through Component 2, as off-takers will be expected to make additional investments (e.g., in processing capacity, storage, and so on) because of the commercial agreements and productive alliances (PAs) established with PGs.

12. **The Project is aligned with the development strategies of the GoP and of the Sindh Provincial Government.** At the national level, LIVAQUA is consistent with the National Agricultural Policy (2019–2024), which emphasizes the need to transition to innovations in the livestock sector to ensure a

[7] World Bank. 2022. *Pakistan – Country Climate and Development Report.* Washington, DC.
[8] Townsend, Robert, Loraine Ronchi, Chris Brett, and Gene Moses. 2018. *Future of Food – MFD in Agricultural VCs*. Washington, D.C.: World Bank.

sustainable use of natural resources, improve the regulatory and surveillance system for diseases, and improve oversight and regulatory mechanisms such as certification schemes for quality control, labeling, and traceability to incentivize private sector investment. LIVAQUA is also aligned with the Blue Economy Vision adopted by the GoP in 2019, which offers a pathway for increasing sustainable seafood production and the aquaculture sector's contribution to the country's economic growth. The Project is also expected to contribute to Pakistan's commitments under the Global Methane Pledge by reducing the intensity of methane emissions from enteric fermentation and manure management in livestock. At the provincial level, LIVAQUA is in line with the Sindh Agriculture Policy 2018–2030, which promotes support to veterinary services and to technologies and practices that reduce emissions. LIVAQUA is also aligned with the Sindh Livestock and Fisheries Enterprise Development Policy draft, which aims at the transformation of the livestock and fisheries sector from conventional towards market-oriented farming by 2025.

13. **The Project is consistent with Pakistan's Nationally Determined Contributions (NDC) of 2021.** In the latest NDC submitted to the United Nations Framework Convention on Climate Change, the country aims to promote climate-smart inputs and management practices in agriculture and livestock management on mitigation and adaptation. The Project contributes to the NDC by introducing climate-smart livestock practices, such as development of heat-resistant livestock breeds, improved manure, and grassland management. The Project is consistent with Pakistan's National Adaptation Plan to incentivize the adoption of climate-smart water and land management practices. The Project is also in line with the Pakistan Country Climate and Development Report in ensuring that promoted practices will support climate resilience and adaptation and reduce emissions or improve GHG emissions intensity as a co-benefit.

II. PROJECT DESCRIPTION

A. Project Development Objective

PDO Statement

14. The Project Development Objective (PDO) is to promote climate-smart and competitive small and medium producers in the livestock and aquaculture sectors in Sindh.

PDO Level Indicators

15. **The PDO will be assessed by the following indicators:** (i) Direct beneficiaries adopting two or more CSPs promoted by the Project (Percentage); (ii) SMPs reaching the expected productivity increase per selected commodity (Percentage); (iii) GHG emissions neutrality, including methane emissions from livestock and aquaculture SMPs supported by the Project (Yes/No); (iv) SMPs with increased marketed value of at least 30 percent through PAs (Percentage); and (v) People with strengthened food and nutrition security (Number of people).

B. Project Components

16. **The Project includes four components** financed through a US$135 million equivalent International Development Association (IDA) credit, US$2 million from the Government of Sindh (GoS), and US$10 million mobilized from local beneficiaries (Producers Groups, PG's, Table 1). The Project's contribution to climate adaptation and mitigation is elaborated in a separate Climate Change Technical Note.

Table 1. Cost Summary of LIVAQUA (US$ million)

Components	Total Cost	GoS	PG's Share	IDA
Component 1: Strengthening the Enabling Environment for Sectoral Growth				
1.1: Improvement of the sector's policies, strategies and evidence-based decision making	5	0	0	5
1.2: Strengthening the delivery of essential knowledge, inputs, and services	72.7	0.7	0	72
Sub-total	***77.7***	***0.7***	***0***	***77***
Component 2: Promotion of Climate-Smart Production, Value Addition, and Inclusive Access to Markets				
2.1: Capacity building and development of horizontal and vertical alliances	6	0	0	6
2.2: Improvement of the market integration of PGs for increased climate-smart production and value addition	52	0	10	42
Sub-total	***58***	***0***	***10***	***48***
Component 3: Project Management, Monitoring, and Learning	***11.3***	***1.3***	***0***	***10***
Component 4: Contingent Emergency Response	***0***	***0***	***0***	***0***
GRAND TOTAL	**147**	**2**	**10**	**135**

17. **Component 1: Strengthening the Enabling Environment for Sectoral Growth.** This component aims to support the development of inclusive, climate-resilient, and sustainable livestock and aquaculture sectors by: (i) improving sector policy and strategic frameworks, as well as evidence-based decision making; and (ii) strengthening the provision of essential knowledge, inputs, and services.

18. **Subcomponent 1.1: Improvement of the sector's policies, strategies and evidence-based decision making.** The Project will finance goods and services for:

a. **Formulation, adoption, and monitoring of policy and strategic frameworks** to notably strengthen the veterinary and aquaculture development frameworks and animal disease control, improve the genetics and breeding strategy, promote fish quality and value addition, and strengthen food safety, especially for the dairy and meat subsectors.

b. **Preparation and response to animal health and climate related emergencies** through contingency plans for livestock and aquaculture, simulation exercises to test and firm up emergency response capacities, and the creation and equipment of rapid response mobile units.

c. **Capacity building of institutions in the livestock and aquaculture sectors to collect, centralize, and analyze sector-wide data** through livestock and aquaculture sectoral dashboards and epidemic surveillance and disease reporting via a digital, web- and smartphone-based system.[9]

19. **Subcomponent 1.2: Strengthening the delivery of essential knowledge, inputs, and services**. The Project will finance goods and services for:

[9] The development of these management information systems (MIS) will be based on pre-existing information systems. Particular attention will be paid to consolidation and interconnection between the reporting and monitoring tools to be developed.

a. **Provision of disease control services**, including refurbishment of veterinary hospitals and clinics, construction of new veterinary complexes at the District level, introduction of mobile dispensaries in remote areas, mass vaccination campaigns against transboundary animal diseases[10] and production diseases, combined with treatments against parasites, and support to private veterinary and aquaculture practitioners.

b. **Provision of diagnostic laboratory services** by helping the Central Veterinary Diagnostic Laboratory comply with biosafety level 3 standards, equipping mobile laboratory units, improving fish disease diagnostics, upgrading the Poultry Research Institute, and building the Sindh Institute of Animal Health's drug testing capacity for both livestock and aquaculture.

c. **Strengthening capacities for production of vaccines** at the Sindh Institute of Animal Health and facilitating public-private partnerships (PPP) for foot-and-mouth disease (FMD) vaccine production.

d. **Provision of food safety services** by helping the Sindh Food Authority (SFA) and the Sindh Livestock and Fisheries Department (L&FD) develop food safety guidelines for the red meat, fish, and dairy VCs, including the domestication of the Federal Law on milk pasteurization. This will also include strengthening staff capacities and equipment to perform supervision and enforcement of food safety compliance, while informing consumers on food safety risks and promoting the consumption of safe products.

e. **Strengthening the breeding and selection mechanisms, and the dissemination of animals and semen for genetic improvement** by scaling up existing artificial insemination (AI) services. This will include piloting a genomic testing laboratory with the University of Karachi, promoting AI in rural communities through demonstrations, building the capacity of public and private AI and creating AI mobile units, strengthening and equipping processing laboratories to scale up the production of AI semen, including liquid nitrogen for the conservation and transport of semen. The Project will pilot imported elite bulls and semen doses of climate-resilient breeds. It will also facilitate the production of genetically improved brood stock for aquaculture.

f. **Research, development and transfer of green technologies** by upgrading research facilities in L&FD's livestock experimental stations, especially for fodder production, support to post-graduate research by female researchers in Agriculture / Veterinary Universities of Sindh, disseminating technical innovations to smallholder farmers through Livestock Farmer Field Schools, and strengthening aquaculture extension services including the creation of mobile extension units. The Project will engage with more research institutions, academia, university, researchers, and private sector actors in aquaculture through competitive research and innovation grants for testing new aquaculture systems and technologies.

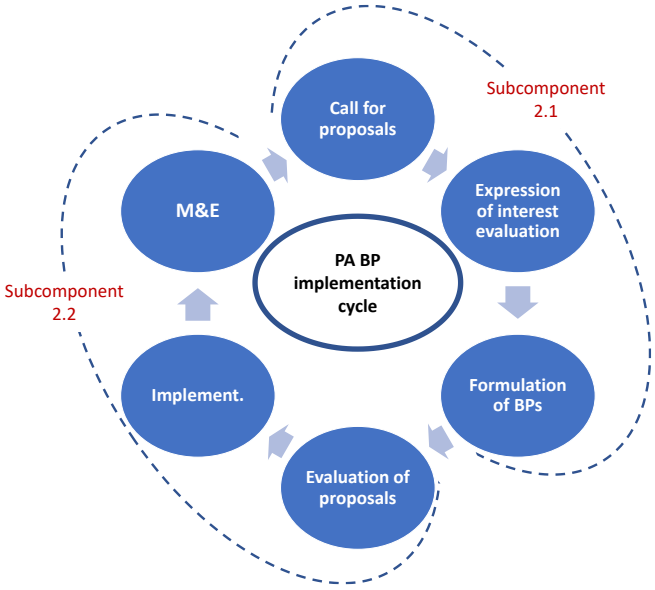
20. **Component 2: Promotion of Climate-Smart Production, Value Addition, and Inclusive Access to Markets.** This component will support growth-oriented SMPs to establish and/or upgrade their market linkages with off-takers in a market-driven, profitable, and sustainable way. It will also help intensify and add value to their production. The Project will do so by: (i) facilitating the formation of PGs and PAs and the preparation of their business plans (BPs); and (ii) competitively selecting and financing the most commercially viable, inclusive, and climate-smart BPs.

[10] Such as *peste des petits ruminants* (PPR, ovine rinderpest), FMD, and lumpy skin disease (LSD).

21. **PAs help build horizontal alliances between producers and vertical alliances between producers and buyers.** PAs involve three core agents: (i) a PG; (ii) one or more buyers; and (iii) market enablers (i.e., local service providers, LSPs). PAs will benefit from: (i) supporting the organization and collective action of growth-oriented SMPs through PGs (horizontal alliances); (ii) bringing together PGs and prospective buyers into vertical alliances, via a commercial agreement to supply, in specified quality and quantity, agri-food produce in high market demand; (iii) supporting BP formulation to meet the terms of the contract endorsed by the buyer; and (iv) supporting BP implementation to allow PGs to make the investments needed to supply the required quantity of quality products.

22. **Subcomponent 2.1: Capacity building and development of horizontal and vertical alliances.** The Project will finance goods and services for the formation of PGs, the establishment of PAs, and the formulation of BPs. LSPs will be hired to organize awareness campaigns and help interested growth-oriented producers form PGs in response to identified business opportunities with potential commercial partners. LSPs will then facilitate the establishment of PAs around fair and transparent commercial agreements that will lead to the formulation of detailed BPs. BPs will need to be fully market-driven, gender inclusive, environmentally sustainable,[11] and climate-smart. LSPs will prepare PGs for the implementation of their BPs by strengthening their technical and business capacities. Figure 1 summarizes the PA BP implementation cycle.

Figure 1. PA BP Implementation Cycle



23. **Subcomponent 2.2: Improvement of the market integration of PGs for increased climate-smart production and value addition.** The Project will finance the provision of Matching Grants,[12] goods and services to competitively select PA BPs and support their implementation by allowing PGs to invest in technical assistance (TA), productive assets, and inputs.[13]

[11] This component will not support BPs from the cattle colony sub-sector due to the waste and emissions they generate.
[12] A matching grant is defined as a one-off, non-reimbursable transfer to Project beneficiaries, for a specific purpose, based on the condition that the recipient contributes for the same purpose.
[13] PGs will be expected to contribute a financial matching of 20 to 30 percent of the cost of their PA BP (cash and in-kind), as

24. **An independent entity will be hired by the Project to assess BPs and mitigate opportunistic behaviors and capture by larger, more connected farmers.** It will ensure BPs are commercially, technically, and financially viable[14] and that they: (i) meet market requirements agreed upon with the buyers; (ii) include climate adaptation and mitigation measures; and (iii) comply with relevant environmental and social (E&S) safeguards. The matching grant mechanism will include a specific window for female-headed PGs.[15]

25. **Matching grant support to PGs will be provided only for investments needed to meet the market specifications agreed upon with the buyer as part of the PA. Such investments may include**:

a. **Quality inputs** required to improve the quality, productivity, and diversification of production, such as improved seeds, breeds, and feed.

b. **Value addition equipment and infrastructure,** such as on- and off-farm cold chain equipment, milk collecting centers (MCCs), transportation and processing equipment and machinery. Equipment and infrastructure will be as energy efficient as possible to reduce GHG emissions. They will also be climate-resilient to withstand heavy precipitation and flooding.

c. **Specialized TA** to ensure SMPs can effectively use the proposed quality inputs, equipment, and infrastructure. This will also build PGs' capacity including in complying with market requirements, adopting on- and off-farm CSPs, mastering new production and processing techniques, understanding market forces, and developing business and marketing skills. TA tailored to female-headed PGs will include business leadership networking support to enable them to access markets and manage business operations.

26. **The matching grant mechanism will include measures to mitigate the risk of crowding out commercial financing**, including, among others, mandating the use of formal bank accounts for the deposit of the producer's matching contribution to the proposed investment and facilitating the acquisition of assets that can then serve as collateral. The Project will focus on unbanked SMPs or those whose financing needs cannot be met by formal FIs and will encourage beneficiaries to graduate to the formal financial system, especially for activities in which lending is routine, such as readily available equipment and inputs.

27. **Component 3: Project Management, Monitoring, and Learning.** This component will support the overall management, implementation, and supervision of Project interventions, capacity building, as well as monitoring, evaluation, communication, dissemination, and continuous learning throughout the life of the Project. The Project's progress and impacts will be monitored and evaluated, notably through a baseline, mid-term, and end-of-project impact assessment, as well as on-demand quantitative or qualitative studies.

28. **Component 4: Contingent Emergency Response.** This component will allow for rapid reallocation of Project proceeds for provision of immediate response to an Eligible Crisis or Emergency, as needed.

C. Project Beneficiaries

will be indicated in the Project Implementation Manual (PIM). This contribution share from PGs will be reviewed from time to time during implementation. It is aligned with the Punjab Resilient and Inclusive Agriculture Transformation Project (P176786), which is also implementing a PA approach in Pakistan, and it was confirmed by research amongst producers and off-takers during Project preparation.

[14] Financial institutions (FI) will be involved in the assessment of the financial viability of BPs submitted for Project financing.

[15] All screening criteria, as well as governance and management aspects of the matching grants (including E&S standards, fiduciary norms, and anti-corruption provisions) will be detailed in the PIM.

29. **The Project's main beneficiaries are small and medium-sized livestock and aquaculture producers and their households.** The Project will directly benefit over 940,000 farm families, including 930,000 for livestock (i.e., 50 percent of the 1.86 million livestock households in Sindh), and 10,000 for aquaculture. Component 1 will support the delivery of public goods and will benefit a large share of producers including subsistence farmers, small-scale farmers, and female farmers. Certain activities that require coordinated collective action to achieve their objective will benefit all producers, including large-scale producers.[16] Strengthened livestock services is expected to increase their outreach from, currently, 20 percent of livestock-rearing households, to around 50 percent (about 930,000 households, 33 percent of which are women, and about 4.65 million beneficiaries,[17] distributed all over the Sindh province). Component 2 will target approximately 19,000 growth-oriented SMPs organized in about 650 PGs for improved market aggregation and access. The Project will also take measures to ensure female farmers' participation in the Project and narrow gender gaps.

30. **Three other groups are expected to benefit from the Project.** Government institutions will benefit from strengthened institutional capacity for providing higher quality public services. Domestic private sector companies will be able to benefit by serving as suppliers of production inputs, as well as health and veterinary services under Subcomponents 1.2 and 2.2, which will in turn strengthen private support services to SMPs. Livestock and aquaculture processors and other off-takers will benefit from lower transaction costs in sourcing higher quality products from PGs thanks to the Project's support in improving their production and investing in their ability to add value to and market their production.

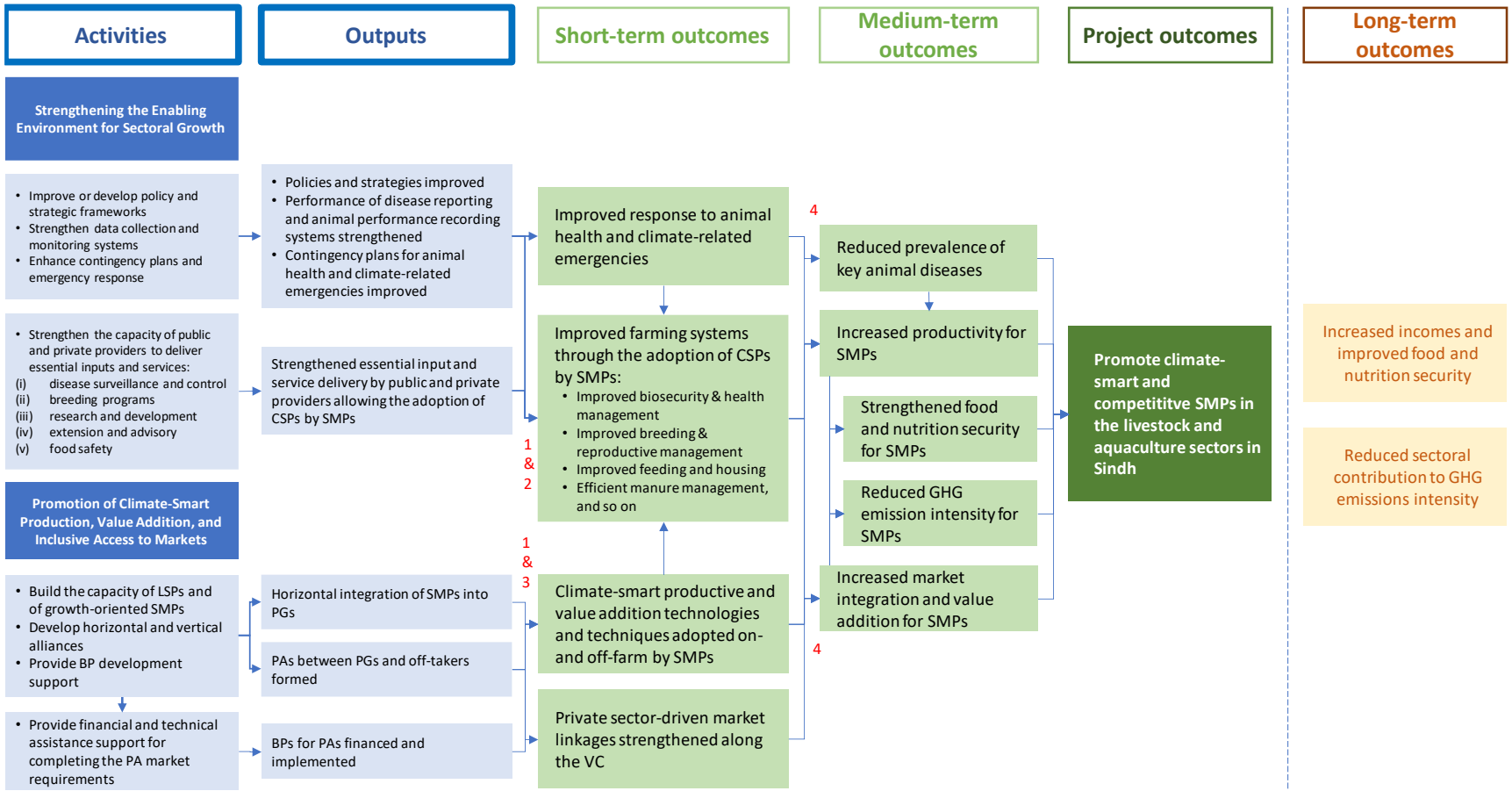
31. **The Project will cover all districts in Sindh using a phased approach.** The provision of essential knowledge, inputs, and services under Component 1 will be province-wide. Districts that have benefited from the Sindh Agriculture Growth Project (SAGP, P128307) and are benefiting from the World Bank-funded Sindh Water and Agriculture Transformation Project (SWAT, P167596)[18] will, however, be targeted in priority, as producers in these districts have the greatest potential to adopt CSPs, increase their productivity, and access markets. The PA approach under Component 2 will be demand-driven and market-based and will therefore depend on commercial opportunities. An initial focus will be placed on areas where such commercial opportunities and the need for market linkages support have been expressed by market actors, including from PGs formed under SAGP, during awareness and outreach efforts carried out during Project preparation.

D. Results Chain

32. **The Project's Theory of Change, illustrated in Figure 2, aims to address market failures affecting livestock and aquaculture SMPs in Sindh,** including: (i) small scale of production and low productivity; (ii) market aggregation failures limiting economies of scale; (iii) coordination failures along the VC leading to information asymmetries and preventing stable market relationships; (iv) inequality in bargaining power between farmers and buyers, as well as input providers; (v) undercapitalization of farmers and challenging access to finance; and (vi) insufficient access to knowledge, inputs, and services. These market failures contribute to low incomes and high vulnerability to external shocks. In addition, livestock systems and, to a lesser extent, aquaculture systems, generate high environmental impacts, such as GHG emissions, land degradation, and localized pollution, which imperil the long-term viability and growth potential of these sectors.

[16] For instance, vaccination campaigns aiming a certain level of vaccination coverage to control the spread of the disease.
[17] Considering an average family size in Sindh of five based on data from the Pakistan Bureau of Statistics.
[18] Or other similar interventions by the Government of Sindh and other partners.

Figure 2. LIVAQUA's Theory of Change



Assumptions:

1. Public institutions are willing to delegate responsibilities to private input and service providers
2. Service improvements meet quality, relevance, timeliness, and outreach needs
3. Producers and buyers are sufficiently incentivized to participate in the productive alliance
4. No major external shocks (e.g., natural disasters)

E. Rationale for Bank Involvement and Role of Partners

33. **The World Bank is uniquely positioned to support Pakistan's efforts to improve the competitiveness, resilience, and sustainability of its livestock and aquaculture sectors.** It has a long history of fruitful cooperation with Pakistan in the agriculture sector, through both lending and policy advisory programs, having financed a wide range of investment projects in Pakistan and in the Sindh province, such as, recently, the Sindh Irrigated Agriculture Productivity Enhancement Project (P145813) or SAGP, which supported both crop and livestock production. LIVAQUA will, however, be the first operation in the Pakistan portfolio focusing exclusively on livestock and aquaculture, recognizing the importance of these sectors in terms of rural incomes, resilience, and food and nutrition security. The World Bank has extensive global experience with the design and implementation of livestock and aquaculture projects, including on topics of increasing productivity, improving market access, value addition and competitiveness, and strengthening public institutions. It has also significant experience in implementing activities for climate resilience, which is key for supporting these sectors.

34. **The World Bank and the International Finance Corporation (IFC) will work together to help mobilize private sector investment in the sector.** The public and private sectors will need to work closely together to address the constraints faced by livestock and aquaculture farmers. The Project aims to facilitate private investment by: (i) identifying investment opportunities in critical areas such as the production of livestock vaccines and cold storage logistics (Component 1, Subcomponent 1.2.c); (ii) supporting a PPP aimed at financing an FMD vaccine production unit (Component 1, Subcomponent 1.2.c); (iii) supporting public–private dialogue on solutions to improve milk safety and the needed policy changes (Component 1, Subcomponent 1.2.d); and (iv) pursuing synergies and collaboration opportunities between LIVAQUA beneficiaries and private operators (including, potentially, IFC clients and partners), notably through the improvement of the production and supply of quality milk, and market linkages between SMPs and large dairy companies (Component 2, Subcomponent 2.2).

F. Lessons Learned and Reflected in the Project Design

35. **The livestock and aquaculture sectors have so far received insufficient support and public funding.** Only two large-scale foreign-funded projects have focused on the livestock sector recently: the World Bank-funded SAGP (2014–2021), and the Japan International Cooperation Agency-funded Sustainable Livestock Development for Rural Sindh Project. Farmer organization models, such as PGs, are almost absent in the Province. However, interventions from SAGP to support the development of PGs have resulted in significant increases in marketed volumes for the producers involved. LIVAQUA builds upon this experience and the lessons learned in supporting the creation of milk producer groups (MPGs) and MCCs. MPGs/MCCs that could establish contractual arrangements with dairy processors, or sell to milk shops, retailers, and sweet shops, allowed farmers to get substantially higher prices for their milk. MPGs without such contracting arrangements had to sell to middlemen or via competitive auctions and received smaller price increases. LIVAQUA builds on these lessons by implementing a new PA approach, which mobilizes farmers into PGs and which supports contractual arrangements to facilitate market access (Component 2). This component reflects lessons from the World Bank's vast experience in implementing PAs, which started in Latin America and expanded to more than 20 countries worldwide. Evaluations of these schemes show that the objectives of improving access to markets for small producers were consistently met. Yet, PAs should not be considered a one-size-fits-all approach. Comprehensive field surveys were carried out in Sindh with producers, PGs, input suppliers, off-takers, FIs, and LSPs to tailor the approach to their specific needs. LIVAQUA also incorporates lessons drawn from the World Bank's

Investing in Sustainable Livestock Guide (2021) and report on *How Can Matching Grants in Agriculture Facilitate Access to Finance* (2019).

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

36. **Overall responsibility for Project coordination, implementation, and management of E&S risks, will be under the L&FD of the GoS who will establish a Project Coordination Unit (PCU) with a Project Coordinator (PC) and a Project Implementation Unit (PIU) with a Project Director (PD).** Project implementation will take place over six years. Earlier experience with similar projects demonstrates that it is important to allocate sufficient time, not only for activities, strengthening knowledge, inputs, and services delivery under Component 1, but also for the support to private sector initiatives under Component 2.

37. **The governance structure for LIVAQUA will include a Project Steering Committee (PSC) and a Project Technical Committee (PTC).** The PSC will provide strategic guidance for Project implementation and approve the Annual Work Plans and Budgets (AWPB) and LIVAQUA progress reports. It will be chaired by the Chairman of the Planning and Development Board (P&D) and will include representatives of P&D, the Ministry of Economic Affairs, Planning Commission, L&FD, the Agriculture Department, the Sindh Forest Department, the SFA, private sector representatives, local authorities, producer organizations, and major non-governmental organizations operating in the livestock and aquaculture sectors. The PTC will provide technical advice to the PCU and the PIU on the quality of implementation. It will also review reports and studies, guidelines, documentation of best practices, and monitoring and evaluation (M&E) reports. It will be chaired by the PC and comprise representatives of the PCU, PIU, L&FD Directorate for Livestock (LDir), and L&FD Directorate for Inland Fisheries (FDir), representatives of PGs in livestock and aquaculture (including inter-professional bodies), representatives of other livestock support projects, scientific research institutes, as well as contractual service providers.

38. **The Project's implementation mechanism will comprise a PCU and a PIU.** It will be fully integrated into and aligned with the Department's structure under the Department's General Secretariat to strengthen the Department's capacities and ensure greater sustainability of interventions at the end of the Project. The PCU will be responsible for planning, coordination, M&E, and reporting of Project activities. The PIU will be responsible for the implementation of Project activities in support of the LDir and FDir. This will include fiduciary compliance, and E&S Standards (ESS) compliance and support. The PIU will be responsible for authorizing and verifying all Project transactions.

39. **The Project will be supported by M&E Consultants (M&ECs), Design and Supervision Consultants (D&SCs) and Project Implementation Consultants (PICs).** The M&ECs will assist in: (i) monitoring and evaluating the physical progress and impacts of the Project; and (ii) overseeing the implementation of the E&S Management Plan (ESMP). The D&SCs will assist in the design and supervision of construction works. The PICs will provide TA and international expertise to support the implementation of Component 2. The governance and implementation structure of the Project will be formalized in the PIM.

B. Results M&E Arrangements

40. **The Project will be supported by a technically and operationally rigorous M&E system.** It will use the Geo-Enabling Initiative for Monitoring and Supervision/KoboToolbox and a web-based MIS to provide data on key Project inputs, outputs, and financial and physical progress. The system will build on L&FD's existing M&E and knowledge management systems. Requirements for M&E and knowledge management systems will be described in the PIM.

41. **The Project's MIS will be complemented with a geographical information system (GIS)** to map all expected infrastructure to be rehabilitated and constructed. This GIS is expected to provide real-time data regarding the progress of the work and will assist the World Bank in remote supervision. To the extent possible, the GIS will also map out activities of other donors in the same areas to support coordination and collaboration. Since the Project would involve personal data, requiring the collection, storage, processing, and transfer of personal data of beneficiaries, the PIM will establish provisions to protect the privacy of beneficiaries using data governance and personal data protection protocols, which should be in line with national and global best practices.

42. **The PCU will assume overall responsibility and coordination of the Project's M&E.** It will prepare quarterly reports as per the GoP's and the World Bank's requirements. Independent M&ECs will be hired to carry out the M&E activities described above and will work under the supervision of the M&E Specialist of the PCU. M&ECs will be assigned to both the PCU and the PIU. A baseline survey will be conducted at Project start-up to confirm the baseline and targets in the results framework (RF). Annual outcome surveys and midline and endline surveys will also be needed to evaluate the Project's outcomes at mid-term and completion stage. The Project will carry out an impact evaluation to support the Project's completion and final review.

C. Sustainability

43. **Project sustainability will be ensured through investments in public capacity building and through the Project's focus on developing climate-smart livestock and aquaculture production systems and on linking SMPs to markets with targeted public support.** LIVAQUA will strengthen public institutions to improve service delivery, coordination, and management in the livestock and aquaculture sectors, and build the technical and management capacity of staff in various public and private institutions. The Project's support to greater market integration of PGs under Component 2 builds on lessons from similar World Bank-supported projects. The market linkages established under Component 2 help create sustainable commercial relationships between PGs and off-takers that are likely to outlast Project support. Global experience shows that the systematic provision of technical support to PGs to install and maintain equipment and machinery for value addition and marketing and plan for operations and maintenance costs in BPs helps maximize the sustainability of such investments. The Project will also help PG members eventually become users of the formal financial system.

IV. PROJECT APPRAISAL SUMMARY

A. Technical, Economic and Financial Analysis

44. **The Project will target SMPs and will aim to stimulate their growth in the most dominant mixed crop-livestock production systems[19] in irrigated areas, with a focus on the production of dairy and of meat from small and large ruminants, as well as on aquaculture development.** Close to 85 percent of Sindh producers are considered small-scale (below 12.5 acres), 10 percent medium-scale (12.5 to 25

[19] Farming systems combining crop and livestock production.

acres), and less than 5 percent large-scale (above 25 acres). The Project will primarily target producers with up to 25 acres and up to 30 heads of large ruminants or 100 heads of small ruminants. In aquaculture, priority will also be given to small-scale and medium-scale producers (i.e., with ponds of less than 10 acres), which account for 65 percent of Sindh's aquaculture producers. Market access support under Component 2 will focus on SMPs that are already engaged in the commercialization of marketable surpluses, as global experience shows that market integration is more successful when targeting such growth-oriented producers.

45. **The Project will aim to foster the adoption of CSPs,** which are defined as specific farming practices (livestock husbandry, aquaculture, agronomic, post-harvest, and so on) that have the potential to increase both productivity and resilience, while contributing to climate change mitigation. In the case of livestock production, mitigation is achieved through reduced GHG emission intensity.[20] This will be applied as follows:

a. **In livestock production**, priority CSPs will focus on productivity and resilience through the adoption of heat and drought tolerant fodder varieties, fodder conservation (silage, hay), agro-forestry based on fodder trees, and rainwater harvesting for animal watering. Promoting improved animal husbandry and health through systematic vaccination, parasite treatment, and improved feed quality and quantity will significantly and simultaneously increase productivity while reducing emission intensity.

b. **In aquaculture**, priority will be given to the utilization of degraded land for productive aquaculture farming and the adoption of semi-intensive and intensive fish farming practices, while controlling wild fish infestation and recycling of manure in aquaculture.

c. **In post-harvest processing and storage operations**, the focus will be placed on energy efficiency, loss reduction, and waste recycling.

46. **The Project is aligned with the goals of the Paris Agreement on both mitigation and adaptation.** With respect to mitigation risks, the proposed livestock and aquaculture practices conform to climate-smart agriculture pillars and are universally aligned with little risk of the Project having a negative impact on Pakistan's low-GHG emissions development pathway. While the livestock herd size is expected to increase, the Project supports the formulation of strategies to green the Sindh livestock sector, promotes improved livestock feeding through on-farm cultivation of grass, forage crops, and fodder trees/shrubs, and supports improved health management, which will reduce methane emissions from enteric fermentation. The Project also supports increased value addition and improved energy efficiency along the VC, which, combined with productivity increases, will lead to reduced food loss and waste and reduced GHG emissions intensity. With respect to adaptation risks, Project design addresses climate risks in a manner that is appropriate and proportionate to the local vulnerabilities including temperature increases and changes in rainfall and runoff with increased incidents of droughts and floods. The design explicitly includes promoting climate-resilient policies and strategies, strengthening the capacity of livestock and aquaculture institutions to implement climate-resilient practices, promoting the adoption of climate-resilient breeds and production technologies, and preparing contingency plans to manage climate risks and reduce the risks to an acceptable level.

[20] The potential to reduce emissions intensity has been assessed using the Global Livestock Environmental Assessment Model – interactive (GLEAM-i). In the case of aquaculture, Project interventions will notably ensure that they do not rely on the use of wild seeds.

47. **Both the economic and financial analyses show positive returns on investment.** The financial analysis assesses the financial performance of Project interventions as compared to a without project (WOP) scenario in which traditional practices are used and productivity is low. Based on illustrative farm models for livestock and aquaculture SMPs, the financial analysis provides their financial internal rate of return (FIRR) over 10 years. A financial analysis of an illustrative smallholder livestock household that benefits from Component 1's health interventions shows an FIRR of 17 percent. Different models are compared to assess interventions of Component 2 and prove their financial viability and favorable returns on investment. Small dairy farming with three adult cows or buffaloes yields a 24.7 percent FIRR, while the integrated smallholder market-oriented model with six adult cows achieves a higher FIRR of 34.7 percent for dairy production. In meat production, large animals with a 12-month fattening cycle achieve a 9.2 percent FIRR, while goat/sheep meat production with a six-month fattening cycle has a 16 percent FIRR. The financial analysis reveals financial viability of small and medium fish hatcheries and nurseries, as well as fish farms. Small (5-acre) and medium (10-acre) fish hatcheries exhibit FIRRs of 9.7 percent and 16.5 percent respectively. Fish nurseries show significantly higher FIRRs of 24.5 percent and 25.8 percent. Small and medium-scale aquaculture interventions show FIRRs at 23.5 percent and 35.1 percent respectively.

48. **The economic analysis shows that the Project has a robust economic internal rate of return (EIRR) of 37.6 percent and an economic net present value of US$537 million.**[21] The economic analysis aggregates the economic net incremental benefits across Project beneficiaries, considering 13,500 livestock and 1,000 aquaculture beneficiaries achieving productivity increases under Component 2 and 507,000 livestock households obtaining health packages and achieving benefits under Component 1. The analysis does not consider indirect economic benefits such as employment or local business development. Sensitivity analyses show that the EIRR remains robust under various scenarios, ranging from 27.2 percent when benefits are delayed by two years and 37 percent when recurrent costs increase.

49. **GHG accounting for livestock activities shows that in a with-project (WP) scenario, GHG emissions intensity decreases for all production systems.** GHG accounting for livestock activities was conducted with GLEAM-i and for aquaculture activities with the Ex-Ante Carbon Balance Tool (EX-ACT).[22] Absolute GHG emissions from livestock increased in both components due to an absolute increase in production. For Component 2, absolute emissions increased from 0.13 million tons of carbon dioxide equivalent (tCO2e) emissions at baseline to 0.17 million tCO2e in a WP scenario and 0.15 tCO2e emissions in a WOP scenario in 2030. Under Component 1, absolute emissions increased from 8.9 million tCO2e emissions at baseline to 10.2 million tCO2e emissions in the WP scenario, which is a lower increase than in the WOP scenario, in which emissions increased to 10.3 million tCO2e emissions. The reduction in emissions growth can be attributed to a decrease in herd size and a less significant increase in overall production. Emissions intensity decreases for all production systems compared to business as usual, i.e., 16 percent reduction for Component 2, and 10 percent reduction in Component 1.

50. **Combined results of livestock and aquaculture interventions show that the Project could generate absolute emissions of 255.77 million tCO2e, as compared to 256.67 million tCO2e emissions in a WOP scenario, resulting in a negative net carbon balance of -0.90 million tCO2e emissions over 20 years, or on average -45,074 tCO2e/year.** Considering livestock emissions only, the net GHG emissions is estimated at -1.38 million tCO2e over 20 years as compared to a WOP scenario. The Project is expected to achieve a notably decrease in GHG emissions intensity (i.e., tCO2e per kg of proteins) of 15 percent for Component 2 interventions and 8 percent for Component 1 interventions. In line with the World Bank's

[21] Discount rate of 9 percent.
[22] A Technical Note, with detailed assessment, is available upon request.

Guidance Note 2024, the net carbon balance was included in the economic analysis at a low and high shadow price of carbon starting at US$55 and US$110, respectively, in 2025 and increasing to US$87 and US$173 by 2045.

B. Fiduciary

51. **The Project's Financial Management (FM) will be the responsibility of the L&FD and its PIU.** L&FD will operate an independent Designated Account (DA) at the PIU, established as per the procedure of Revolving Fund Assignment Account issued by the Ministry of Finance, Federal Government for World Bank funding. The account will be opened in the National Bank of Pakistan. The L&FD will submit its withdrawal applications directly to the World Bank through Client Connection. Before filing a withdrawal application, internal approval by the PD will be required. This DA will be authorized to operate on a dual signature basis of authorized officials. The same DA will be used to process payments of the PIU, in addition to the payments of the PCU registered as eligible expenditures of the Project. Disbursements will be based on a bi-annual cash forecast provided in the bi-annual interim unaudited financial reports prepared and submitted by the Project within 45 days of end of six months.

52. **FM arrangements will follow the requirements of the World Bank Policy for Investment Project Financing (IPF), revised in October 2018.** The Project will be a part of the GoS's annual development budget. The New Accounting Model, which includes the Chart of Accounts prescribed by the Auditor General of Pakistan (AGP), will be used. External audit will be conducted by the Directorate General Audit Sindh, which is a subordinate office of the Office of the AGP. The annual audit report and management letter will have to be submitted to the World Bank within six months of the close of the financial year. The Project's internal audit will be conducted by a firm of chartered accountants hired from the market. This firm will review compliance with rules and procedures and present its report to the PSC twice a year.

53. **Procurement activities will be carried out following the World Bank's Procurement Regulations for IPF Borrowers.** All the identified works contracts fall within the national competitive bidding threshold of US$20 million. Some goods contracts may be procured through international competitive bidding. Some consultancy contracts will need to be advertised internationally. The largest goods contract is estimated to cost US$5 million, while the largest consultancy contract is estimated to cost US$6 million. Procurement procedures for national competitive bidding will be subject to the conditions specified in the Regulations, section 5.4, and agreed with the World Bank. Component 2 will be implemented using a community participation approach. Beneficiaries will be provided technical support to prepare a BP and opportunity to avail a matching grant for their investments. The PIU will facilitate in setting up tripartite agreements with the equipment supplier(s) and beneficiary PGs for various types of equipment. While a long list is provided, exact interventions will be demand driven. Details are captured in a Project Procurement Strategy for Development (PPSD). The Project will be subject to the World Bank's Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by the International Bank for Reconstruction and Development (IBRD) Loans and IDA Credits and Grants.

54. **The World Bank carried out a procurement risk assessment.** Procurement-related risks, such as timely staffing of the PIU, adequate planning and market approach, and contract management, have been identified and mitigation measures are agreed with the L&FD, as included in the PPSD. The plan will be reflected in the Procurement Risk Assessment and Management System. Details of the procurement arrangements are provided in Annex 1.

C. Legal Operational Policies

Legal Operational Policies	Triggered?
Projects on International Waterways OP 7.50	Yes
Projects in Disputed Area OP 7.60	No

55. **Aquaculture activities are likely to use water from the Indus River system, an international waterway: OP 7.50 on "Projects on International Waterways" (the Policy) therefore applies to the Project.** The Project involves the improvement of aquaculture systems, including rehabilitation and installation of ponds, which will take water from the irrigation water channels, fed indirectly by the Indus River through primary secondary or tertiary canals and farm channels. Activities will be limited to the rehabilitation and improvement of existing schemes and will not: (i) adversely affect the quality or quantity of water flows to other riparian countries; or (ii) be adversely affected by other riparian countries' water use. The exception to the notification requirement according to paragraph 7 (a) of the Policy was approved by the Regional Vice President on March 25, 2024.

D. E&S

56. **The environmental risk rating of the Project is Substantial and the social risk rating is assessed as Moderate, giving an overall Project E&S risk classification of Substantial.** All ESS are relevant except ESS7 on Indigenous Peoples and ESS9 on Financial Intermediaries. The environmental risks include soil erosion due to overgrazing, which leads to loss of fertile land and increased sedimentation in water bodies. Excessive use of agrochemicals such as pesticides can pose significant risks to communities, land and water quality, and aquatic ecosystems. Livestock waste may also detrimentally affect aquatic ecosystems and increase resource pressure on local communities, especially for water resources. The risk of invasive species also remains relevant, as existing aquaculture operations supported by the Project often cultivate non-endemic species without clear controls for preventing their introduction into natural habitats. Construction activities may result in increased local dust and emissions, particularly due to vehicles and other machinery used, noise emissions, issues related to solid waste, associated community health and safety risks related to civil work activities. As the Project will involve the procurement, provision, and administration of pesticides, veterinary medicines, and vaccines, and other sector specific inputs, there are significant risks around the safe handling, storage, and disposal of these materials, especially given their potential to harm both environmental and human health. Only pesticides that are legal for the GoS will be allowed for use, along with pesticides handling and management protocols. Social risks encompass issues such as community health and safety, particularly the improper use of aquaculture and livestock inputs such as pesticides, medicines, and vaccines. Use of child labor/family labor is a risk since it is common in rural Sindh to involve children in livestock and aquaculture management. The Project will ensure that the mitigation measures within the Labor Management Procedures (LMP), Occupational Health and Safety, and Community Health and Safety ensure that direct or indirect employment of children (age defined as per ESS2 and by Sindh labor laws) is prohibited. The risk of elite capture – defined as the deliberate attempt by culturally powerful groups to exclude vulnerable groups, especially women and other historically marginalized groups, from the intended Project benefits and schemes – is relevant for Components 1 and 2. The risks of elite capture can be compounded by the actions of large or influential farmers and biases in preliminary surveys used to identify target villages, PG members, buyers, and market enablers. No private land acquisition is anticipated in the Project, as all investments will be done on public lands. In case of farmers, voluntary land donation will be available as an option and the good practice

principles of voluntary land donations will be followed. Hence no involuntary land acquisition nor resettlement are expected.

57. **To mitigate E&S risks, the Recipient has prepared and disclosed the E&S Commitment Plan (ESCP) and the Stakeholder Engagement Plan (SEP).**[23] The Recipient also prepared the E&S Management Framework (ESMF) and the Labor Management Procedures (LMP) that will be finalized and disclosed upon Project effectiveness. The L&FD has prior experience on a World Bank-funded project (SAGP) closed in June 2019. The project was under safeguards policies with category B and received a satisfactory rating upon completion. However, the L&FD does not have dedicated staff or resources to manage the E&S risks associated with the Project. The Project implementation mechanism will comprise a PCU and a PIU. The PIU will be headed by a PD, and two Deputy PDs Administrative will be responsible for compliance with E&S requirements. As per the ESCP, a Senior Safeguards Specialist and a Gender Specialist will be engaged at the PIU to lead and coordinate E&S aspects of the Project, while each of the Deputy PDs Administrative (Livestock and Aquaculture) will manage an Environment Specialist and a Social Specialist.

58. **Gender.** In Sindh, approximately 31 percent of women depend on livestock as a source of livelihood, usually through livestock management of small dairy farms (three to five animals). Meanwhile, women's role in fisheries and aquaculture is often greatest in the post-harvest stages, such as cleaning, processing, and distribution of the catch. Despite their major and growing role in both sectors social norms, lack of access to information and credit, low literacy, male-dominated dairy cooperatives and MCCs,[24] household and childcare duties, and restricted mobility affect women's participation, lead to their lower productivity, and to the large income gap with men. The low participation of women in farming-related decision-making processes further constrains their access to innovations, extension services, entrepreneurship training, and technologies.

59. **Formal PGs led by women in Sindh are very rare due to cultural and other barriers, and data collection needs to be systematized.** Social factors have also led to women's limited access to natural as well as financial resources. In 2018, 77 percent of agrarian women were not aware of micro-credit organizations and institutions. Most of the loans provided to women are used by male heads of households, making it difficult for women to enter agribusiness activities and to connect with formal VCs. Data obtained from the L&FD indicates that women-led PG formation in livestock farming is constrained by several factors. Cultural barriers prevent women from playing a lead role in business. SAGP was not able to operationalize two women-led MPGs due to cultural hindrances, and both were turned into men-led MPGs. However, female interest was evident, with 30 percent of the members of the 153 MPGs supported by the project being women and with some women active in decision-making. When it comes to participating in agricultural VCs, female-led PGs encounter greater obstacles compared to their male-led counterparts. Some primary challenges revolved around limited access to credit, financial resources, information, and markets, as well as the fact that female-led or female-member groups lacked formal organizational structures. Specifically, the following tend to inhibit formation of these groups: (i) female-led PGs tend to be smaller—fewer than 10 members—compared to male-led PGs, which tend to be around 30 to 35 members; (ii) they typically cannot secure a formal commercial agreement with a buyer, and often do not receive adequate prices; (iii) women's activities are typically focused around their house, e.g., backyard poultry rearing or backyard fish farming; and (iv) female-led PGs have more limited access

[23] The SEP and ESCP were disclosed on the L&FD website by the GoS on March 22, 2024 (see https://livestock.sindh.gov.pk/sindh-livestock-project) and on the World Bank website on March 31, 2024 (see https://documentsinternal.worldbank.org/search/34293019; and https://documentsinternal.worldbank.org/search/34293018).
[24] GoS. 2018. *Sindh Agriculture Policy (2018-2030)*.

to financing. These factors limit their potential to grow and increase their incomes in livestock and aquaculture.

60. **To address the above gender gaps, the Project will support a dedicated application window for female-headed PGs** under Component 2 to enable their access to: (i) tailored support from women LSPs for registering as formal PGs with as few as five members; and (ii) technical and financial support for the implementation of their BPs under conditions designed to help address the specific market failures faced by women in the livestock and aquaculture sectors. Given that backyard poultry rearing and backyard fish farming are typically managed by women, the Project will support female-headed PGs to present BPs for such activities, even though they are outside of the Project's target sub-sectors. The Project will also provide preferential conditions for female-led PGs by lowering the expected levels of financial matching (i.e., 10 percent versus 25 percent for other groups), and by lifting the requirement of identifying a formal commercial agreement with a buyer. The Project will track the number of PA BPs approved and funded for female-led PGs to monitor the narrowing of gender gaps.

61. **Citizen engagement and beneficiary feedback.** Multiple Project benefits have been designed in a way that gives the Project inherent opportunity to engage with the citizens at large and seek feedback from beneficiaries on their satisfaction levels to the Project interventions. For instance, the delivery of support through PGs will require the PIU to engage at the village level. Beneficiary feedback surveys and citizen score cards will be used to assess the quality of the service delivery. An intermediate result indicator has been added to the RF on the same under Component 3.

V. GRIEVANCE REDRESS SERVICES

62. **Grievance Redress.** Communities and individuals who believe that they are adversely affected by a project supported by the World Bank may submit complaints to existing project-level grievance mechanisms or the Bank's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the Bank's independent Accountability Mechanism (AM). The AM houses the Inspection Panel, which determines whether harm occurred, or could occur, as a result of Bank non-compliance with its policies and procedures, and the Dispute Resolution Service, which provides communities and borrowers with the opportunity to address complaints through dispute resolution. Complaints may be submitted to the AM at any time after concerns have been brought directly to the attention of Bank Management and after Management has been given an opportunity to respond. For information on how to submit complaints to the Bank's GRS, visit http://www.worldbank.org/GRS. For information on how to submit complaints to the Bank's AM, visit https://accountability.worldbank.org.

VI. KEY RISKS

63. **The overall risk of the Project is rated Substantial.** The main risks and mitigation measures are described below.

64. **Political and Governance risk is Substantial.** The GoS has demonstrated a strong commitment to the Project sustained across election cycles. The Project requires coordination among different government and non-government entities. The Project aims to partially mitigate these risks through the PSC, which will be established under the leadership of the P&D and will be comprised of all key stakeholders involved in the Project, such as the Ministry of Economic Affairs, Planning Commission, L&FD, the Agriculture Department, the Sindh Forest Department, the SFA, private sector representatives, local

authorities, producer organizations, and major non-governmental organizations operating in the livestock and aquaculture sectors.

65. **Macroeconomic risk is High.** While Pakistan's economy has stabilized over the past 12 months due to new external inflows and improvements in macroeconomic management, debt and external financing needs remain elevated, and risks remain very high. Significant risks include international price or interest rate shocks; natural disasters that may impact domestic production, revenue collection, or expenditure needs; reversal of recent reforms to constrain expenditures or to ensure exchange rate flexibility; and lack of progress in further structural reforms in the fiscal, state-owned enterprise and energy areas. Realization of risks may lead to macroeconomic instability, with major impacts on economic activities, prices, and household incomes, thereby impeding achievement of project results. Risks will be partially mitigated by ongoing World Bank and other partners' support to structural policy reforms in the fiscal, energy, and state-owned enterprise reform sectors. Mitigation measures also include the financing provided by the Project through the IPF instrument and the monitoring by the PSC that resources will remain available during the implementation of the Project.

66. **Institutional Capacity for Implementation and Sustainability risk is Substantial.** The scale of the Project, spanning most of Sindh and dealing with a million farm families, raises the risk of overwhelming the technical and management capacity of the GoS to carry out the Project. While the implementing agency, the L&FD, has experience from SAGP, LIVAQUA introduces new elements, such as a focus on aquaculture and the PA approach, for which additional capacity and experience need to be built. The L&FD currently does not have an agribusiness/marketing Directorate but is planning to consider it while building on the experience of implementing LIVAQUA's Component 2. LIVAQUA will also support public infrastructure in the livestock and aquaculture sectors and there is a risk of failing to properly ensure operations and maintenance for such infrastructure. The Project will mitigate these risks by strengthening institutional capacities, with a focus on aquaculture, agribusiness, and marketing, and on developing robust operations and maintenance plans for the provided infrastructure. Further, by strengthening private sector involvement in service provision, the Project supports the GoS in reallocating budget to ensure sustainability of public institutions. Due to heightened security challenges in the northern part of Sindh, which may have an impact on Project activities in that area, the Project will implement security risk monitoring practices, as well as other security risk management measures for the implementation, monitoring, and supervision of Project activities in that part of the province.

67. **Fiduciary risk is Substantial.** The risk is due to a need to strengthen internal controls. FM risks relate more specifically to: (i) untimely funds flow; (ii) inadequate asset management; (iii) protection of resources from fraud and corruption; and (iv) timely and reliable financial reporting. A detailed action plan on procurement and FM will contribute to strengthening internal controls, notably by: (i) applying government accounting rules and procedures; and (ii) using an internal audit firm to conduct periodic internal audits coupled with the annual audit conducted by the Office of the AGP. Both will serve as a strong control tool. Additionally, capacity issues exist at the government and department levels, which explains why the FM risk is kept at Substantial. This risk is expected to reduce to Moderate if prescribed mitigating measures function properly. The Project will have a dedicated FM staff hired to support the proposed mitigation measures detailed in Annex 1.

68. **Environment and Social risk is Substantial.** Environmental risks include soil erosion, reduced fertile land, use of agrochemicals, livestock waste, the introduction of invasive species, and the improper handling, storage, and disposal of materials, all of which have the potential to degrade the environment and impact ecosystems. Social risks include the use of child labor (in the form of family labor associated in livestock and aquaculture management at the household level), the exclusion of vulnerable groups, and

the potential for elite capture. All these risks will be mitigated using instruments such as the ESMF, Community Health and Safety, LMP, and other instruments as enshrined in the ESCP. Each of the documents follows World Bank guidance on concrete measures to manage risks at the design, construction, and operations stages.

69. **Other: Climate and Disaster risk is Substantial.** A Climate and Disaster Risk Screening was conducted for the Project and shows a substantial risk of climate change, as evidenced by recent floods in Sindh in September 2022. The annual cost of natural resource losses and disasters in the province equals 4–6 percent of estimated provincial GDP. The Project will contribute to mitigating these negative impacts and risks by introducing CSPs in livestock and aquaculture production and by improving sectoral data collection and introducing animal health interventions, which will allow to better prepare, manage, and respond to climate risks. Proposed interventions to improve livestock health, productivity, farmers' access to knowledge, inputs, services, and markets, which will increase SMPs' incomes, or interventions to improve rangeland management are expected to increase the resilience of livestock production systems, rangeland ecosystems, and farmers' livelihoods and allow farmers to recover more quickly after extreme events.

VII. RF AND MONITORING

PDO Indicators by PDO Outcomes

Baseline	Period 1	Period 2	Period 3	Period 4	Period 5	Closing Period
Climate-smart						
Direct beneficiaries adopting two or more CSPs promoted by the Project (Percentage)						
Jun/2024	Jun/2025	Jun/2026	Jun/2027	Jun/2028	Jun/2029	Dec/2029
0%	0%	35%	45%	50%	60%	60%
➢Of which female direct beneficiaries (Percentage)						
0%	0%	33%	33%	33%	33%	33%
SMPs reaching the expected productivity increase per selected commodity (Percentage)						
Jun/2024	Jun/2025	Jun/2026	Jun/2027	Jun/2028	Jun/2029	Dec/2029
0%	0%	50%	55%	60%	70%	80%
➢Of which female SMPs (Percentage)						
0%	0%	10%	10%	10%	10%	10%
GHG emissions neutrality, including methane emissions from livestock and aquaculture SMPs supported by the Project (Yes/No)						
Jun/2024	Jun/2025	Jun/2026	Jun/2027	Jun/2028	Jun/2029	Dec/2029
No	Yes	Yes	Yes	Yes	Yes	Yes
Competitive						
SMPs with increased marketed value of at least 30 percent through PAs (Percentage)						
Jun/2024	Jun/2025	Jun/2026	Jun/2027	Jun/2028	Jun/2029	Dec/2029
0%	0%	50%	55%	60%	70%	80%
➢Of which female SMPs (Percentage)						
0%	0%	10%	10%	10%	10%	10%
Other						
People with strengthened food and nutrition security (Number of people) CRI						
Jun/2024	Jun/2025	Jun/2026	Jun/2027	Jun/2028	Jun/2029	Dec/2029
0	135,000	270,000	405,000	570,000	825,000	940,000
➢People with strengthened food and nutrition security – Youth (Number of people) CRI						
Jun/2024	Jun/2025	Jun/2026	Jun/2027	Jun/2028	Jun/2029	Dec/2029

0	6,750	13,500	20,250	28,500	41,250	47,000
➢People with strengthened food and nutrition security – Female (Number of people) [CRI]						
Jun/2024	Jun/2025	Jun/2026	Jun/2027	Jun/2028	Jun/2029	Dec/2029
0	44,050	89,100	133,650	188,100	272,250	310,200

Intermediate Indicators by Components

Baseline	Period 1	Period 2	Period 3	Period 4	Period 5	Closing Period
Component 1. Strengthening the Enabling Environment for Sectoral Growth						
Livestock and aquaculture strategies developed and endorsed (Number)						
Jun/2024	Jun/2025	Jun/2026	Jun/2027	Jun/2028	Jun/2029	Dec/2029
0	0	0	2	3	7	7
Contingency plans developed and approved (Number)						
Jun/2024	Jun/2025	Jun/2026	Jun/2027	Jun/2028	Jun/2029	Dec/2029
0	0	2	6	6	6	6
Livestock and aquaculture MIS developed and functional (Number)						
Jun/2024	Jun/2025	Jun/2026	Jun/2027	Jun/2028	Jun/2029	Dec/2029
0	0	0	2	4	4	4
Farmers reached with livestock and aquaculture assets or services (Number)						
Jun/2024	Jun/2025	Jun/2026	Jun/2027	Jun/2028	Jun/2029	Dec/2029
0	135,000	270,000	405,000	570,000	825,000	940,000
➢of which female farmers (Number)						
Jun/2024	Jun/2025	Jun/2026	Jun/2027	Jun/2028	Jun/2029	Dec/2029
0	44,550	89,100	133,650	188,100	272,250	310,200
➢Farmers reached with animal health and extension services, including vaccination (Number)						
0	135,000	270,000	405,000	570,000	825,000	940,000
➢Farmers reached with breeding services (Number)						
0	8,400	16,800	25,200	33,600	42,000	50,400
➢Farmers reached with livestock and aquaculture trainings (Number)						
0	5,050	10,100	15,150	20,200	25,250	25,250
Vaccination coverage rate for key animal diseases - PPR (Percentage)						
Jun/2024	Jun/2025	Jun/2026	Jun/2027	Jun/2028	Jun/2029	Dec/2029
5%	80%	80%	80%	80%	80%	80%
Vaccination coverage rate for key animal diseases - LSD (Percentage)						

Jun/2024	Jun/2025	Jun/2026	Jun/2027	Jun/2028	Jun/2029	Dec/2029
0%	30%	60%	60%	60%	60%	60%
Average increased productivity (milk, meat and fish) by SMPs receiving only animal health and extension services (Percentage)						
Jun/2024	Jun/2025	Jun/2026	Jun/2027	Jun/2028	Jun/2029	Dec/2029
0%	0%	4%	6%	8%	10%	10%
Average reduction of GHG emissions (CO2-eq) intensity per kg of protein by SMPs receiving only animal health and extension services (Percentage)						
Jun/2024	Jun/2025	Jun/2026	Jun/2027	Jun/2028	Jun/2029	Dec/2029
0%	0%	3%	5%	6%	8%	8%
Component 2. Promotion of Climate-Smart Production, Value Addition, and Inclusive Access to Markets						
SMPs in PGs registered by L&FD - Livestock (Number)						
Jun/2024	Jun/2025	Jun/2026	Jun/2027	Jun/2028	Jun/2029	Dec/2029
0	2,000	8,000	12,000	16,000	18,500	18,500
➢of which female SMPs (Number)						
0	200	800	1,200	1,600	1,850	1,850
SMPs in PGs registered by L&FD - Aquaculture (Number)						
Jun/2024	Jun/2025	Jun/2026	Jun/2027	Jun/2028	Jun/2029	Dec/2029
0	100	500	900	1,100	1,330	1,330
➢of which female SMPs (Number)						
0	5	25	45	55	65	65
PA BPs approved and funded (Number)						
Jun/2024	Jun/2025	Jun/2026	Jun/2027	Jun/2028	Jun/2029	Dec/2029
0	0	100	300	550	600	650
➢of which PA BPs approved and funded for female-headed PGs (Number)						
0	0	11	32	60	65	70
Average increased productivity for dairy cattle by SMPs receiving animal health, breeding, extension, training services, and support for value addition and marketing (Percentage)						
Jun/2024	Jun/2025	Jun/2026	Jun/2027	Jun/2028	Jun/2029	Dec/2029
0%	0%	5%	10%	20%	30%	30%
Average increased productivity for cattle and small ruminants for meat by SMPs receiving animal health, breeding, extension, training services, and support for value addition and marketing (Percentage)						
Jun/2024	Jun/2025	Jun/2026	Jun/2027	Jun/2028	Jun/2029	Dec/2029
0%	0%	3%	6%	12%	15%	15%
Average increased productivity for aquaculture ponds by SMPs receiving animal health, breeding, extension, training services, and support for value addition and marketing (Percentage)						
Jun/2024	Jun/2025	Jun/2026	Jun/2027	Jun/2028	Jun/2029	Dec/2029
0%	0%	3%	6%	12%	15%	15%

Average reduction of GHG emissions (CO2-eq) intensity per kg of protein by SMPs receiving animal health, breeding, extension, training services, and support for value addition and marketing (Percentage)						
Jun/2024	Jun/2025	Jun/2026	Jun/2027	Jun/2028	Jun/2029	Dec/2029
0%	0%	3%	6%	9%	12%	15%
Component 3. Project Management, Monitoring, and Learning						
Grievances addressed within the stipulated time (Percentage)						
Jun/2024	Jun/2025	Jun/2026	Jun/2027	Jun/2028	Jun/2029	Dec/2029
0%	70%	75%	80%	90%	90%	90%
Project beneficiaries satisfied with the Project (Percentage)						
Jun/2024	Jun/2025	Jun/2026	Jun/2027	Jun/2028	Jun/2029	May/2030
0%	0%	80%	80%	80%	80%	80%
Component 4: Contingent Emergency Response						

Monitoring & Evaluation Plan: PDO Indicators by PDO Outcomes

CLIMATE-SMART	
Direct beneficiaries adopting two or more CSPs promoted by the Project	
Description	Percentage of the Project's direct beneficiaries that have adopted two or more of the CSPs promoted by the Project, including at least one CSP classified as highly impactful on the resilience of production systems. A list of the CSPs promoted by the Project is included in the Detailed Project Description Technical Note. Adoption refers to a change in use or in practice after the first year of Project support.
Frequency	Annual.
Data source	Project M&E System, mid-term evaluation and annual outcome surveys.
Methodology for Data Collection	The adoption of CSPs for all Project beneficiaries will be monitored annually in the Project M&E System starting from Year 2. The effectiveness of adoption will be verified and confirmed through a mid-term evaluation survey conducted in Year 3 and annual outcome surveys conducted on a sample of Project beneficiaries starting from Year 4. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU.
Of which female direct beneficiaries	
Description	Percentage of female direct beneficiaries among the Project's total number of direct beneficiaries that have adopted two or more of the CSPs promoted by the Project.
Frequency	Annual.
Data source	Project M&E System, mid-term evaluation and annual outcome surveys.
Methodology for Data Collection	The adoption of CSPs for all female Project beneficiaries will be monitored annually in the Project M&E System starting from Year 2. The effectiveness of adoption will be verified and confirmed through a mid-term evaluation survey conducted in Year 3 and annual outcome surveys conducted on a sample of Project beneficiaries starting from Year 4. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU.
SMPs reaching the expected productivity increase per selected commodity	
Description	Percentage of SMPs that have registered the expected increase in animal/production unit productivity resulting from the Project's support. It focuses on the SMPs that have received animal health, breeding, extension, training services, and support for value addition and marketing. Expected productivity increase levels per year for this sub-group are detailed in the intermediate result indicator on "Average increased productivity (milk, meat, and fish) by SMPs receiving animal health, breeding, extension, training services, and support for value addition and marketing".
Frequency	Annual.
Data source	Project M&E System, mid-term evaluation and annual outcome surveys.
Methodology for Data Collection	The percentage of SMPs reaching the expected productivity increase per selected commodity (dairy cattle systems, beef cattle systems, small ruminant meat systems, fish farming ponds) will be monitored in the Project M&E System starting from Year 2. The achievement of expected productivity increases will be verified and confirmed through a mid-term evaluation survey conducted in Year 3 and annual outcome surveys conducted on a sample of SMPs starting from Year 4. Targets are cumulative.

Responsibility for Data Collection	PCU, PIU.
Of which female SMPs	
Description	Percentage of female SMPs among the SMPs that have achieved the expected increase in animal/farm productivity.
Frequency	Annual.
Data source	Project M&E System, mid-term evaluation and annual outcome surveys.
Methodology for Data Collection	The percentage of female SMPs reaching the expected productivity increase per selected commodity (dairy cattle systems, beef cattle systems, small ruminant meat systems, fish farming ponds) will be monitored in the Project M&E System starting from Year 2. The achievement of expected productivity increases will be verified and confirmed through a mid-term evaluation survey conducted in Year 3 and annual outcome surveys conducted on a sample of SMPs starting from Year 4. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU.
GHG emissions neutrality, including methane emissions from livestock and aquaculture SMPs supported by the Project	
Description	This indicator reflects the climate impact (i.e., net GHG emissions of agricultural commodity production) and monitors whether the net zero increase in GHG emissions (carbon dioxide equivalent), including methane emissions has been effective through the Project's lifetime.
Frequency	Annual.
Data source	Annual assessment using GLEAM-i, EX-ACT, and other relevant tools.
Methodology for Data Collection	GHG emissions are converted to carbon dioxide equivalent using standard global warming potential values. Quantification can be performed using Intergovernmental Panel on Climate Change (IPCC) 2006 Guidelines calculators (e.g., GLEAM-i, Cool Farm Tool). The team may consider using certified methodologies such as the Gold Standard Small Holder Dairy Methodology to generate tradeable GHG mitigation outcomes, the LEAP 2018 guidelines for assessing environmental performance in small and large ruminant supply chains, GLEAM-i, EX-ACT, and other relevant tools. "Yes" will reflect the effectiveness of net zero increase in GHG emissions. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU.
COMPETITIVE	
SMPs with increased marketed value of at least 30 percent through PAs	
Description	Percentage of SMPs with a PA BP approved and receiving funding from the Project that report an increase in the value of products sold through PAs of at least 30 percent.
Frequency	Annual.
Data source	Project M&E System, mid-term evaluation and annual outcome surveys.
Methodology for Data Collection	The Project beneficiaries with an increase in the value of products sold through PAs will be monitored annually in the Project M&E System starting from Year 2. The effectiveness of increase will be verified and confirmed through a mid-term evaluation survey in Year 3 and annual outcome surveys starting from Year 4. It will be conducted on a sample of SMPs that have received Project support through PAs. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU.
Of which female SMPs	

Description	Percentage of female SMPs among the SMPs reporting an increase in the value of products sold through PAs of at least 30 percent.
Frequency	Annual.
Data source	Project M&E System, mid-term evaluation and annual outcome surveys.
Methodology for Data Collection	The female Project beneficiaries reporting an increase in the value of products sold through PAs will be monitored annually in the Project M&E System starting from Year 2. The effectiveness of increase will be verified and confirmed through a mid-term evaluation survey in Year 3 and annual outcome surveys starting from Year 4. It will be conducted on a sample of SMPs that have received Project support through PAs. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU.
OTHER	
People with strengthened food and nutrition security (Number of People)	
Description	Direct Project beneficiaries whose food and nutrition security has been strengthened as a result of Project interventions.
Frequency	Quarterly.
Data source	Project M&E System /Progress report.
Methodology for Data Collection	Monitored through the progress reports of various implementing entities. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU.
People with strengthened food and nutrition security – Youth (Number of People)	
Description	Direct youth Project beneficiaries whose food and nutrition security has been strengthened as a result of Project interventions.
Frequency	Quarterly.
Data source	Project M&E System /Progress report.
Methodology for Data Collection	Monitored through the progress reports of various implementing entities. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU.
People with strengthened food and nutrition security – Female (Number of People)	
Description	Direct female Project beneficiaries whose food and nutrition security has been strengthened as a result of Project interventions.
Frequency	Quarterly.
Data source	Project M&E System/Progress reports.
Methodology for Data Collection	Monitored through the progress reports of various implementing entities. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU.

Monitoring & Evaluation Plan: Intermediate Results Indicators by Components

COMPONENT 1. STRENGTHENING THE ENABLING ENVIRONMENT FOR SECTORAL GROWTH	
Livestock and aquaculture strategies developed and endorsed	
Description	Specific policy and strategic frameworks developed and endorsed with the support of the Project to ensure proper planning and adequate budgeting of livestock and aquaculture interventions in alignment with international standards. This includes: (i) the Sindh Livestock Policy Action Plan; (ii) the Sindh livestock breeding strategy; (iii) the Animal health strategy and legislation; (iv) the Disease control plans; (v) the Strategy to green the Sindh livestock sector; (vi) the Sindh aquaculture strategy and legislation; and (vii) the Aquatic animal health plan, strategy, and legislation.
Frequency	Biannual.
Data source	Progress reports. Project M&E System.
Methodology for Data Collection	Monitored through L&FD progress reports. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU, L&FD.
Contingency plans developed and approved	
Description	Contingency plans against priority diseases and for climatic emergencies that have been developed and approved. This includes four plans for livestock diseases (avian influenza, FMD, PPR, LSD), one plan for aquaculture, and one plan for climate emergencies.
Frequency	Biannual.
Data source	Progress reports. Project M&E System.
Methodology for Data Collection	Monitored through L&FD progress reports. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU, L&FD.
Livestock and aquaculture MIS developed and functional	
Description	MIS modules (sectoral dashboards and reporting systems) developed to have accurate, up-to-date and comprehensive data to enable informed policy making, planning, and targeting in the livestock and aquaculture sectors. MIS modules developed are considered functional when they enable information to be collected and shared with users in accordance with what has been defined in the feasibility study/action plan. Two MIS modules related respectively to production and diseases will be developed and operationalized for each of the two sectors (livestock and aquaculture).
Frequency	Biannual.
Data source	Progress reports. Project M&E System.
Methodology for Data Collection	Monitored through L&FD progress reports. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU, L&FD.
Farmers reached with livestock and aquaculture assets or services	
Description	Farmers provided with new/improved livestock, aquaculture assets, or services as a result of Project support. Assets include property, biological assets, and farm and processing equipment. Biological assets may include live animals and genetic material of livestock, crops, trees, and shrubs. Services include research, extension, training, education, information and communication technologies, inputs (e.g., feed, fertilizers, pesticides, labor), production-related services (e.g., soil testing, animal health/veterinary services, AI), phyto-sanitary and food safety services, agricultural marketing support services (e.g., price monitoring, export promotion), access to farm and post-harvest machinery and storage

	facilities, employment, irrigation and drainage, and finance. Farmers are people engaged in agricultural activities or members of an agriculture-related business (disaggregated by men and women) targeted by the Project.
Frequency	Quarterly.
Data source	Progress reports. Project M&E System.
Methodology for Data Collection	Monitored through the progress reports of various implementing entities. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU.
Of which female farmers	
Description	Female farmers provided with new/improved livestock or aquaculture assets or services as a result of Project support.
Frequency	Quarterly.
Data source	Progress reports. Project M&E System.
Methodology for Data Collection	Monitored through the progress reports of implementing entities. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU.
Farmers reached with animal health and extension services, including vaccination	
Description	Farmers provided with animal health services including vaccination, clinical care, control of parasites, routine animal health checkup, laboratory analysis, and extension services.
Frequency	Quarterly.
Data source	Progress reports. Project M&E System.
Methodology for Data Collection	Monitored through the progress reports of implementing entities. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU.
Farmers reached with breeding services	
Description	Farmers provided with breeding services (AI, heat synchronization, provision of improved bulls, embryo transfer, pregnancy diagnosis).
Frequency	Quarterly.
Data source	Progress reports. Project M&E System.
Methodology for Data Collection	Monitored through the progress reports of implementing entities. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU.
Farmers reached with livestock and aquaculture trainings	
Description	Farmers provided with trainings. For livestock, trainings include Farmer Field Schools. For aquaculture, farmers will be reached through a mass training program (i.e., conventional training in government stations).
Frequency	Quarterly.
Data source	Progress reports. Project M&E System.
Methodology for Data Collection	Monitored through the progress reports of implementing entities. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU.
Vaccination coverage rate for key animal diseases – PPR	
Description	Vaccination coverage of small ruminants against PPR calculated by reporting the number of vaccinated animals versus the total animal population estimated on the basis of the most

	recent available figures recorded in the updated National Strategic Plans or the results of the forthcoming livestock census as soon as they are available. As recommended by the World Animal Health Organization/FAO Global PPR eradication programme, the vaccination protocol will be based on two successive years followed by the vaccination of young animals (of four months to one year in age) during one or two successive years.
Frequency	Annual.
Data source	Vaccination campaign plans, vaccination campaign reports. Project M&E System.
Methodology for Data Collection	Vaccination coverage is determined at the end of each campaign / year, based on field reports. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU, L&FD.
Vaccination coverage rate for key animal diseases – LSD	
Description	Vaccination coverage of cattle against LSD calculated by reporting the number of vaccinated animals versus the total animal population estimated on the basis of the most recent available figures recorded in the updated National Strategic Plans or the results of the forthcoming livestock census as soon as they are available. Percentage of animals vaccinated over total number of animals.
Frequency	Annual.
Data source	Vaccination campaign plan. Vaccination campaign reports. Project M&E System.
Methodology for Data Collection	Vaccination coverage is determined at the end of each campaign / year, based on field reports. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU, L&FD.
Average increased productivity (milk, meat, and fish) by SMPs receiving only animal health and extension services	
Description	Average increase in the efficiency of production of the various commodities. It assesses, on the sub-group of beneficiaries receiving health and extension services, how the average quantity of output per animal/production unit has increased for the year in question compared with the baseline.
Frequency	Annual.
Data source	Progress reports. Project M&E System. Annual outcome survey.
Methodology for Data Collection	This indicator will be monitored for each commodity (milk, meat, and fish) on the sub-group of beneficiaries receiving health and extension services, through the progress reports of implementing entities and registered in the Project's M&E system. The productivity increase will be verified and confirmed through annual outcome surveys conducted on a sample of Project beneficiaries starting from Year 3. Average productivity increases will be calculated by aggregating productivity increases for each commodity, using the respective protein content of each commodity. The average production increase will thus be expressed in percentage of increase of protein output per animal or production unit. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU, L&FD.
Average reduction of GHG emissions (CO2-eq) intensity per kg of protein by SMPs receiving only animal health and extension services	
Description	This indicator reflects the climate impact (i.e., net GHG emissions of agricultural commodity production) and monitors the average reduction of GHG emissions (carbon dioxide equivalent) intensity per kg of protein registered on the sub-group of SMPs receiving only animal health and extension services.
Frequency	Annual.

Data source	Annual assessment using GLEAM-i, EX-ACT, and other relevant tools.
Methodology for Data Collection	GHG emissions are converted to carbon dioxide equivalent using standard global warming potential values. Quantification can be performed using IPCC 2006 Guidelines calculators (e.g., GLEAM-i, Cool Farm Tool). The team may consider using certified methodologies such as the Gold Standard Small Holder Dairy Methodology to generate tradeable GHG mitigation outcomes, the LEAP 2018 guidelines for assessing environmental performance in small and large ruminant supply chains, GLEAM-i, EX-ACT, and other relevant tools. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU.
COMPONENT 2. PROMOTION OF CLIMATE-SMART PRODUCTION, VALUE ADDITION, AND INCLUSIVE ACCESS TO MARKETS	
SMPs in PGs registered by L&FD – Livestock	
Description	SMPs in PGs in the livestock sector that have been registered as per the procedures defined by the L&FD.
Frequency	Quarterly.
Data source	L&FD database/progress reports. Project M&E System.
Methodology for Data Collection	Quarterly monitoring based on the L&FD database and progress reports. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU, L&FD.
Of which female SMPs	
Description	Female SMPs in PGs registered in the livestock sector.
Frequency	Quarterly.
Data source	L&FD database/progress reports. Project M&E System.
Methodology for Data Collection	Quarterly monitoring based on the L&FD database and progress. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU, L&FD.
SMPs in PGs registered by L&FD – Aquaculture	
Description	SMPs in PGs in the aquaculture sector that have been registered as per the procedures defined by the L&FD.
Frequency	Quarterly.
Data source	L&FD database/progress reports. Project M&E System.
Methodology for Data Collection	Quarterly monitoring based on the L&FD database and progress reports. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU, L&FD.
Of which female SMPs	
Description	Female SMPs in PGs registered in the aquaculture sector.
Frequency	Quarterly.
Data source	L&FD database/progress reports. Project M&E System.
Methodology for Data Collection	Quarterly monitoring based on the L&FD database and progress reports. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU, L&FD
PA BPs approved and funded	
Description	BPs submitted by PGs as part of the PA agreement that have been assessed, approved, and have received financial support from the Project.

Frequency	Quarterly.
Data source	Reports of BPs evaluation sessions. Project M&E System.
Methodology for Data Collection	Monitored based on the reports of BPs evaluation sessions. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU, entity in charge of BPs evaluation.
Of which PA BPs approved and funded for female-headed PGs	
Description	BPs submitted by women-led PGs as part of the PA agreement that have been assessed, approved, and have received financial support from the Project.
Frequency	Quarterly.
Data source	Reports of BPs evaluation sessions. Project M&E System.
Methodology for Data Collection	Monitored based on the reports of BPs evaluation sessions. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU.
Average increased productivity for dairy cattle by SMPs receiving animal health, breeding, extension, training services, and support for value addition and marketing	
Description	Average increase in the efficiency of milk production for dairy cattle systems. It assesses, for the sub-group of beneficiaries receiving the full package of services, how the average quantity of output per animal/production unit has increased for the year in question compared with the baseline.
Frequency	Annual.
Data source	Progress reports. Project M&E System. Annual outcome survey.
Methodology for Data Collection	This indicator will be monitored for dairy cattle for the sub-group of beneficiaries receiving the full package of services, through the progress reports of implementing entities and registered in the Project's M&E system. The productivity increases will be verified and confirmed through annual outcome surveys conducted on a sample of Project beneficiaries starting from Year 3. The average production increases will be expressed in percentage of increase of protein output per animal or production unit. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU.
Average increased productivity for cattle and small ruminants for meat by SMPs receiving animal health, breeding, extension, training services, and support for value addition and marketing	
Description	Average increase in the efficiency of meat production for beef cattle and small ruminants' systems. It assesses, for the sub-group of beneficiaries receiving the full package of services, how the average quantity of output per animal/production unit has increased for the year in question compared with the baseline.
Frequency	Annual.
Data source	Progress reports. Project M&E System. Annual outcome survey.
Methodology for Data Collection	This indicator will be monitored for small and large ruminants for the sub-group of beneficiaries receiving the full package of services, through the progress reports of implementing entities and registered in the Project's M&E system. The productivity increases will be verified and confirmed through annual outcome surveys conducted on a sample of Project beneficiaries starting from Year 3. The average production increases will be expressed in percentage of increase of protein output per animal or production unit. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU.
Average increased productivity for aquaculture ponds by SMPs receiving animal health, breeding, extension, training services, and support for value addition and marketing	

Description	Average increase in the efficiency of fish production for aquaculture ponds. It assesses, for the sub-group of beneficiaries receiving the full package of services, how the average quantity of output per animal/production unit has increased for the year in question compared with the baseline.
Frequency	Annual.
Data source	Progress reports. Project M&E System. Annual outcome survey.
Methodology for Data Collection	This indicator will be monitored for aquaculture ponds for the sub-group of beneficiaries receiving the full package of services, through the progress reports of implementing entities and registered in the Project's M&E system. The productivity increases will be verified and confirmed through annual outcome surveys conducted on a sample of Project beneficiaries starting from Year 3. The average production increases will be expressed in percentage of increase of protein output per animal or production unit. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU.
Average reduction of GHG emissions (CO2-eq) intensity per kg of protein by SMPs receiving animal health, breeding, extension, training services, and support for value addition and marketing (Percent)	
Description	This indicator reflects the climate impact (i.e., net GHG emissions of agricultural commodity production) and monitors the average reduction of GHG emissions (carbon dioxide equivalent) intensity per kg of protein registered on the sub-group of SMPs receiving the full package of services.
Frequency	Annual.
Data source	Annual assessment using GLEAM-i, EX-ACT, and other relevant tools.
Methodology for Data Collection	GHG emissions are converted to carbon dioxide equivalent using standard global warming potential values. Quantification can be performed using IPCC 2006 Guidelines calculators (e.g., GLEAM-i, Cool Farm Tool). The team may consider using certified methodologies such as the Gold Standard Small Holder Dairy Methodology to generate tradeable GHG mitigation outcomes, the LEAP 2018 guidelines for assessing environmental performance in small and large ruminant supply chains, and other relevant tools. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU.
COMPONENT 3. PROJECT MANAGEMENT, MONITORING, AND LEARNING	
Grievances addressed within the stipulated time	
Description	This indicator monitors the compliance of PCU in addressing the grievances related to the Project in a timely manner and in accordance with defined procedures.
Frequency	Bi-annual.
Data source	Project M&E System.
Methodology for Data Collection	Progress reports will include data related to the GRM. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU.
Project beneficiaries satisfied with the Project	
Description	Percentage of Project beneficiaries reporting satisfaction with the support received from the Project.
Frequency	Annual.
Data source	Annual satisfaction survey.
Methodology for Data Collection	Annual satisfaction survey conducted on a sample of Project beneficiaries. Targets are cumulative.
Responsibility for Data Collection	PCU, PIU.

ANNEX 1: Implementation Arrangements and Support Plan

COUNTRY: Islamic Republic of Pakistan
Sindh Livestock and Aquaculture Sectors Transformation Project

Implementation Arrangements

1. **Overall responsibility for Project coordination, implementation, and management of E&S risks, will be under the L&FD of the GoS who will establish a PCU with a PC to oversee the execution of all project activities.** Project implementation will take place over six years in the province of Sindh.

2. **The governance structure will include a PSC and a PTC** (Figure A1.1). The PSC will provide strategic guidance for Project implementation and approve AWPBs and LIVAQUA progress reports. It will meet at least once a year under the chairmanship of the Chairman P&D and will include representatives of P&D, the Ministry of Economic Affairs, Planning Commission, L&FD, the Agriculture Department, the Sindh Forest Department, the SFA, private sector representatives, local authorities, producer organizations, and major non-governmental organizations operating in the livestock and aquaculture sectors. The FAO and the World Bank may participate as observers.

3. **The PTC will be responsible for overseeing and monitoring Project implementation.** It will meet at least once per semester under the chairmanship of the Secretary of L&FD and will provide technical advice to the PCU and the PIU on the quality of implementation. It will also review reports and studies, guidelines, documentation of best practices, and M&E reports. It will be chaired by the PC and comprise representatives of the PCU, PIU, L&FD's LDir and FDir, representatives of PGs in livestock and aquaculture (including inter-professional bodies), representatives of other livestock support projects, scientific research institutes, as well as contractual service providers.

4. **The Project implementation mechanism will comprise a PCU and a PIU.** In addition, it will involve Focal Points in the Environment Department and the Social Welfare Department to facilitate the implementation of the Project's technical activities, as well as ESMP requirements.

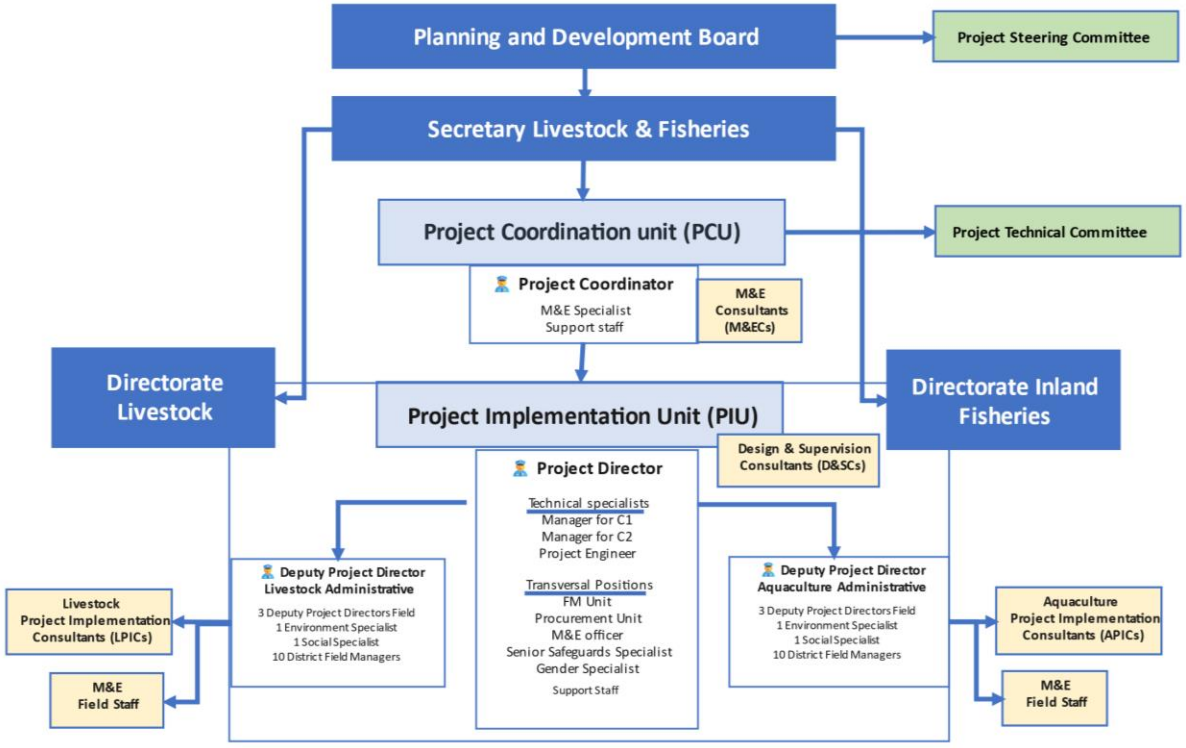
5. **The PCU will oversee all Project activities and will be responsible for planning, coordination, M&E, and reporting of project activities.** The PCU will have a PC nominated by L&FD and supported by M&E Consultants. They will supervise the work of the M&ECs. The PCU will report to the Secretary of L&FD and will be based in Karachi.

6. **The PIU will be responsible for the implementation of Project activities in support of the LDir and FDir.** The main function of the PIU will be to implement Project activities in accordance with the provisions of the Financing Agreement regarding the management and use of IDA resources. This will include procurement and FM compliance, and ESS compliance and support. The PIU will be responsible for authorizing and verifying all Project transactions. It will have a PD, two Deputy PDs Administrative (one for Livestock and one for Aquaculture) Managers for each Component 1 and 2, and a Project Engineer. The PD will report to the PC. The PIU will also have specialists in FM, Procurement, M&E, Safeguards, and Gender. The PIU will be based in Hyderabad and will work closely with the LDir and FDir.

7. **At the district level, the PIU District Field Managers will operate in the districts covered by the Project and be located with the L&FD's district offices.** The District Field Managers will be responsible for the planning, implementation, and monitoring of Project activities at the district level.

8. **District Coordination Committees (DCCs) will be constituted in each district to support the implementation of the Project and contribute to the assessment of field progress.** They will include the following members: (i) Deputy Commissioner concerned (chairman); (ii) Additional Deputy Commissioner concerned; (iii) Additional Director and Deputy Director Livestock; (iv) Representative of Revenue Department; and (v) District Field Manager of the Project. DCCs are expected to meet every six months to review the physical and financial progress of the Project, ensure effective Project implementation, oversee the proper flow of funds to Project beneficiaries, arrange transparent internal monitoring of Project activities, and make recommendations to the PTC for improving the pace of implementation.

Figure A1.1. Institutional Arrangements



9. **LIVAQUA will aim to coordinate and develop synergies with other operations** centered on the agriculture, livestock, and aquaculture sectors, in addition to access to finance in Sindh, including: (i) Government-funded livestock and aquaculture operations; (ii) World Bank-funded projects like SWAT (P167596) and the Sindh Flood Emergency Rehabilitation Project (P179981); and (iii) externally-funded projects like the USAID-funded Revival of livelihood, food security and nutrition of the flood-affected population in Sindh project and the European Union-funded Growth for Rural Advancement and Sustainable Program, among others.

10. **The Project will be supported by M&ECs, D&SCs, and PICs.** The M&ECs will assist in: (i) M&E of the Project's physical progress and its impacts, including collection of Project survey data to assess progress towards the indicators listed in the RF; and (ii) supervision of the implementation of ESMPs. The D&SCs will provide support for construction works, including preparation of design, rough estimates, tender documents, supervision of construction, and installation, quality assurance, quantity certification. The PICs will provide TA and international expertise to support the implementation of Component 2 activities. These consultants will be selected through international competitive procurement methods. The M&ECs will report to the PCU. The PICs and D&SCs will report to the PIU.

11. **M&E and reporting mechanisms.** With the support of M&ECs, the PCU will be responsible for submitting quarterly reports in an appropriate format to the GoS and the World Bank no later than 45 days after the end of each quarter. The consolidated report will cover the overall Project implementation status, outcomes, and detailed progress of all components, such as progress on physical constructions, progress on capacity building and training, progress and results of special studies, and other fiduciary and safeguard issues. The report will cover the implementation of ESMPs and the activities of the PICs, D&SCs and M&ECs. The reports will also cover financial and procurement information, including: (i) comparisons of actual physical and financial outputs with forecasts, and updated six-monthly Project forecasts; (ii) Project financial statements, including sources and application of funds, expenditures by category statement, and special accounts reconciliation statements; (iii) a procurement management report, showing status and contract commitments; (iv) progress in works completion, and the distribution of works among users compared with the targets; and (v) issues and alternative solutions, and so on.

12. **A baseline survey will be conducted at Project start-up to confirm the baseline and targets in the RF.** Annual outcome surveys and midline and endline surveys will also be needed to evaluate the Project's outcomes at mid-term and completion stage. The Project will carry out an impact evaluation to support the Project's completion and final review.

13. **The PCU will prepare annual reports no later than September 30 of each year of Project implementation.** The report will cover: (i) the progress of each component, implementation of key features of the ESMP, key performance indicators, operation of Project facilities, and financial statements; and (ii) the AWPB for implementation, annual funds required for implementation, an updated disbursement profile, planned actions for mitigating negative effects, and target indicators for the coming FY. A mid-term review of the Project will be undertaken in 2027. An Implementation Completion Report will be prepared by the World Bank no later than six months after the closing date.

Strategy and Approach for Implementation Support[25]

14. **Procurement activities will be carried out following the World Bank's Procurement Regulations for IPF Borrowers.** All the procurement activities under this Project will follow the World Bank Procurement Regulations for IPF Borrowers (Procurement in IPF, Goods, Works, Non-Consulting and Consulting Services – Fifth Edition, September 2023). All identified works activities fall within the national competitive bidding threshold of US$20 million. Most of the goods will also be procured nationally, while four to five large consultancies will be advertised internationally. The Project will be subject to the World Bank's Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants (revised as of July 1, 2016, Anti-Corruption Guidelines). All procurements will be undertaken by the PIU.

15. **A PPSD has been developed by the PIU.** The PD PIU will be responsible for procurement and contract signing with support from the PIU procurement staff and in coordination with the two deputy PDs. Under Subcomponent 2.2, procurement for the beneficiary PGs will be done under a tripartite agreement. This will be a demand-driven exercise and the type of equipment and number of contracts will be based on demand. The PIU will facilitate the identification of suppliers of the goods listed in the BPs, and tripartite agreements will be signed between the beneficiary PG, the PIU, and the supplier. A procurement plan has been prepared covering the first 18 months of Project implementation.

[25] This is an indicative and flexible instrument, which will be revised during implementation and adjusted based on what is happening on the ground. The implementation plan should be consistent with the design and riskiness of the operation and should be adequately resourced.

16. **The World Bank carried out a procurement risk assessment of the PIU.** The risks identified include timely staffing of the PIU, adequate planning and market approach, and contract management. The Procurement risk rating is Moderate, as the procurements are neither large nor complex.

17. **The World Bank will conduct annual (or ad hoc as needed) procurement post review in addition to prior review as required in the procurement plan and regular implementation support missions.** Procurement activities are also subject to auditing by an independent third party or supreme audit institutions if required.

18. **Supervision will review the Project's FM system, including but not limited to accounting, reporting, and internal controls.** Supervision will also cover sub-projects on a random sample basis. The World Bank will work with the PCU and the PIU to improve coordination among different departments and units for FM and reporting.

19. **The World Bank will supervise and provide guidance to the L&FD for the implementation of the agreed actions for E&S issues.**

20. **The World Bank will supervise the implementation of the agreed anti-corruption governance procurement and governance plan.**

Implementation Support Plan

21. **The World Bank will ensure timely, efficient, and effective implementation support to the PCU and PIU.** Timely monitoring and support to the L&FD will be mainly provided by team members in the country offices of the region, especially for the first 18 months of implementation. Formal supervision and field trips will be carried out semi-annually.

22. **Detailed inputs from the World Bank are outlined below:**

a. **Technical inputs:** The World Bank will contract individual consultants for skills and expertise on animal husbandry, aquaculture, PAs and market integration practices, and promotion of CSPs and technologies. Specialists with high-level procurement skills are required for review of the major goods and works contracts as well as the consulting services from PICs, D&SCs, and M&ECs. During construction and commissioning, technical supervision is required to ensure that contractual obligations are met on technical grounds.

b. **Fiduciary requirements and inputs:** Training will be provided by the World Bank's FM and Procurement Specialists based in the country office. The team will also help the L&FD identify capacity-building needs to strengthen its FM capacity and to improve procurement management efficiency. Formal supervision of FM will be carried out semi-annually, while procurement supervision will be carried out on a timely basis as required beside the mandatory annual procurement post review of the Project. Under Component 3, funds are available to the L&FD for recruitment of specialized skills as needed for fiduciary input and compliance.

c. **ESS:** This is a substantial risk project in terms of E&S. Training is required on environmental monitoring and reporting, and the implementing agencies' capacity will be enhanced. On the social side, implementation support will focus on Project activities targeted at small farmers as agreed under the implementation plan. Field visits are required on a biannual basis.

D. **Operations:** The Task Team Leader and co-Task Team Leader supported by an operations officer based in the country office will provide day-to-day supervision of all operational aspects and coordination with the client and among World Bank team members.