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INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED CREDIT

IN THE AMOUNT OF SDR 356.8 MILLION

(US$500 MILLION EQUIVALENT)

TO THE

PEOPLE'S REPUBLIC OF BANGLADESH

FOR A

LIVESTOCK AND DAIRY DEVELOPMENT PROJECT

November 9, 2018

AGRICULTURE GLOBAL PRACTICE
SOUTH ASIA REGION

CURRENCY EQUIVALENTS
(Exchange Rate Effective August 31, 2018)

Currency Unit = Bangladesh, Taka (BDT)
1 SDR = US$ 1.40139
1 US$ = BDT 83.81

FISCAL YEAR

July 1 - June 30

ABBREVIATIONS AND ACRONYMS

ABs	Agribusinesses
AI	Artificial insemination
AMR	Antimicrobial resistance
ASF	Animal source food
BDT	Bangladesh Taka
BSTI	Bangladesh Standard Testing Institute
CBSPs	Capacity Building Service Providers
COP	Conference of the Parties
CPF	Country Partnership Framework
CRI	Corporate Results Indicator
CSA	Climate Smart Agriculture
CTC	Chief Technical Coordinator
D&SC	Design and Supervision Consultant
DH	Dairy Hubs
DLI	Disbursement Linked Indicator
DLS	Department of Livestock Services
DPD	Deputy Project Director
DRG	Dynamics of Rural Growth Study in Bangladesh
DRMP	Dairy Revolution and Meat Production
EASP	Extension and advisory services providers
EIA	Environmental Impact Assessment
EIRR	Economic Internal Rate of Return
EMF	Environment Management Framework
ESMF	Environmental and Social Management Framework
FAO	Food and Agriculture Organization of the United Nations Organization
FCI	Finance, Competitive and Innovation
FI	Financial Institutions
FM	Financial Management

FMS	Financial Management Specialist
FSA	Food Safety Authority
FY	Five Year
FYP	Fiscal Year Plan
GAAP	Governance and Accountability Action Plan
GHG	Green House Gas
GoB	Government of Bangladesh
GRM	Grievance Redress Mechanism
GRS	Grievance Redress Service
IA	Implementing Agency
ICT	Information and Communication Technology
IDA	International Development Association
IDRA	Insurance Development and Regulatory Authority
IFC	International Finance Corporation
INAPH	Information Network for Animal Productivity and Health
IPF	Investment Project Financing
IRR	Internal Rate of Return
IUFR	Interim Unaudited Financial Report
LFFS	Livestock Farmers' Field Schools
LFP	Labor force participant
LIPP	Livestock Insurance Pilot Program
LIS	Livestock Information System
LIU	Livestock Insurance Unit
LSP	Livestock Service Providers
M&E	Monitoring and Evaluation
MAS	Manufacturing, Agribusiness and Services
MFD	Maximizing Finance for Development
MGSs	Matching Grant Schemes
MIS	Management Information System
MoFL	Ministry of Fisheries and Livestock
MSE	Mid-sized enterprise
MSME	Micro, Small and Mid-Sized Enterprises
MSSE	Micro and Small-sized enterprise
NATP	National Agricultural Technology – Phase I Project
NDC	Nationally Determined Contributions
NGO	Non-Governmental Organization
NLDP	National Livestock Development Policy
NLID	National Livestock Identification Database
NPV	Net Present Value
OIE	World Organization for Animal Health
OP	Operational Policy
PD	Project Director
PDO	Project Development Objective
PIC	Project Implementation Committee
PIM	Project Implementation Manual
PIU	Project Implementation Unit

PMP	Pest Management Plan
PMU	Program Management Unit
PO	Producer Organization
PP	Productive Partnership
PPP	Public Private-Partnership
PPSD	Project Procurement Strategy for Development
PSC	Project Steering Committee
RGAP	Regional Gender Action Plan
SME	Small and mid-sized enterprise
SMS	Short Message Service
SOE	Statements of Expenditure
SOPs	Standard Operating Procedures
SORT	Systematic Operations Risk-rating Tool
SP	Sub-Project
TA	Technical assistance
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development
VAT	Value Added Tax
VBD	Vector borne disease
VMCC	Village milk collection center
VS	Veterinary Services
WB	World Bank
WBG	World Bank Group

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DATASHEET

BASIC INFORMATION

Country(ies)	Project Name	
Bangladesh	Livestock and Dairy Development Project	
Project ID	Financing Instrument	Environmental Assessment Category
P161246	Investment Project Financing	B-Partial Assessment

Financing & Implementation Modalities

[ ] Multiphase Programmatic Approach (MPA)	[✓] Contingent Emergency Response Component (CERC)
[ ] Series of Projects (SOP)	[ ] Fragile State(s)
[ ] Disbursement-linked Indicators (DLIs)	[ ] 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
[ ] Alternate Procurement Arrangements (APA)	

Expected Approval Date	Expected Closing Date
06-Dec-2018	06-Dec-2023
Bank/IFC Collaboration	Joint Level
Yes	Complementary or Interdependent project requiring active coordination

Proposed Development Objective(s)

The project development objective is to improve productivity, market access, and resilience of small-holder farmers and agro-entrepreneurs operating in selected livestock value chains in target areas.

Components

Component Name	Cost (US$, millions)
Productivity Improvement	142.51
Market Linkages and Value Chain Development	224.65
Improving Risk Management and Climate Resilience of Livestock Production Systems	105.67
Project Management Monitoring and Evaluation	73.83
Unallocated funds	32.00

Organizations

Borrower:	People's Republic of Bangladesh
Implementing Agency:	Department of Livestock Services

PROJECT FINANCING DATA (US$, Millions)

SUMMARY

Total Project Cost	578.66
Total Financing	578.66
of which IBRD/IDA	500.00
Financing Gap	0.00

DETAILS

World Bank Group Financing

International Development Association (IDA)	500.00
IDA Credit	500.00

Non-World Bank Group Financing

Counterpart Funding	78.66
Borrower	47.36
Local Communities	26.00

Local Farmer Organizations	5.30

IDA Resources (in US$, Millions)

	Credit Amount	Grant Amount	Total Amount
National PBA	500.00	0.00	500.00
Total	**500.00**	**0.00**	**500.00**

Expected Disbursements (in US$, Millions)

WB Fiscal Year	2019	2020	2021	2022	2023
Annual	20.00	94.00	127.00	136.00	123.00
Cumulative	20.00	114.00	241.00	377.00	500.00

INSTITUTIONAL DATA

Practice Area (Lead)

Agriculture

Contributing Practice Areas

Finance, Competitiveness and Innovation

Climate Change and Disaster Screening

This operation has been screened for short and long-term climate change and disaster risks

Gender Tag

Does the project plan to undertake any of the following?	
a. Analysis to identify Project-relevant gaps between males and females, especially in light of country gaps identified through SCD and CPF	Yes
b. Specific action(s) to address the gender gaps identified in (a) and/or to improve women or men's empowerment	Yes
c. Include Indicators in results framework to monitor outcomes from actions identified in (b)	Yes

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

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

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

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	✓	
Performance Standards for Private Sector Activities OP/BP 4.03		✓
Natural Habitats OP/BP 4.04	✓	
Forests OP/BP 4.36		✓
Pest Management OP 4.09	✓	

Physical Cultural Resources OP/BP 4.11		✓
Indigenous Peoples OP/BP 4.10	✓	
Involuntary Resettlement OP/BP 4.12	✓	
Safety of Dams OP/BP 4.37		✓
Projects on International Waterways OP/BP 7.50		✓
Projects in Disputed Areas OP/BP 7.60		✓

Legal Covenants

Sections and Description

Section and Description

Institutional Arrangements (FA Section I.A of Schedule 2).

a) By no later than one (1) month after the Effective Date, the Recipient, shall establish and thereafter maintain, throughout the period of implementation of the Project, a Project steering committee, a Project implementation committee, a Project management unit ("PMU"), and eight (8) Project implementation units ("PIUs") with functions and resources satisfactory to the Association.

b) By no later than one (1) month after the Effective Date, the Recipient, shall establish and thereafter maintain, throughout the period of implementation of the Project, a livestock insurance unit within the PMU, with functions and resources satisfactory to the Association.

c) By no later than three (3) months after the Effective Date, the Recipient, through the PMU shall engage the services of a Design and Supervision consultant with qualifications, experience and terms of reference satisfactory to the Association.

Sub-Projects and Matching Grants (FA Section I.B and I.C of Schedule 2)

For purposes of carrying out the Sub-Projects, under Parts A.2(iii), B.2(i) and B.3(ii) of the Project respectively, the Recipient shall: (a) review and appraise all the Sub-Projects' proposals in accordance with the terms and conditions of the Grant Manual; and (b) after ensuring that all the pre-requisites set out in the Grant Manual have been fulfilled with, make a Sub-Grant under a Sub-Project Grant Agreement with the respective selected Beneficiary under terms and conditions acceptable to the Association.

For the purpose of providing Matching Grants for POs and ABs under Part B.1(ii) of the Project the Recipient through DLS, shall ensure that Matching Grants are made available to eligible Beneficiaries pursuant to the eligibility criteria and procedures detailed in the Grant Manual along with the PIM.

Prior to the transfer of any amount to a Beneficiary, on account of a Matching Grant for an approved Business Plan, the Recipient shall ensure that DLS has entered into a Grant Agreement with the Beneficiary, under terms and condition acceptable to the Association.

Safeguards (FA Section I.D of Schedule 2). The Recipient shall ensure that the Project is carried out in accordance with the provisions of the EMSMF (which shall include the RPF and the SECDF), PMP and all Safeguard Assessments and Plans and the requirements of the Grievance Redress Mechanism.

Exclusions (FA Section I.F of Schedule 2).

The Recipient shall ensure that the following expenditures are financed exclusively out of its own resources and not

out of the proceeds of the Credit: (i) all land required for the purposes of the Project; (ii) all resettlement and rehabilitation compensation and other assistance to Affected Persons, in accordance with the RAPs; (iii) purchase of vehicles other than 360 ambulatory veterinary clinics; (iv) recurrent expenditures such as workshop allowances, sitting allowances, cash per diems, honoraria and fuel; and (v) customs duty-value added taxes.

Conditions

Type	Description
Effectiveness	The Additional Condition of Effectiveness consist of the following: (a) the Project Implementation Manual has been issued and put into effect in a manner satisfactory to the Association.
Type	Description
Disbursement	No withdrawal shall be made: (a) for payments made prior to the Signature Date; (b) under Categories (2), 3(a) and (b) and 4 until the Recipient submits evidence satisfactory to the Association that the Grant Manual has been issued by DLS, in a manner satisfactory to the Association; and (c) under Categories (6) for Emergecy Expenditures until the Association is satisfied of the satisfaction of the conditions in respect of the said expenditures (CERC component).

BANGLADESH
LIVESTOCK AND DAIRY DEVELOPMENT PROJECT

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I. STRATEGIC CONTEXT

A. Country Context

1. Despite being one of the world's most densely populated countries and highly vulnerable to climate induced natural disasters, Bangladesh has achieved robust economic growth over the past decade,[1] and the Millennium Development Goal of halving the incidence of extreme poverty from 44.2 percent in 1991 to 13.8 percent in 2016. Poverty reduction has been driven by increases in agricultural productivity, wages, female labor force participation and remittance transfers. Agriculture provided 43 percent of employment in 2016 and accounted for 90 percent of poverty reduction from 2005-2010.

2. Bangladesh will need to sustain growth to meet its target of reaching middle-income status by 2021 and eliminating poverty by 2030. About 22 million people remain below the international extreme poverty line (US$1.90 2011 Purchasing Power Parity), and in rural areas their share exceeds a quarter of the population. Malnutrition continues to be widespread in Bangladesh[2], even amongst food producing households and where agriculture is the main source of income. Bangladesh ranks 90th out of 118 countries in the Global Hunger Index and 142nd out of 186 countries in the Human Development Index. Despite a significant expansion of the power generation capacity in recent years, an estimated 31 percent of the rural population still lacks access to electricity (Bangladesh Bureau of Statistics (2017)).

3. Agriculture (crops, livestock, forestry, and fisheries) features prominently in the Government of Bangladesh (GoB)'s 7th Five-Year Plan (7th FYP) and is expected to contribute significantly to the governments' short and medium-term goals. This will require achieving productivity gains, diversification, value addition and agro-processing, commensurate with national environmental protection, risk mitigation, and climate change adaptation strategies. Both the World Bank's 2016 Dynamics of Rural Growth study in Bangladesh (DRG) and the Bangladesh Development Update point to the livestock and fisheries sub-sectors as key, but underexploited drivers for agricultural growth.[3]

4. The development of the agriculture sector is also a high priority for driving growth and jobs. Raising productivity in agriculture matters for jobs in several ways. First, given the links between agriculture and the non-agricultural rural economy[4], weaker productivity growth may slow the growth of the non-agricultural rural economy. This can, in turn, slow job creation in rural areas, and weaken the counterweight to the forces that are pushing toward massive migration toward the Dhaka megacity, with negative externalities in terms of environmental, social, and congestion costs. Second, with slowing growth in demand for labor from the industrial sector, there is a risk that the transformation process may push agricultural workers into low quality services jobs.

[1] The Gross Domestic Product (GDP) grew well above the average for developing countries in recent years. GDP growth averaged 6 percent annually since 2000 and has accelerated to over 7 percent since 2016.
[2] Nationwide, about 41 percent of children under 5 years of age are chronically malnourished, and 22 percent are born with low birth weights.
[3] Growth in agriculture is estimated to have been a decent 2.6 percent in FY16, driven by growth in non-crop agriculture. Rice production has stagnated, but minor food crops, livestock products and fish production have grown remarkably.
[4] Shilpi, Forhad J.; Emran, Shahe. 2016. Agricultural productivity and non-farm employment: evidence from Bangladesh. Policy Research working paper; no. WPS 7685.

5. Impacts of climate change trends will significantly impact the agriculture sector (crops, livestock, fisheries, and forestry[5]) and can already be felt today. Bangladesh's 2009 Climate Change Strategy and Action Plan prioritizes agricultural adaptation and resilience, and the 7th FYP recognizes climate change as an added, critical challenge to reducing poverty and environmental degradation. Given the country's high population density and continued loss of arable land caused by urbanization[6] and other factor,[7] increasing agricultural productivity will be critical to achieving food security in the face of climate change. Sustainably diversified agriculture is urgent to make household income more resilient and to continue supporting economic growth and poverty reduction efforts.

B. Sectoral and Institutional Context

6. Livestock is an important socio-economic component in Bangladesh and for the poorest. Livestock accounts for 1.7 percent of the economy's Gross Domestic Product but employs 14 percent of total labor force and accounts one-third of total agricultural employment. Over 70 percent of rural households are engaged in livestock production which contributes a large share of the smallholder and landless farmers' livelihoods. Most poor rural households raise livestock which provide power for cropping, transport, threshing and oilseed crushing; manure as source of fertilizer and fuel; a ready source of cash; and milk, meat and eggs for human consumption. Livestock provides business opportunities for Producer Organizations (POs); Micro, Small and Mid-Sized Enterprises (MSMEs); and service providers.

7. Livestock has high potential to create rural jobs and livelihood opportunities for women, youth,[8] and the vulnerable in rural areas. Currently 68 percent of agricultural labor force[9] are women and they are mainly involved in livestock and poultry systems.[10] In addition, a growing share of rural households without cultivable agricultural land are engaged in livestock.[11] Therefore, growth in the livestock sub-sector, combined with targeted support has potential to close the gender gap in rural labor force participation[12] and to create more, and better economically-rewarding jobs, especially for women, youth, and the landless.[13]

8. Demand is growing rapidly, and animal source food (ASF) will play more a critical role in improving nutritional status. Cattle and buffalo milk, ruminant meat, and poultry meat and eggs are the main animal source food consumed. Production is lagging consumption growth, resulting in rising deficits: the 7th FYP anticipates annual deficits of 1.5 billion eggs, 0.5 million tons of meat, and more than 5.9 million tons of milk by 2021. In 2015-2016, imports of dairy reached US$248.8 million. Young children and pregnant and lactating women are particularly vulnerable to nutritional deficits and micronutrient deficiencies. ASF are source of six critical nutrients (vitamin A, vitamin B12, riboflavin, calcium, iron and zinc) and essential

[5] World Bank. 2014. River Salinity and Climate Change: Evidence from Coastal Bangladesh.
[6] The urban population is currently estimated to represent 26 percent of the total population, and this figure is expected to double within the next 2 decades.
[7] It is estimated that about 0.56 percent of agricultural land is converted into non-agricultural use annually. (Source: Md Abul Quasem (2011). 'Conversion of Agricultural Land to Non-Agricultural Use in Bangladesh: Extent and Determinants", Bangladesh Development Studies, Vol. XXXIV, March 2011, No. 1).
[8] Youth are less than 25 years of age.
[9] South Asia Regional Gender Action Plan (RGAP) FY16-FY21
[10] Jaim, W. M. H. & Hossain Mahabub. 2011. *Women's Participation in Agriculture in Bangladesh 1988-2008: Changes and Determinants.*
[11] The 2016 Household Income and Expenditure Surveys of Bangladesh Bureau of Statistics show that the share of rural agricultural landless households involved in livestock subsector increased to 66 percent in 2010 from 37 percent in 2000.
[12] The gender gap in labor force participation (LFP) in rural areas remains large, only 38% of women are in the labor force while 82% of men are in the labor force (Bangladesh Bureau of Statistics, 2017).
[13] The female unemployment rate in the rural areas increased from 4.9 percent in 2010 to 6.5 percent in 2015-16; while the unemployment rate among the rural youths increased to 8.6 percent in 2015-16 from 6.7 percent in 2010.

amino acids. Consumption of relatively small amounts of ASF can thus substantially contribute to dietary adequacy and alleviation of micronutrient deficiency. Livestock development can build on: Growing demand for ASF; high density of cattle population (145 large ruminants/km2 in 2010 with production clusters); high potential for productivity improvement; favorable agro-ecological conditions for feed production; availability of crop residues and a culture of mixed crop-livestock farming.

Main Characteristics of Livestock Production Systems

9. Livestock value-chains are largely informal. Mixed livestock production systems predominate, and animals are generally stall-fed or graze around the homestead. in small family-based production units. Considerable numbers of cattle and buffaloes are found in smallholder production systems as most farmers keep small animals and poultry. The livestock supply chains in Bangladesh largely depend on these smallholders, who are mostly practicing subsistence farming and do not have the capacity to meet the demand for a growing livestock industry. The red meat value chain is the least developed, with only two formal meat processing enterprises operating in the country, whereas the poultry chain is the most commercially developed. The milk supply chain provides a mixed picture, as milk not consumed by farming households is supplied to informal traditional markets (>80 percent), while the rest enters a much smaller, but growing[14] formal commercial processing and distribution circuit (5 percent). The overall formal milk market comprises 1.35 million tons (or US$775 million, mostly in the form of powder for industrial use, pasteurized milk, followed by Ultra High Treatment (UHT) milk), of which a third is sourced locally. The few commercially developed value chains of red meat, poultry, egg, and milk are centered around the big cities (Dhaka and Chittagong).

10. Smallholder producers are nevertheless engaged in commerce and contribute into private sector led value chains to varying degrees. Many smallholder producers in the livestock value chains depend on surplus production being sold to neighbors, markets or off-takers for improved livelihoods and income. Whether formally registered as a business or not, the smallholders are *de facto* private sector actors. They engage in sales of surplus product and thus connect to a large and complex supply chain that include: feed manufacturers, health service providers, artificial insemination (AI) providers, logistics and transport providers, processors, retail and wholesale sales agents and exporters. By design, this project will support commercialized smallholders to improve livestock production levels, access to markets and quality – all of which will reinforce commercialization and improve integration into private sector led value chains.

11. Dairy production is dominated by small scale mixed crop-livestock units with very low productivity. Seventy percent of the dairy farmers are smallholders producing 70-80 percent of the country's total milk which shows the importance of dairy in Bangladesh. During the last ten years, milk production grew by 4 percent but was driven by the increased number of animal head (4.8 percent) and not by increased productivity. These dairy production units commonly comprise 1-3 local/nondescript milking cows producing less than 480 liters per cow per annum. There are around 25 million heads of cattle (dairy and beef, 95 percent) and buffalo (5 percent) in Bangladesh, with over 75 percent of cows on less than 1 ha land, which, if not efficiently managed, puts undue strain on an already scarce natural

[14] Feedback from the major processing companies indicates that demand is still expanding but that farmgate prices are above the cost of using imported whole milk powder to make recombined milk for packaging. Thus, several processors with the ability to change the balance of fresh and recombined milk may be using more imported milk powder.

resource base. Total milk production is around 7.27 million tons per the Department of Livestock Services (DLS) (2016).

12. Beef accounts for about 65 percent of total meat produced. Goat meat, also mostly based on small family-based production units, contributes about 5 percent to national meat output but the goat population has been growing rapidly (nearly 30 percent over the last 10 years). A unique challenge for the meat sub-sector is that nearly 30 percent of all annual slaughtering is performed during a three-day period over Eid, with over 350,000 cattle/buffalo slaughtered in Dhaka alone.

13. The poultry industry is moving towards self-sufficiency in meeting local demand for meat and eggs. A significant part of the broiler market (40 percent) is dominated by a more resilient locally bred Sonali chicken, which sells for a much higher price (>40 percent more) and is suited to backyard and semi-intensive production. The broiler industry now depends on imported maize and protein grains for formulating high performance feeds.

14. The main gender gaps in livestock are related to decision making, social barriers, and access to economic activities. Women's role in livestock tends to be focused on home-based activities such as feeding and milking of cows, as well as raising small ruminants and backyard poultry. Women's involvement in marketing is limited, primarily due to traditional norms that restrict their mobility[15] and their decision-making role both within the home and within community-based organizations, such as producer organizations. Women's involvement in marketing is also constrained by limited business skills, voice and agency, and access to inputs, services and technology. In addition, women are relatively more vulnerable to climatic disasters and face further obstacles in terms of heavy workloads, and time-use. There have been recent improvements in gender equality: The Global Gender Gap Index (2017) ranks Bangladesh 47 out of 144 countries, climbing several spots and recording progress across all dimensions of the economic opportunity and participation, improving gender parity for legislator, senior official and manager as well as professional and technical roles. Nevertheless, gender discrimination persists and is widely recognized as a primary underlying cause of undernutrition in Bangladesh.

Key Issues to be Addressed in the Proposed Project

15. Unlocking the growth potential of livestock will require addressing challenges in the following areas: (i) poor practices along the value chains (animal husbandry, animal health); (ii) weak value chain organization and infrastructure; (iii) low access to insurance services and products; (iv) low risk management (climate but also markets, food safety and public health and wide livestock exposure to a range of perils); (v) institutions and services; and (vi) policies and regulations.

16. Low productivity is due largely to poor animal husbandry practices, low penetration of high-yielding breeds and shortage of feed and fodder. Bangladesh has one of the highest cattle densities in the world, but the lowest productivity (milk, meat, calving). Animal husbandry practices implemented by livestock farmers have much room for improvement, across all dimensions including, feeding, watering, animal shelter, and more. Much of the dairy and meat producing cattle herd population continues to be of low yielding breeds. Commercial livestock feed markets are underdeveloped and suffer from tariff policies and a weak enforcement of regulation. Thus, quality formula feeds and feed supplements are not available at affordable price for smallholders, who rely predominantly on poor quality crop residues for

[15] Anderson and Eswaran (2009) reported that 93 percent of women in rural Bangladesh had never been to the local bazaar.

feed, impacting productivity, animal health and animal welfare. Production growth in the sub-sector has also led to an increasing dependence on feed imports (mainly corn and soybean), currently satisfying only about 50 percent of feed demand.

17. High incidence of disease results in high levels of animal losses, reduced productivity and generate public health risks. Disease prevalence is high among cattle[16], small ruminants[17], and poultry.[18] Vaccine production facilities exist for most of the common diseases, but supply falls short of meeting demand. The most important disease threats on public health concerns include[19]: anthrax, brucellosis, zoonotic influenza and tuberculosis. Antimicrobial resistance (AMR) is a growing concern requiring cross-sectoral approach. The country is developing a National Strategy for AMR; it has also a Strategic Framework for One Health, a National Avian and Pandemic Influenza Preparedness and Response Plan, and a Strategy for Rabies Elimination. In 2016, the GoB established a One Health Secretariat.[20]

18. Investment is needed in milk collection centers, processing plants and slaughterhouses but consumer perceptions limit demand for formally sold and processed meat. Modern and safe slaughterhouses are virtually nonexistent and most, if not all, animals are being slaughtered illegally and under primitive circumstances on road sides or in inadequate and unhygienic conditions at the wet market facilities and in courtyards. In Bangladesh, there is some private investment in meat processing who produce chilled and frozen meat to consumers prepared to pay for guaranteed high-quality meat, including luxury hotels, restaurants, supermarkets, and own retail outlets. One firm, Bengal Meat, also exports chilled and frozen meat to Gulf country markets. Slaughter and processing regulation, however, is weak or non-existent which limits consumers' willingness to pay for higher quality meats.

19. Furthermore, legislative and regulatory enforcement for the slaughtering of animals function poorly. Should this practice remain, private sector will be hesitant to invest in hygienic slaughtering and meat processing facilities, as consumers are not willing to pay a premium for certified meat slaughtered and processed under hygienic conditions. Dairy supply chains are somewhat more developed, but the existing 328 milk collection centers gather less than 5 percent of national milk production. Slow traffic, unreliable access to energy supply and lack of cold chains are major bottlenecks for the development of value chains. Safeguarding the prerequisite for the growth of producing milk and meat, producers should take advantage of the opportunities to improve quality and reduce loss in the dairy and meat sub-sector partially through access to renewable energy technologies such as solar energy, for post-harvest processing and cooling, but also through building capacities and implementation of good agricultural practices and food safety management systems at farmers and processors levels.

20. Food safety standards are set by the Bangladesh Standard Testing Institute (BSTI) and food safety surveillance through Bangladesh Food Safety Authority (FSA). Nevertheless, key challenges remain to attaining basic food safety, including the relevant standards for livestock and livestock products of the World Organization for Animal Health (OIE) and the food safety standards of Codex Alimentarius

[16] Foot and Mouth Disease, metabolic diseases and mastitis.
[17] Peste des Petits Ruminants, Sheep and Goat Pox and parasitic infestation.
[18] Newcastle Disease, Infectious Bursal Disease, Avian Influenza.
[19] Centers for Disease Control and Prevention: Overview of the One Health Zoonotic Disease Prioritization https://www.cdc.gov/onehealth/pdfs/zoonotic-disease-prioritization-workshop.pdf.
[20] Staff seconded from the Directorate General Health Services, the DLS, and the Bangladesh Forest Department operate the One Health Secretariat, which is responsible for routine coordination. An Inter-Ministerial Steering Committee on One Health is responsible for guiding and monitoring One Health activities in Bangladesh.

Commission set by the Food and Agriculture Organization (FAO) and the World Health Organization. FSA has been recently established and lacks basic capacity and funding to perform its function. Controls should be performed at pre-harvest level and subsequent stages of processing through the final consumption (farm-to-fork concept) to minimize food safety risks. Public awareness of the risks and health implications related to food safety and food handling is extremely low.

21. High risks and limited access to insurance further constrain the long-term development of the livestock industry. Limited insurance coverage[21] and markets result in high levels of vulnerability among small and medium scale milk and meat producers. Rural households' livestock assets are highly exposed to risks—including loss of livestock—associated with natural events[22] and major disease outbreaks. These income shocks have potentially long-lasting consequences. Uninsured risk in livestock production is among the key impediments for improving smallholder productivity. Livestock insurance could help reduce the vulnerability of small and medium scale milk and meat producers as well as enhance productivity. However, the coverage of livestock insurance remains very limited as the overall percentage of rural households with livestock mortality insurance protection is below 3 percent. Agricultural credit has turned into an indispensable input in agricultural development if poor and marginal farmers are to access high yield modern agricultural technologies. A sound livestock insurance market could stimulate investment in the sub-sector, including of smallholders, and potentially lead to a crowding in of credit as lending risks for financial institutions fall.

22. Climate change impacts on livestock production threaten to hamper the development of livestock. Higher temperatures will reduce animal productivity through heat stress and accelerate the breeding of parasites and bacteria, resulting in increased incidence of vector borne diseases (VBD). Rainfall variability, drought, and rising salinity will reduce the productivity of grazing lands and forage cultivation, as well as increase competition with crop production for scarce land and water resources. Low awareness, financial and technical capacity, market access among small-scale livestock producers, as well as underdeveloped processing chains in meat and milk are identified as reducing the sub-sector's ability to cope with extreme whether events and adapt to climate change.

23. Greenhouse gas (GHG) emission intensity is at unsustainable levels, contributing to an outsized environmental footprint of livestock. Livestock currently contributes to 25 percent of Bangladesh's total GHG and its current growth path exhibits high and growing levels of emission intensity per unit of milk and meat produced, currently approaching 6 times the world average. A range of feasible, established approaches are available that both reduce emission intensity and expand production efficiency, including on-farm improvements in livestock feeding strategies, animal health, breeding, manure and waste management, as well as low-emission technologies for post-farm-gate activities such as milk chilling and transport. Many of the approaches provide opportunities to increase off-the-grid access to energy in rural areas with renewables, such as biogas from digesters fed with livestock manure and solar mini-grids to help power the cold chain. Improved manure and waste management furthermore dis-incentivizes manure dumping in rivers and other public areas and enhances soil health and nutrient flows.

[21] Livestock insurance market is subject to inefficiencies including: (1) the availability of reliable insurance data, (2) challenges to reach small and medium potential policyholders, (3) low support for the risk financing of the catastrophic layer of reinsurance (lack of external reinsurers), (4) limited availability of insurance products, and (5) poor enabling legal and regulatory environment.

[22] In 2007, the estimated value of damage of Cyclone Sidr and floods to the livestock sector was respectively US$19.3 million and US$7.6 million, 5.7 percent of the total losses in the agricultural sector.

24. Weak institutional capacity and coordination is a further issue. Livestock extension and advisory services providers (EASPs) are decentralized with a range of actors involved, both public and private EASPs, as well as non-governmental organizations (NGOs)). The private sector contributes to input and services supply but is operating at limited scale. The plurality of EASPs leads to difficulties in coordination between different actors and an unclear share of responsibilities between public and private service providers. The public livestock EASP (DLS) has limited operational capacity and budget.[23] Livestock services' deployment from central level is limited at Upazila level and private sector services are insufficient, resulting in limited delivery of services to smallholder farmers. There is a need for coordination or incentive to facilitate collaboration among EASPs actors and leverage private services providers to strengthen and drive success of livestock services delivery in the country. Similarly, project formulation revealed weak information and analytical capacity for evidence-based policy making, and largely ineffective policy frameworks.

Government Plans and Investment Opportunities

25. The GoB's National Livestock Development Policy 2007 (NLDP) aims to increase livestock related products by 2.5 to 3 times by the year 2020 to feed the country's growing population. The GoB has adopted several policies and promulgated acts to harness the potential of livestock for economic growth and poverty alleviation. The NLDP identifies ten critical programs for dairy and meat production development and outlines the need to strengthen institutional arrangements in livestock, with the establishment of a Dairy Board, a Dairy Research Institute, and a Poultry Research Institute. Among the NLDP's programs, the project will contribute to dairy development and meat production; poultry development; veterinary services (VSs) and animal health; feeds and fodder management; breeds development; marketing of livestock products; access to credit and insurance to climatic and other risks; and institutional development for research and extension. Per the NDLP, DLS' role would be enhanced to focus on providing public good services and private sector, NGOs and community-based organizations would be encouraged to provide more of the livestock services including VSs and vaccinations. The proposed project supports GoB plans to scale-up climate smart investments in livestock, recognizing the need to enhance dairy, meat and egg productivity, job creation, export earnings, and public health while minimizing their climate induced vulnerability.

26. The project will support the country's Nationally Determined Contributions 2015 (NDC). The project will contribute to efficiency gains in livestock, GHG intensity reduction, and development of climate change resilient food systems, which are key priorities in 2015 Bangladesh's NDC (2015) under the United Nations Framework Convention on Climate Change (UNFCCC) COP 21 Paris Agreement. The NDC includes improving and cultivating stress tolerant varieties as an adaptation priority. Specific activities introduced in the NDC that the proposed project operation could contribute to include providing off-the-grid access to energy (solar, biogas), incentivizing the uptake of biogas (40 percent market share by 2030, conditional), and increasing the share of manure and organic waste in the fertilizer mix (35 percent by 2030, conditional). The project also will quantify related GHG reductions and will explore the potential for their monetization.

[23] Livestock extension is poorly staffed and resourced. At the Upazila, staffing levels of 60-70 crop farming extension agents are in stark contrast with only about 3 livestock extension agents. At the national level, institutional capacity for the promotion and regulation of the livestock sub-sector is also low, including with respect to quality assurance of inputs and products, research, regulatory oversight, market development, etc.

The project will support GoB's objective of creating a conducive environment to promote gradual uptake of livestock insurance[24] and enable household farms to reduce vulnerability and exposure to severe losses resulting from climate induced and other disasters. It will also support livestock insurance in coordination and under the legal framework of GoB and specifically, of the Insurance Development Regulatory Authority (IDRA). Livestock insurance can play a key role by protecting small and medium scale dairy and meat producers against the death of their cattle, thereby protecting their assets, livelihoods and incomes. Insuring risks in the livestock production can also facilitate investments in higher-productivity dairy/meat cows and introducing minimum standards of animal husbandry practices, thereby reducing accidents and mortality. Livestock insurance could also remove constraints for expansion of credit and access to finance for low income male and female producers.

Rationale for Bank Involvement

27. The project will address the key challenges that restrict private sector investments in the livestock industry. It will leverage industry knowledge of IFC's Manufacturing, Agribusiness and Services (MAS) department, which has identified dairy and livestock as a high potential investment industry. IFC has a long-term loan with PRAN Dairy (US$15 million) and a pipeline which includes dairy, poultry and feed value chains. During project preparation, such industry knowledge has well identified the major risk factors being faced by private sector agribusinesses at large, including sporadic outbreaks of animal diseases, lack of infrastructure and the capacity of the GoB and service providers to contain diseases and food safety risks. The project will strengthen DLS' capacity by financing required infrastructure, skills and knowledge to improve VSs. The project will support a more enabling environment for the private sector to increase business scale by improving value chain integration and enabling consistent, high quality, and safe supplies. IFC Advisory Services, either executed by MAS Advisory or the Finance, Competitiveness and Innovation (FCI) Global Practice, may seek trust fund support to develop an Advisory Service initiative that complements the objectives and activities of the project.

Maximizing Finance for Livestock Development

28. Barriers to private sector participation in infrastructure investments and service delivery include weak policy and regulations. To remove the barriers, the project will adopt the World Bank Group (WBG)'s integrated Maximizing Finance for Development (MFD) approach to agricultural value chain developed in January 2018 and includes 6 principles: The first four focus on livestock production input markets, the fifth principle on infrastructure investment, and principle six on production and livestock output markets.

29. First, to facilitate private sector contribution to investments, the project will support POs to function as MSMEs, leveraging in capital from these private sector actors through IDA-financed matching grants (MG) towards investments within livestock value-chains. MGs will be deployed to encourage

[24] In 2014/2015, the World Bank Group at the request of the Ministry of Finance conducted a comprehensive study on agricultural insurance including crops, livestock, and aquaculture insurance and fully subsidized for the poorest insurance options. *Pre-conditions for insurance:* Effective insurance solutions require good-quality data to develop in a sustainable manner. Animal Health Checking, tracing records and Certification set up as preconditions for cattle insurance alongside maintaining a national database of livestock mortality for reporting and recording. *Micro-insurance market:* a limited number of microfinance practitioners are marketing livestock-investment loan insurance to their members; however, the scale is small, and programs are exposed to catastrophe losses as they are not eligible for formal reinsurance. Conversely, insurance companies, the only entities authorized to provide insurance services in Bangladesh, have been reluctant to invest in developing livestock insurance products and services mainly due to lack of rural distributional networks and pricing constraints. *Enabling environment:* Bangladesh Insurance Sector Development Project" of the World Bank is currently working to strengthen the institutional capacity of the regulator and state-owned insurance corporations and to increase the coverage of insurance in Bangladesh.

investment that enhances the efficiency of supply chains and quality of inputs, as well as investments in cold storage, packaging, and other value addition activities. These can in turn support a modern retail sector in Bangladesh (now around 0.5 percent and the smallest in the world) by providing efficient supply chains and better-quality products. MGs will be channeled through productive partnerships (PPs) between POs or MSMEs and agri-businesses to contribute to achieving the GoB's objective of encouraging Public-Private-Partnerships (PPPs) and accelerate investment flows into the sub-sector. With mobilization of a large pool of POs and MSMEs, the project will support sustainable and better organized supply chains for the milk and meat processors, as well as upstream animal feed manufacturers. This helps generate viable supply chain partners for larger agribusiness investments from the private sector at large.

30. Second, project support to POs and MSMEs will not only act as vehicles to finance lumpy value chain investments, they will also be empowered to engage in ongoing commercial activity with agri-businesses and to provide services to their members and high-quality products to clients, respectively. To achieve this, the project will strengthen their capacity and skills in running their businesses, including legal registration, business management, organization, procurement, financial management and governance. Capacity development and business management training from the project will support the POs and MSMEs to expand their businesses further in livestock.

31. Third, the project will focus GoB services on public goods that enable private EASPs, MSMEs and POs to provide services to farmers within the value chains for which a sustainable private market can be created. These will include the following services along the value chain: advisory services and technology, training and technical assistance, equipment and logistics, financial services and products, marketing and commercialization, input supply (feed), and livestock health services.

32. Fourth, building on the first three principles, the project will contribute to linking these actors by developing effective and commercially viable livestock input supply chains. This will be achieved by deploying investments and MGs to facilitate input production by POs and other MSMEs, and using targeted support for EASPs, POs and other private actors coupled with regulatory interventions aimed at certifying quality of input.

33. Fifth, to crowd in private investments and improve food supply chains, the project will directly invest in areas in which MGs alone are unlikely to crowd in sufficient amounts of private investment. This includes upgrading of basic public infrastructure in logistic and transportation to supply critical market segments, as well as promoting PPPs for livestock insurance with the goal of developing a sustainable market for livestock insurance in Bangladesh.

34. Sixth, the project will build and promote at scale commercially viable business models by actively facilitating linkage of POs and MSMEs with formal market and processing industries, promoting quality, hygiene and food safety, improving business environment and providing better extension services. The livestock supply chains largely depend on the smallholders, but the latter do not have the capacity or the aim of meeting all the input and service needs of the livestock industry. Investment in input supply chains is also needed to bolster production, improve quality and facilitate the private sector investment.

35. Specifically, the project will also use the MFD approach to mobilize and enable private participation in services delivery (e.g., AI, VSs including vaccinations, etc.) and co-finance larger investments in livestock value and supply chains with public good aspects, (e. g., hygienic slaughter

houses; improved milk collection centers; sanitary local wet markets, etc.). Respectively, it will enable private investor participation in:

- *Service delivery in AI and VSs* by providing standard operating procedures (SOPs) for AI training, regulation of AI service delivery and certification of AI technicians; supporting enforcement of existing Acts for VSs like Quarantine Act and Disease Control Act, OIE approval of SOP development and enforcement/practice, establishment of mini diagnostic laboratory and ambulatory veterinary clinic at each district and Upazila hospital; minimizing/eliminating competition of public livestock services and helping private EASPs provide more of the VSs and AI, by focusing DLS' role of public services provider (in regulations, monitoring, quality assurance and control, food safety, disease surveillance); and ultimately contributing to building an effective food safety system.
- *Basic infrastructures with public goods aspects and support to compliance* of standards by: Supporting enforcement of Slaughter and Quality Control of Meat Policy and development of SOPs for monitoring and certifying of slaughterhouse operators and GoB inspectors; providing input to drafting food safety legislation; co-investing into hygienic and appropriate facilities, equipment and in laboratory networks, including training of personnel; providing input into development of efficient and risk-based food safety surveillance system, food safety capacity building for POs/MSMEs and larger companies, wider public awareness and risk communication, etc.

C. Relevance to Country Partnership Framework (CPF) Objectives

36. The project is strategically well positioned to contribute to all three focus areas identified in the CPF, 2016. It will enhance the business environment and facilitate trade in meat and dairy products by developing these value chains and addressing existing regulatory bottlenecks, as well as contribute to increasing the availability of clean energy in rural areas (CPF Focus Area 1 Growth and Competitiveness). It will enhance income opportunities for a large share of rural poor deriving the bulk of their livelihoods from livestock, mitigate risk exposure and potential loss of incomes, improve health and nutritional outcomes through targeted measures (e.g. school feeding), and mainstream women empowerment (CPF Focus Area 2 Social Inclusion). It will increase the resilience and reduce the environmental footprint of production by mainstreaming climate smart agriculture (CSA) practices (CPF Focus Area 3 Climate and Environmental Management). The project is also in line with priority outcomes of Pillar 2 of South Asia Regional Gender Action Plan FY16-FY21. Overall, by targeting smallholder livestock farmers, especially women, the project will contribute to the WBG's Strategic Goals of Ending Extreme Poverty and Shared Prosperity. The CPF Focus Areas are closely associated with the WBG's Strategic Goals and GoB's 7th FYP to attain 7.4 percent annual growth and significantly reduce poverty within the next 5 years.

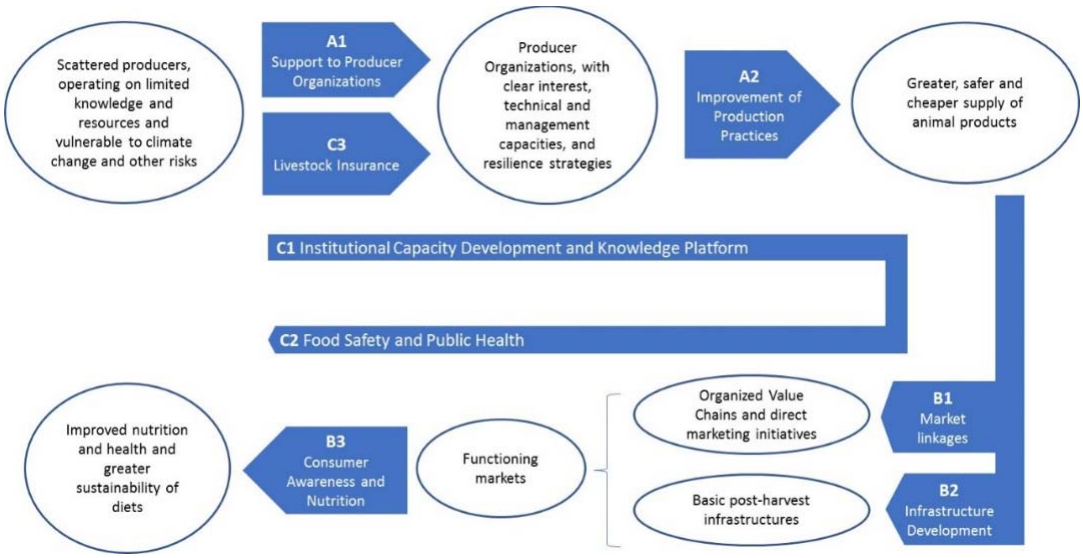
II. PROJECT DESCRIPTION

A. Results Chain (Theory of Change)

37. The project seeks to improve productivity, market access, and resilience of smallholder farmers and agro-entrepreneurs by supporting climate smart production systems, farmer empowerment and commercialization. A schematic depiction of the project's results chain is provided in Figure 1. It will foster a market-led transformation of livestock production, while ensuring that the supply response to growing demand is sustainable, inclusive, safe, and environmentally conscious. To this end, the project will improve the ecosystem for value chain development by financing key infrastructures including markets,

and access to market, insurance and financial products and services, capacity building for both private value chain actors like smallholder organizations, and public agencies in supportive regulation; as well as knowledge. It will establish partnership with public FIs (Bangladesh Krishi Bank, Palli Sanchoy Bank and Rajshahi Krishi Unnayan Bank) and other banks to promote co-financing credit for farmers and agro-entrepreneurs. Climate resilient livestock production systems will be developed through the promotion of appropriate CSA practices addressing feeding strategies, animal health and welfare, animal husbandry and breeding, as well as manure and waste management (including production of energy), improved storage and processing. It will also build on existing experience to foster the generation of renewable energy from solar and livestock manure sources.[25] Project activities on animal health, food safety and AMR will embrace the One Health principles since it will address public health at the human animal interface.

Figure 1: Results chain



38. The project is designed and will be implemented considering the different gender roles. The three key approaches CSA, farmer-demand driven support services, and market access offer clear opportunities to mainstream gender and address the gender gaps. The 7th FYP notes that promotion of renewable energies that help avoid GHG emissions could also promote economic participation of women. The project will actively pursue the participation of women.

B. Project Development Objective

39. The project development objective (PDO) is to improve productivity, market access, and resilience of smallholder farmers and agro-entrepreneurs operating in selected livestock value chains in target areas. Resilience will address risks related to climate, financial shocks, animal health, food safety, and

[25] An estimated 31 percent of the rural population still lacks access to electricity, and about 17 percent do not have access to potable water.[25] However, renewable energy of solar and waste sources is one of the priorities of the government to alleviate fossil-fuel based energy consumption and climate pollutions, and over the last decade both solar energy and biogas production have been increasing cumulatively and attained at 195.2 MW and 72,104[SREDA] numbers having capacity of 6.0 m^3 to 2700 m^3 biogas.

zoonotic diseases. Resilience will be strengthened by mainstreaming CSA practices, implementing measures that improve food/feed safety, and developing livestock insurance. The targeted species are cattle, buffalo, goats, sheep and chicken. These value chains are considered strategic for both food security/nutritional supply and for their comparative advantage on the regional markets and associated income generation potential.

40. The project will target all main value chains in the country: (i) dairy from small and medium-scale mixed crop-livestock systems; (ii) poultry from improved scavenging and semi-scavenging systems, and semi-intensified broilers systems; and (iii) red meat from small and mid-scale cattle and small ruminant production units. Up to 68 percent of households raise cattle in different areas of the country, and 74 percent of the total cattle are kept by land poor farmers. Cattle produces 98 percent of the total liquid milk and 39 percent of total meat of the country. Like cattle, buffalo are kept largely (67 percent of total) by land-poor farmers. Bengal goat, a potential genetic resource of the country, is popularly considered as a tool for poverty alleviation. Up to 58 percent of all households raise goats in different areas of the country, and 83 percent are raised by land-poor farmers. Similarly, almost 80 percent of all sheep in the country is raised by land-poor farmers. There are about 275 million chickens produced under both small-scale (small extensive scavenging, extensive scavenging, semi-intensive and small-scale intensive) and commercial systems. About 55 percent of total households raise chicken and poultry. About 130 companies and 100,000 small and medium poultry farms employ 3-5 million people. Both native, Sonali and commercial broilers account for 54 percent of the total domestic meat production. About 85-90 percent of liquid milk produced in rural and peri-urban dairy is marketed in local markets. Milk product manufacturers procure the rest 10-15 percent. Poultry activity generates from 17-30 percent of profit margin for live animals and processed meat respectively and generates employment of 128-159 man-days/ton. Beef cattle activity generates from 16-35 percent of profit margin for live animals and processed meat respectively and generates employment of 5-6 man-days/ton.

C. Project Beneficiaries

41. Primary project beneficiaries are small and medium scale livestock producers (2,000,000 households, i.e. about 26 percent of the country's cattle, goat, sheep, and poultry producers), MSMEs (1,000 with a total of about 5,000 employees) and service providers (2,000 DLS staff, and 5,000 private veterinarians and others) in the selected value chains and project areas. The selection criteria of POs will include: (i) operating at least one value chain targeted by the project; (ii) coordination/management of at least one collective activity in the interest of farmer group members; and (iii) existence of requisite management bodies. MSEs in cottage industry and manufacturing will be selected along the following criteria: (i) trade license and operating bank account; (ii) operations in a target livestock production system and value chain; (iii) availability of own fixed assets, less than US$1.25 million); and (vi) number of employed workers less than 50.

42. The project will also benefit another 2,000,000 consumer households through consumer awareness and nutrition programs, for which selection criteria and procedures will be detailed in the project manuals, as well as benefitting from investments in critical public infrastructures to improve food safety. Other direct beneficiaries include youth, livestock support service institutions, including public livestock research and extension services, and NGOs. Secondary project beneficiaries are other livestock producers not directly involved with the project activities, but who would nevertheless benefit from an improved policy and regulatory environment, positive externalities of improved production practices through peer-to-peer learnings, more opportunities in dynamic value chains or improved capacities in

animal health and production service deliveries. Agri-businesses operating in target value chains will also benefit better organized supply and better and safer quality of livestock products from partnerships with POs and MSMEs, as well as improved infrastructures and better regulatory environments. Likewise, livestock services providers such as private veterinarians and input providers of feed, medicines, and breeding materials will benefit from a strengthened enabling environment and professionalized value chains). Finally, consumers in Bangladesh will benefit with cheaper, safer and better quality national ASF supply, improved regulations and their enforcement, and increased awareness of food safety and quality issues.

43. The project will give special focus to women (50 percent of beneficiaries) and youth (20 percent of beneficiaries). In Bangladesh, women are mostly involved in back-yard poultry and livestock rearing, but very few women engage in marketing and sales of livestock and poultry products. In addition, youth unemployment rate is over 10 percent, which also affects the educated youth and female youth in the rural areas. The project will contribute to closing the gender gaps in women's empowerment and decision making and accessing economic activities by improving women's and youth's role in the livestock sub-sector, creating and supporting an enabling environment by focusing on: (i) facilitating their access to livestock services and improved climate smart technology; (ii) improving their technical skills and business acumen by providing tailored technical and business-management trainings to access more profitable economic opportunities; (iii) catalyzing access to finance, risk management, information and networking; and (iv) ensuring inclusive and climate change-affected producer group formation and participation. The financial, and wider economic, benefits from improved livestock productivity driven by women's participation in project activities should encourage families to support women's stronger mobility and involvement in livestock sub-sector.

44. The primary geographic focus areas of the project are the rural and peri-urban areas of the high potential regions (i.e. secondary growing cities) where livestock production systems play a critical role in food production and diets and/or are vulnerable to climatic induced risks. The selection criteria of project areas and mechanism will be detailed in the Project Implementation Manual (PIM). Selection criteria will include: (i) presence of POs or MSMEs; (ii) livestock production potential for development of cattle, buffalo, goat, sheep, and poultry; (iii) accessibility; and (iv) readily available market opportunities (traders, units processing, etc.). According to national livestock distribution[26] and based on the criteria above, the project will cover 64 districts and 491 Upazilas which includes 4,750 unions. The following main areas will be targeted for: (i) cattle: 491 project target Upazilas nationwide; (ii) buffalo: north-west, south-east, north-east and coastal; (iii) goats: south-west and north-west; (iv) sheep: north-west and south; and (v) poultry: 491 project target Upazilas nationwide. Pockets of malnutrition where additional consumption of ASF can be provided to improve diets may be targeted.

45. **Citizen Engagement**. The project will involve beneficiaries through: (i) policy dialogue and consultations among different stakeholders engaged and interested in livestock production under Components A, B and C; (ii) feedback from project beneficiaries and other stakeholders on market constrains, extension services, knowledge gaps on innovations, and trainings provided through the project; and (iii) participatory planning and implementation of the activities. Citizen engagement is also part of the project's Results Framework through participatory community monitoring. An Information and Communication Technology (ICT)-based Grievance Redress Mechanism will cover all aspects of project

[26] Huque and Khan analysis, 2017.

implementation and will be available to direct and indirect project beneficiaries. The ICT platform-based Grievance and Redress system register grievances from citizens and provide notifications and outcomes back to the concerned citizens. Citizen Engagement activities will be complemented by awareness raising activities and targeted information campaign directed to the small farm holders to ensure they know how to benefit from project activities. The project also aims to foster greater participation of women and vulnerable farmers by proactive outreach to these target groups. The Results Framework will track the share of targeted livestock producers-including women farmers-satisfied with the livestock services received.

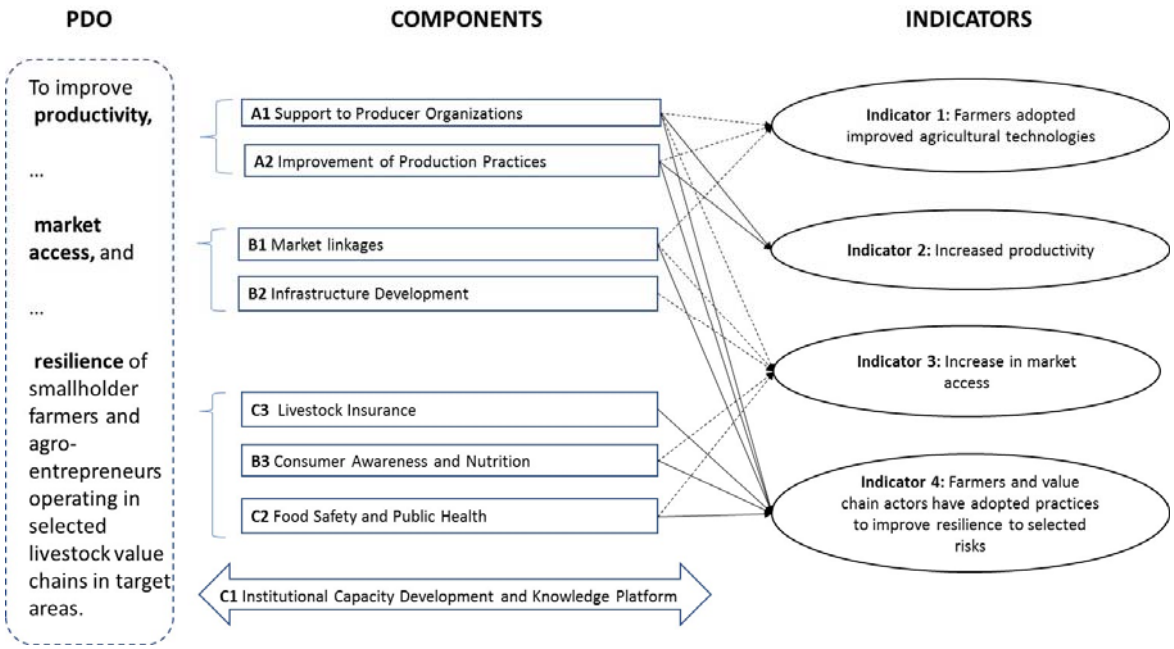
D. PDO-Level Results Indicators

46. The PDO indicators are:

- Farmers adopting improved agricultural technology (following CSA principles) [core indicator] (# of female and Youth);
- Increased productivity of targeted species by direct beneficiaries (aggregated over cattle, buffalo, goat, sheep and poultry);
- Increase in market access reflected in increased sales (milk and/or processed milk products, live animals and meat, and egg) among the livestock producers and value chain actors in project areas (percent for female and Youth);
- Farmers and value chain actors have adopted practices to improve resilience to selected risks (including climate induced risks), and/or livestock insurance products have been developed (percent of female benefit and Youth).

47. The project's theory of change relating PDO to activities and indicators is shown in Figure 2 below.

Figure 2: Theory of change: from PDO to indicators



E. Project Components

Component A: Productivity Improvement (IDA, US$142.51 million)

48. The component's objective is to raise on-farm productivity, and to increase efficiency, safety and profitability through climate smart livestock management, better approaches to animal health, nutrition, and breeding. It will comprise two Sub-components:

49. *Sub-component A1: Producer Organizations (POs) (IDA, US$29.93 million)*. Sub-component A1 will help strengthen/establish POs, mobilize producers around a commodity of common interest as an effective means to deliver training (including on improving climate resilience), inputs and marketing support to smallholder farmers and develop risk mitigation strategies. It will put emphasis on meaningful female participation. Most successful models in Bangladesh have worked exclusively with women or have a strong focus on them and POs have proven successful for empowering women farmers and integrating women service providers in value chain activities. Sub-component A1 will address the gender gaps in access to inputs, services and decision-making by analyzing and addressing possible obstacles for women to participate in and benefit from POs as well as to identify locally relevant climate change impacts on which to focus capacity building.

50. Key investments under this sub-component include: (i) mapping of existing POs and analytics to inform large scale mobilization of women in POs; (ii) formation or consolidation of POs into more formal structures under current regulation, if desired by members; (iii) knowledge and skills development through farmer field schools that will cover not only production management, but business planning, negotiation, production marketing, with tailored demand-led training for women that specifically takes into consideration any identified obstacles to their participation (e.g. by providing child care facilities, and using methods suitable for illiterate and innumerate women, and more); (iv) mobilization of locally recruited Livestock Service Providers (LSPs), trained and equipped; (v) identifying relevant climate change impacts locally and to equip farmers with the knowledge and practical skills to become more resilient to these impacts; (vi) ICT to support financial management of the POs and use of Information Network for Animal Productivity and Health (INAPH) for production and market data.

51. A targeted public education campaign, and behavioral change communication will help the small farmers and POs become aware of the benefits of applying lessons from the training. These communications and the effectiveness of targeted skills training through Livestock Farmers' Field Schools (LFFS) will be monitored and further enhanced from results from INAPH. Behavioral change communication and methodologies (such as IFAD's household methodologies) will be used as part of training to engage husbands and representatives of local governments to better understand "why" it is important to recognize and build on women's contribution to livestock production and their engagement in the decision making. Community members will also be sensitized to create enabling environment and structures for women to go to market places and dairy hubs. It will fund studies to target implementation areas and will provide basic business development skills training in areas such as financial literacy, business planning, negotiation, and marketing. These activities will be facilitated by a network of LSPs, to be developed under sub-component C1, which will support LFFS and other capacity building activities as co-facilitators. Use of digital technologies such as Short Message Service (SMS), or mobile apps will

complement capacity building efforts. LFFS and other extension methodologies will be utilized to train LSPs and POs.

52. *Sub-component A2: Improved climate smart production practices (IDA, US$112.58 million)*. It will finance the POs that are strengthened/established under sub-component A1 to sustainably increase productivity through better animal husbandry, reduced production costs, and improved quality, safety and environmental sustainability of animal products delivered by small- and medium-scale farmers. A2 will address all the key aspects of animal production: feed (production, storage, marketing and ration balancing), breed (development, dissemination, and producer-based improvement programs), health (surveillance, vaccination, biosecurity and control of production diseases through vaccination, e.g. against Foot and Mouth Disease, and deworming), housing and manure management. Improved practices, better breeds and balanced nutrition supported by the sub-component will reduce GHG emissions while also making the production systems more resilient to climate change and more mindful of animal welfare. It will support both investments in key demonstration equipment and facilities, and activities aimed at improving producers' knowledge and access to services.

53. Investments under sub-component A2 will be directly aligned with sub-component A1 LFFS and will include: demonstration fodder nurseries, upgrading of breeding centers, and small equipment (e.g. for feed balancing, renewable energy production, shelters, biosecurity and water filtration). It will finance (in form of grants) various eligible PO's Sub-Projects (SPs) covering investments under three main themes: feeding and nutrition, breed improvement, health and housing management. It will be supported by private LSPs, to be established under sub-component C1, for animal producers, such as: door step ration balancing advisory, feed input, AI, and animal health.

Component B: Market linkages and Value-Chain Development (US$224.65 million, of which IDA US$193.35 million)

54. The objective is to increase producers' linkage to profitable markets, improve the volume, quality and safety of livestock products being marketed, and decrease transaction costs along the value chains.

55. *Sub-component B1: Market linkages and Investments along the Value Chains (US$75.77 million, of which IDA US$44.47 million)*. B1 will improve market linkages by supporting POs and MSMEs through two routes adapted to the local conditions: (i) Productive Partnerships (PPs) between POs or MSMEs and larger agribusiness buyers (ABs) or POs and MSMEs themselves, including service providers and (ii) direct marketing by POs or MSMEs. These routes will allow for both an incremental upgrading of the informal sector and strengthening of the formal sector. Sub-projects (SPs) will be financed through the provision of Matching Grant Schemes (MGs) to promote access to financing for interested POs and MSMEs in support of commercial relationships with ABs. For instance, dairy hubs (DH) will be one set of PPs supported under the project. DHs are investments made by agribusiness firms, that are based on a network of 20-25 village milk collection centers (VMCC) in a radius of about 15-25km, i.e. one center for every 1-2 villages. In partnership with a commercial dairy company, VMCCs feed milk into a hub owned and operated by the company. Supporting POs and entrepreneurs with VMCCs as part of a PP, can help tip the balance on greater MFD dairy hub investments by reducing supply risk, as well as connecting more smallholders to higher value commercial markets. The project will also finance PO and MSME SPs[27] with

[27] Eligibility criteria of any SP will notably include a sound SP proposal and detailed business plan with: (i) investment costs and financing including beneficiary contribution (for POs, contribution could be in cash, in kind, in work, or a combination of these); (ii) operational and general costs;

clearly defined strategies to deliver market and social benefits, including climate mitigation and adaptation Co-Benefits. Improving access to markets was identified as an important climate change resilience strategy for smallholders, enabling to adapt production volumes and inputs/outputs to fluctuating conditions. In sum, eligible expenditures for MGs can include value chains investments all along the value chain including feed entrepreneurs, manure entrepreneurs, small-scale chilling, processing and storage facilities, private service providers or technologies for product diversification and CSA, all the way to on-farm shops (retail), among others. MGs will be provided based on sound investment plans and will be provided in three defining levels: (i) Mid-Sized Enterprises (MSEs) (50:50 funding up to maximum grant of US$300,000); (ii) Micro and Small-Sized Enterprises (MSSEs) (50:50 funding up to maximum grant of US$100,000); and (iii) POs (90:10 funding below US$100,000).

56. To support this activity, the project will fund service providers that can assist POs and MSMEs in the development of their technical and business proposals. In addition to the communication campaign on the PP activity, it will include targeted outreach campaigns for women on objectives, processes and rules of selection of PPs and provision of MGs. Selected POs and MSMEs' proposals will be supported in developing respective SPs that include a business plan/model,[28]clearly outlining the sustainability of the partnerships' incentive structures and potential linkages with supply chain actors beyond the project period. To maximize the project's impact, eligible POs will include those who have benefited with support from Component A and in all cases, will meet a well-defined set of criteria.

57. PPs are essentially agreements between POs or MSMEs and ABs and are based on: (a) product quality; (b) quantity to be produced and purchased; (c) delivery modalities: how the product will be delivered, when, and in what condition; (d) payment and price determination criteria; and (e) each partner's contribution to the partnership. By providing MG, the project leverages in private investment capital that alone would have been insufficient. As mentioned, the project will also support SPs with strong public goods elements, such as those that include climate smart and environmentally friendly technology (e.g. waste management, renewable energy production, energy and water efficient devices), food safety compliance investments, inclusion and knowledge transfer to smallholders or more marginalized value chain actors (e.g., collection points in remote/poor areas, milk quality testing devices for quality-based pricing). All SPs financed by MGs will leverage ICT and use a mobile tablet-based platform to keep track of their operations, processes, progress, and lessons learned that will feed into the INAPH which will provide the project's overall Management and Information System (MIS) and Monitoring and Evaluation (M&E) function.

58. *Sub-component B2: Critical and Climate Resilient Public Infrastructure for Livestock Development (IDA US$110.21 million)* will finance (in the form of grants) public and collective climate resilient infrastructure for value chain development to address barriers to livestock processing, food safety and marketing. This will include: (i) improvement of slaughtering at local wet markets and selected pilot slaughterhouse support at district level and in major cities to hygienically meet slaughter capacity needs at peak times (e.g. during major festivals and during extreme climate events). These slaughter and market

(iii) technologies envisaged; (iv) targeted markets and input/output price assumptions; organizational and capacity-building needs and proposed activities; operational, environmental, and social risks and mitigation measures; (v) a multiannual cash projection (before and after financing through the grant, POs' own resources, and loans); (vi) a profitability analysis (comparing the "with Project" and "without Project" situations); and (vii) key indicators such as return on capital, profitability ratio (benefits before and after tax on sales), etc.

[28] PRAN's Hub model under UNIDO-PRAN project is a good example. There was a clear pathway from the very outset, how PRAN will reach small holder dairy farmers in a commercially viable manner to ensure their required milk supply through a facilitative supply chain development approach.

facilities investments will upgrade or replace dilapidated and decaying buildings that are leading to chronically bad hygiene and pose a significant hazard to the health and welfare of workers, livestock, consumers and the wider environment; and (ii) renewable energy installations (solar panels, bio-digesters) at the livestock processing facilities and milk chilling and cooling facilities.

59. This sub-component will fund an initial in-depth analysis of needs and options, both in terms of technology and public private partnerships management structures. It will also finance a feasibility study for a possible Total Mixed Ration /Densified Total Mixed Ration manufacturing plant. Such studies will result in a transparent prioritization of needs, business plans, and general guidelines of investment decision-making along MFD lines. Investment plan options will be made with special attention to their financial viability, gender-related issues pertinent to the access and use of facilities by women, as well as building resilience and opportunities to achieve climate change mitigation co-benefits. To mobilize private sector, investments will include cost-sharing and contracting, leasing or other partnership arrangements with the private sector for the operation of any new or upgraded Government-owned facilities.

60. *Sub-component B3: Consumer Awareness and Nutrition (IDA, US$38.67 million)* will undertake a robust behavioral change communication and public education campaign using traditional and new media tools to raise awareness about diet- appropriate nutrition and food preparation practices. For maximum nutritional impact, the project will focus on pregnant and lactating mothers and children under two years, as well as women with school children, and medical and public health community workers. Topics will include the importance of animal source foods (ASF) in diets, food safety and hygiene. The communication campaign will differentiate between consumer groups with nutrition *deficits*, to improve their diets balanced with adequate ASF, from those already eating high levels of ASF.

61. This component will finance public efforts and engage the private sector in the consumer awareness and nutrition campaign. Grants will be given to dairy enterprises willing to undertake exhibition and demonstration activities on safe and nutritious dairy products to school children. This collective effort aims to further stimulate demand and behavioral change as it pertains to livestock product consumption. It will target rural schools for better nutrition while supporting dairy farmers through facilitating their local procurement of fresh milk from producers. B3 will be designed and implemented through a multi-sectoral approach, including all the relevant line Ministries. Eligible expenditures include training on nutrition awareness for students, mothers, and teachers; student identity cards; visits to dairy farms and processing units for students; impact analysis; as well as support for operating costs; processing and packaging equipment and milk transportation means; and any other relevant expenditures for the exhibition and demonstration function.

Component C: Improving Risk Management and Climate Resilience of Livestock Production Systems (IDA, US$105.67 million)

62. This component will finance the development of an enabling environment conducive to sustainable livestock sub-sector growth. It will strengthen the institutional framework and capacity of public sector institutions and private sector partners, address the gender gap in economic decision making, and promote viable risk management strategies, including insurance and food safety measures, through the following Sub-components:

63. *Sub-Component C1: Institutional Capacity Development and Knowledge Platform (IDA, US$65.47 million)* will strengthen the physical and human capacity of the MoFL, DLS, and the overall institutional

setup governing and supporting the sustainable development of livestock. It will strengthen policy advisory services, knowledge and innovation capacity and critical sub-sector information systems. It will include strengthening academic, technical and vocational training to improve capacity including climate adaptation and mitigation. Based on the findings of a comprehensive Capacity Needs Assessment of the sub-sector, DLS and livestock services, a Human Resources Development Plan will be elaborated and implemented, including management training, the promotion of an equitable staff complement of men and women in DLS and extension agents, skill-mix and age structure. Policy analysis and policy formulation will be carried out in priority domains such as breeding and AI services, core capacity of VSs, including disease monitoring and control and vaccine services, climate change adaptation and mitigation, environmental performance and others.

64. A broad risk analysis will be carried out to underpin the development of a national risk management plan for livestock (climate, markets, food safety and public health). These can further translate into related regulations, procedures and manuals, considering gender and environmental considerations such as pollution control, climate risks and GHGs. In addition, GHG reductions (or "mitigation outcomes") relating to the project will be quantified using internationally recognized methodologies, establish suitable monitoring, reporting, and verification systems, and support warehousing of these mitigation outcomes. These mitigation outcomes would be used towards Bangladesh's own NDC targets or monetized through sale to interested buyers.

65. This sub-component will finance the establishment of a network of private LSPs. These are the LSPs which will support capacity building for POs within sub-component A1 and A2. These may also be the LSPs deployed in relation to a specific productive partnership in Component B, or they may be supported through component B in setting up service hubs supporting access to inputs and services. This component will help in the identification, organization and networking of LSPs. The project can also support LSPs in this component with additional training to support private service delivery to farmers, in addition to DLS provision of public services. A Livestock Knowledge Platform will also be established and include government, private sector, financial sector, knowledge institutions, NGOs and international partners, to generate policy advisory services and support evidence-based policy making, as well as to promote innovations and guide the establishment of a Livestock Information Systems (LIS). In this, it will build, for example, on the Information Network for INAPH and a National Livestock Sector Identification Database (NLID) addressing high yielding dairy animals. The LIS will include the data required to guide and monitor climate change mitigation and adaptation efforts in livestock.

66. The sub component will strengthen the country's skill set for the sector's development. Academic and vocational training will be supported to produce a cadre of high-quality graduates with the knowledge and professional skills needed to spur the development of livestock and meat and dairy value chains. The sub-component will also promote national and international partnerships (e.g. with the Netherlands in the context of the Livestock Knowledge Platform) to strengthen capacities for research, learning and innovation. It will also finance feasibility studies for the possible establishment of new institutions to complement or restructure the existing institutional setup for livestock services delivery and strengthen the organizational and institutional framework of the sub-sector in Bangladesh, particularly the potential role and feasibility of establishing of (i) a multi-stakeholder Dairy Development Board; (ii) a Bangladesh Dairy Research Institute for research devoted to pre- and post-harvest dairy development; and (iii) a Bangladesh Poultry Research Institute to conduct research on poultry meat processing, meat safety and quality issues.

67. *Sub-Component C2: Food safety and public health (IDA, US$21.82 million)* will improve food safety and quality assurance, complementing on-going efforts of the Ministry of Food, the Bangladesh FSA, and the Ministry of Health and Family Welfare, supported by the Netherlands, United States Agency for International Development (USAID), and the FAO among others. It will focus on: (i) improving regulations and their enforcement, establishing quality standards for dairy and meat products, and feed; (ii) developing SOPs for control and certification of operators, facilities, dairy and meat products and feed; (iii) introducing traceability systems for supply chains, building on the INAPH developed under Sub-component C1; (iv) training and demonstration of different food safety compliance modalities at farm, transport, slaughtering, processing and retail levels; (v) establishing a system for safe food production, processing, marketing and expanding laboratory capacity at central and regional levels for testing food and feed samples as well as building a centralized database of the food borne illness incidents; and (vi) training and skills development including mobile applications, SMS, and video based training materials for farmers, service providers, DLS staff, processors, retailers, and consumers for farmers, service providers, DLS staff, processors, retailers, and consumers.

68. *Sub-component C3: Livestock Insurance (IDA, US$18.38 million)* will support the GoB in creating an enabling environment to promote gradual uptake of livestock insurance by introducing a Livestock Insurance Pilot Program (LIPP) aimed to reduce farmer vulnerability to asset losses and build resilience to shocks, including extreme climate events. This will include support to DLS to establish pre-conditions for livestock insurance to ensure good quality data to develop effective insurance solutions. This will be done by building on the ICT and animal health services delivery architecture set up under the project, to establish a sustainable system to: (i) identify and trace individual livestock animals with the NLID, which is part of the INAPH system, to provide high quality and proximity vet services, vaccinate and conduct pre-inspections, ensure and track animals' health management, conduct loss inspections and provide loss adjustment services; and (ii) develop and maintain a national database of livestock mortality and health and pre-conditions records for reporting and recording linked to the ICT architecture.

69. In parallel, work will be conducted to support the development of a National Livestock Insurance Policy by the insurance regulator, IDRA. Under phase 2 of the LIPP, support will be provided for developing operational and distributional options. A partner agent model will be implemented where product development and policy underwriting will be done by insurance companies while FIs/dairy producers will be delivering channels to distribute the policies and raise awareness by leveraging the existing outreach in the rural areas and engagement with farmers and local communities. To raise awareness and motivate the farmers to insure their cattle, a mass awareness campaign will be undertaken to show benefits of the insurance using face-to-face interactions in close collaboration with the local NGOs, traditional media and mass media. The fiscal cost of the scheme will be estimated, with targeted premium subsidies (in form of grants for the farmers) to lower the premium rates and gradually promote up-take of livestock insurance among smallholders.

70. Technical assistance will be provided to pre-selected corporations and foundations based on the number of insurance products and services delivered. Clear criteria in product design, pricing and low-cost operating systems and procedures' design and to act as partner agent for livestock insurance products' distribution will all be considered. Involvement will be explored for private insurance companies and adoption of partner agent models, including FIs and dairy processors. The livestock insurance scheme would be formulated with the objective of demonstrating the benefit of insuring livestock to the people and popularizing it. Investments will be made to support awareness raising and

popularizing livestock insurance schemes which will be conducted in close collaboration with the private and NGO sector.

71. Financial literacy campaigns would be conducted, and awareness raised among smallholders on the benefits of livestock insurance schemes. As financial literacy is very important in helping women understand the insurance products, extensive training and information-sharing will be planned to help increase insurance uptake among women. Communication activities will be tailored to the needs and perceptions to risks of the different target audience groups, with a special focus to the women. For consistency and for catalyzing access to finance, eligible POs and MSMEs will be selected among those who are involved in PPs with ABs and benefiting with MGSs.

72. *Sub-component C4: Contingency emergency response (US$0 million)* to enable a rapid mobilization of funds in the event of an eligible crisis or emergency following an adverse natural or manmade event.

Component D: Project Management, Monitoring and Evaluation (US$73.83 million, of which IDA US$26.47 million)

73. Component D will establish the Project Management Unit (PMU) at DLS headquarters, with eight Project Implementation Units (PIUs), one in each Divisional Livestock Office, and set-up adequate fiduciary, governance, audits and accountability systems, communication and monitoring and evaluation, coordination, and special evaluation studies. The PMU/PIUs will establish capacities and work out efficient modalities for a considerable body of work in implementing MGs and PPs including competitive calls, contracting and contract monitoring involved. PMU and PIUs should play a crucial intermediator role in many skill domains presently not reflected in the Implementing Agency (DLS) and transition them to the formal structure and staffing over the years, namely, concerning (i) the capacity to focus on demand-led approaches, markets, market research, PPs and PPPs, and (ii) the establishment of a database and information center.

F. Project Cost and Financing

74. The lending instrument for the proposed project is the Investment Project Financing (IPF). The total cost of the proposed project is estimated at US$578.66 million over 5 years of which US$500 million from IDA. GoB's contribution (US$47.36 million) will essentially fund customs value added tax related costs of foreseen investments, staff cost, workshop allowances, sitting allowances, cash per diems, honoraria, purchase of vehicles, and fuel on a parallel basis. Under component B (Market linkages and Value-Chain Development), beneficiary POs and MSMEs will co-finance investments up to equivalent US$5.30 million through MGs and partner private processors co-investments in 20 new dairy hubs are estimated around US$26.00 million.

Table 1: Project Cost and Financing (US$ million)

Project Components	Project cost	IDA Financing	Counterpart Funding	POs	ABs
Component A	142.51	142.51	0.00	-	-
Component B	224.65	193.35	0.00	5.30	26.00
Component C	105.67	105.67	0.00	-	-
Component D	72.63	25.27	47.36	-	-
Project Preparation Advance (This amount is included in Component D of the PAD data sheet)	1.20	1.20	-	-	-
Unallocated funds	32.00	32	-	-	-
Total Costs	**578.66**	**500.00**	**47.36**	**5.30**	**26.00**

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

75. The main implementing agency will be DLS in MoFL. The implementation mechanisms, including sequencing of activities and an overall implementation support plan, will be described in detail in the PIM. A Project Steering Committee (PSC) will be formed, chaired by the Secretary MoFL, to provide strategic oversight and guidance the project implementation. A Project Implementation Committee (PIC) will assist PSC on oversight of technical issue of implementation. DLS will establish a PMU and PIUs to ensure a day-to-day implementation and supervision of the project. The PMU will be headed by a strong team comprising a Project Director (PD), a Chief Technical Coordinator (CTC), and five Deputy Project Directors (DPDs) to be deputed from the GoB personnel. PMU and PIUs will be supported/empowered by design and supervision and capacity building firms. Importantly, the firms' responsibilities will include significant hands-on training of the DLS, PMU and PIUs staff to ensure the necessary capacity during transition period. This will reduce significantly the risks of institutional capacity gaps during the initial years of implementation and reduce the total cost of consulting services.

76. Design and Supervision Consultant firm (D&SC). Based on agreed Terms of Reference, the PMU will be supported during the first 48 months by a Project D&SC to be hired on a competitive basis. The D&SC will be hired within 3 months of project effectiveness to help the PMU with the timely mobilization and uptake of the project. He/she will carry out feasibility studies related to the construction works, prepare procurement packages, and supervise the works in coordination with DLS and other relevant ministries.

77. Capacity Building Service Providers (CBSPs). CBSPs will be hired on a competitive basis, and could be either private firm, state-owned agency, or NGOs and will be hired upon project effectiveness to help the PMU with the timely mobilization and uptake of the project direct support and training. Components A, B and C will be implemented by DLS in partnerships with a CBSP in agribusiness for Component A and B and sub-component C2 on food safety. Sub-component C1 will be implemented by DLS through PMU. A

separate Livestock Insurance Unit (LIU) will be established in the PMU with dedicated personnel (an insurance officer, a computer operator, a support staff) procured through competitive basis from market, responsible for the overall implementation and management of the Livestock Insurance Pilot Program (LIPP). The LIU will implement and monitor the LIPP through a partner agent model in collaboration with insurance companies, IDRA and delivery channels. There will be LIU representatives in each PIUs responsible for project field activities where LIPP operates. The LIU will work in compliance with insurance best practices and with ability to serve small farmers efficiently with risk mitigation products. The key functions of the LIU would include: (i) implementation and refinement of the LIPP; (ii) coordination with insurance companies and delivery channels under the partner agent model; (iii) control of the financial aspects of LIPP; organization of the promotion and awareness activities to maximize rural stakeholder participation; and (iv) M&E of insurance.

B. Results Monitoring and Evaluation Arrangements

78. Framework for monitoring outcomes/results. The monitoring of outcomes/results will be based on the results framework and monitoring arrangements that are described in detail in Annex 1. The project's M&E function will be mainly ICT-driven and track progress in activities, outputs, and outcomes using indicators from the results framework. For the monitoring of the project processes and results, the project M&E function will adopt an ICT-based project MIS that caters to the project level information needs. The PMU will adopt an M&E strategy for project processes, information requirements, tools and methodologies for data collection, analysis and reporting; and a comprehensive M&E plan with clear roles and responsibilities as they relate to indicators tracking with respect to data gathering and reporting. The project M&E will also use Participatory Community Monitoring and Accountability approaches such as for local level monitoring, performance evaluation of services, and citizen feedback. In addition, the project M&E function will undertake periodic beneficiary assessments through sample surveys to track the project's progresses towards its goal. The M&E system will also include special thematic/diagnostic studies during implementation to supplement and complement data gathered from the regular monitoring. Hired third-party M&E firms will undertake the necessary baseline, mid-term and impact evaluation activities. The PIM will detail the organizational and technical procedures of M&E system.

IV. PROJECT ASSESSMENT SUMMARY

A. Technical Analysis and Lessons Reflected in Project Design

79. Overall, lessons highlight the importance of an integrated approach with focus on productivity through breed improvement, feeding and animal health, risk management, and on market access for POs to both input and output markets. This approach reflects the findings of the DRG study, which showed that developing a commercially viable smallholder livestock sub-sector needs to address productivity, incentives and profitability, climate resilience and risk management concurrently. On the latter, lessons from the Bank's experience in Risk Mitigation and Insurance were also brought to bear on the project design, including: the Kenya Livestock Insurance Program, the Livestock Insurance Linked to National Project for Cattle and Buffalo Breeding in India, the Index-based Livestock Insurance Program in Mongolia, and the studies conducted by the WBG on Types of GOB Premium Subsidy Support to Livestock Insurance.

80. Further lessons about: (i) institutional strengthening to provide effective extension advice and training and establish pre-conditions for livestock insurance; and (ii) establishing an adequate incentive and regulatory framework to stimulate private investments in value-chains were also important. A unique identification, recording and information system at the individual animal level has been found to support productivity and marketing and enable traceability and evidence-based decision making. Ensuring representation of women and developing an advisory and services delivery system at the farmers' doorstep has proven more effective, and a system with female workers offering higher quality service appropriately delivered, most sustainable. Local collection points focused on cold chain is essential for access for women, as well as supporting quality. Small scale processing under hygienic conditions can be highly profitable. Farmer skills development using LFFS has demonstrated highest adoption rates, especially for women, and the many climate smart best practices can be readily adopted by farmers, e.g., ration balancing practices can reduce GHG by up to 20 percent.

81. Other lessons on the structure of productive partnerships derive from the Bank's well documented experience in Productive Alliances. Key lessons include:

(i) Formation of functional POs takes time. Projects need to work with the POs that are already operating, while supporting the formation of new POs for further cycles of productive partnership. For the identification of exiting POs, the project will use information from previous and ongoing Bank-financed projects.

(ii) Support for core decentralized public services is critical to the project at operational levels. The project is designed not only to support capacity building for public and private EASPs and to establish a knowledge platform, but also to fill gaps in current implementation capacity while leveraging ICT to optimize services providers' interventions and service delivery.

(iii) Technical, financial, organizational, and management capacities of beneficiary POs, communities and MSMEs are the keys to project performance.

(iv) Capacity building under the project is designed to go beyond training on agricultural techniques, and to cover organization, operations and business management; as well as procurement, financial management, logistics, and resources management. To wit, how to run a business. Support to POs and MSMEs on responding to market demand is a driving factor of success, which is why POs and MSMEs' SPs should be designed to meet the existing market specification and demands of ABs as customers, not based on vague market hypotheses or expectations of needs.

(v) SPs must be comprehensive enough to cover all critical activities and expenses. Weak formulation, cost estimates, and financial analysis of SPs will delay and hinder implementation; and (vi) within value chains, effective links between POs and MSMEs (suppliers), ABs (buyers are necessary conditions for competitiveness while, if need be, FIs (credit) and targeted technical assistance (TA) can be essential for successful PPs. The project will promote pilot insurance with POs and MSMEs engaged on PPs with ABs to catalyze loans from FIs.

B. Economic and Financial (if applicable) Analysis

82. The proposed project is expected to generate multiple benefits. Such benefits include: enhanced service delivery capacities of public institutions responsible for the development of livestock; enhanced

technical capacities of livestock professionals and TA providers in general; improved animal health and food safety in the country; greater awareness of food safety and nutrition among consumers; improved infant nutrition through schools; improved livestock productivity which lead to increased farmers' income; and value chain development through improved infrastructure and development and expansion of rural businesses. While these benefits are important to GoB and to the country population at large, credibly quantifying all the benefits is not feasible. Accordingly, the financial and economic analysis is conducted considering only those benefits that are readily measurable and can be clearly associated with project's main and direct investment activities, namely: improved livestock productivity and value chain development. Investments aimed at generating such benefits represent 50 percent of project costs and so the approach yields very conservative estimates of benefits.

83. The financial and economic analysis is based on a cost-benefit methodology. Representative farm models and likely value chain business or operation unit models were developed based on information collected from DLS as well as NGO's and private sector actors involved in the livestock sub-sector of the country. The analysis uses seven farm models: (i) small-scale dairy cattle farm changing local breed for cross breed; (ii) small-scale dairy cattle farm already with cross breed; (iii) small-scale beef fattening activity; (iv) small-scale goat fattening activity; (v) small-scale commercial poultry farm; (vi) small-scale Sonali poultry farm; and (vii) backyard scavenger poultry activity. In addition to these "production" models, supplementary or other farm/business models are also included: (i) green fodder production; (ii) feeds and fodder processing; (iii) manure-based production of biogas and fertilizers; (iv) village milk collection center; (v) mini-dairy processing unit; and (vi) wet market slaughtering facility. Farm-level investment support will essentially be provided with Livestock Productivity and Innovation Invest Fund foreseen under sub-component A2, whereas investment support for value-chain development will be provided though the matching grant mechanism and the milk collection support activities foreseen under sub-component B2. Both farmers and value chain actors receiving investment support are expected to contribute with a share of investment costs.

84. Basic parameters and assumptions for the financial analysis include: project execution period of 5 years; subproject operation/evaluation period of 15 years; exchange rate of 80 BDT/US$; and annual discount rate of 12 percent for the financial analysis and 5 percent for the economic analysis. Financial prices were converted into economic prices for major products (milk, beef, goats and poultry) and for labor costs. Economic and financial prices of production inputs are assumed to be equal since they are generally purchased locally without duty/tax distortions.

85. The Economic Internal Rate of Return (EIRR) and Net Present Value (NPV) for the project activities and investments directly related with livestock productivity and value chain development are 23.5 percent and US$137 million, indicating that the overall project is economically justifiable. Sensitivity analysis to test the robustness of the EIRR shows it is sensitive to implementation delays and reduction of benefits: a two-year delay reduces the EIRR to 12 percent; similarly, a 30 percent reduction in benefits would also reduce the Internal Rate of Return (IRR) to 12 percent. The project is somewhat less sensitive to cost increases: EIRR drops to 14 percent with a 30 percent increase in costs. At farm and business/operation unit level, the financial IRR and NPV of foreseen investments show that all investments are financially viable: 19 percent and US$6,000 for dairy farms changing local breed for cross breed; 23 percent and US$10,300 for dairy farms already with cross breed; 35 percent and US$1,900 for beef fattening; 33 percent and US$2,800 for goat fattening; 40 percent and US$1,600 for commercial poultry farms; 47 percent and US$1,900 for Sonali poultry farms; 25 percent and US$800 for backyard poultry rearing; 18

percent and US$500 for PO green fodder production; 17 percent and US$19,000 for feeds and fodder processing; 26 percent and US$77,700 for manure/organic waste processing unit; 21 percent and US$63,500 for village milk collection center; 27 percent and US$384,000 for mini-dairy processing firm; and 47 percent and US$1,078,600 for wet-market slaughtering facility.

86. Climate Co-Benefits and project's effect on GHG balance. The assessment of climate Co-Benefits for the project has mitigation and/or adaptation outcomes. For mitigation, activities were selected that contribute to productivity gains including feeding, animal health, herd management, manure management, energy efficiency, and renewable energy. The project will have a mitigation effect: 1.4 million tCO2eq, equivalent to ca. 70,000 tCO2-eq per year over the implementation and 15-year capitalization phase. Considering an average price of US$40 per tCO2eq, the incremental aggregate economic NPV due to climate Co-Benefits is US$17.3 million. Marginal emission reduction is achieved in the livestock sector: given the scope for productivity gains in cattle and small ruminant production, the project will foster output growth through productivity gains rather than through herd expansion. Preliminary results show that direct GHG emissions per unit of milk would be reduced by 35 percent among project beneficiaries, while absolute direct emissions would be left about constant. Most of the expected mitigation effect of the project will be achieved through the rehabilitation of degraded pastures and through the replacement of 50,000 ha of rice with maize for feed production. Adaptation activities include capacity development, disease control, traceability and information systems, and insurance.

C. Fiduciary

I. Financial Management

87. The Financial Management (FM) risk has been assessed as "Substantial". Since DLS has direct experience in handling IDA funded operations with NATP-II and in dealing with Designated Account of IDA funds, FM arrangements will be in place to ensure smooth management of the IDA proceeds. These include: (i) an FM Specialist (FMS) will be recruited for the implementing agency (IA); (ii) one accounts officer and one accountant will be recruited to support the FMS in carrying out day to day accounting and book keeping function; (iii) within 6 months from the effectiveness of the project, a PIM will be prepared in compliance with GoB and Bank guidelines and a Grant Manual will be prepared outlining the funds flow mechanisms, accounting and reporting arrangements; (iv) a Designated Account in the form of Convertible Taka Special Account will be opened with a nationalized commercial bank acceptable to IDA; (v) all project related expenditures will be recorded and compiled at the IA; (vi) the IA will procure and install an off the shelf accounting software to record project expenses; (vii) a set of Interim Unaudited Financial Reports (IUFRs) will be prepared and submitted to the Bank within 45 days after the close of each calendar quarter; (viii) annual external audit of the project will be carried out by the Comptroller and Auditor General of Bangladesh, through its Foreign Aided Project Directorate and the report will be submitted to the World Bank within 6 months after the close of each financial year; (ix) two internal audits will be carried out by outsourced private auditors during the tenure of the project, the first one, 1 year after project effectiveness and the second one, 1 year before the project closure; and (x) following determination of a ceiling, disbursement will be made on an advance and replenishment basis, based on submission of Statements of Expenditure (SOE).

88. In addition, after one year of implementation, the Bank will review the FM performance, in terms of robustness and accuracy in recording of financial transactions as well as financial reporting, for determining eligibility of the project to convert from SOE based disbursement modality to that of IUFRs

including a 6-monthly forecast of fund requirements. There would be reporting of expenditures by the beneficiaries of grants which should be reported in the withdrawal application.

II. Procurement

89. All goods, works, non-consulting services and consulting services required for this project and to be financed with IDA financing shall be procured in accordance with the World Bank Procurement Regulations for IPF Borrowers, dated July 1, 2016 (Revised in November 2017) referred as Procurement Regulations. Procurement capacity assessments of DLS has been conducted and Procurement risk of the project is Substantial. DLS has experience of implementing Bank-financed projects. DLS implemented two IDA-financed projects (the Global Program for Avian Influenza and Human Pandemic Preparedness and Response Project, and the National Agricultural Technology Project) successfully and is currently implementing the IDA-financed National Agricultural Technology Program Phase-II Project. DLS has prepared a Project Procurement Strategy for Development (PPSD) with procurement risk (rated as "Substantial") and related mitigation plan. PPSD has also major and high value procurement packages in the procurement plan with sourcing and contracting strategy.

D. Safeguards

I. Environmental Safeguards

90. The operation envisaged to have some adverse environmental impacts on local scale. With the increase of livestock and poultry bird numbers, comes an increased amount of additional animal waste. This is not expected to be a severe problem in a warm tropical country like Bangladesh, where denitrification is quick, but proper regulation for manure deposition is needed. The runoff from manure can flow into water bodies causing severe ecological harm, and decomposing waste can release dust particles, bacteria, endotoxins, and volatile organic compounds, as well as hydrogen sulfide, ammonia, and other odorous substances into the air. Increase in livestock number and production also increases demand for feed crops thus requiring intensification of agricultural land use and resulting in a host of environmental costs including increased erosion, lower soil fertility, reduced biodiversity, pollution of ground and surface water, and impacts on atmospheric constituents, and climate. It is anticipated that some activities may trigger reversible environmental impact during the site clearance and infrastructure development. The project is not expected to be close to any environmentally sensitive areas.

91. The Bank's umbrella policy on environmental safeguards, Environmental Assessment OP/BP 4.01 is triggered along with OP 4.09 on Pest Management. As instrument, DLS has therefore, developed an Environmental Management Framework (EMF), which is combined with Social Management Framework to form a single document, the Environmental and Social Management Framework (ESMF). The EMF provides guidance for environmental impacts screening and, where necessary, carry out detailed, more-specific environmental impact assessments and subsequently prepare environmental management plans for project activities, where specific program and site locations are identified. The ESMF also includes criteria to identify components and activities which require further stringent environmental assessments in the form of Environmental Impact Assessment (EIA). A separate standalone document Pest Management Plan (PMP) is also prepared to cover pest control procedures and pesticide related hazards. The Department of Environment under the Ministry of Environment and Forests is the competent national authority to administer the Environmental Conservation Act of 1995 and its amendment (2010), which define Environmental Clearance Procedures in Bangladesh.

II. Social Safeguards

92. The project interventions are expected to bring better and more sustainable livestock management practices, develop market linkages in value-chains and improve risk management and resilience of livestock production systems. The project primarily targets small-scale producers, processors and service providers in the value chain in project areas across the country. All activities will be designed and implemented using all-inclusive consultative and participatory processes. Acquisition of private land using eminent domain law of the country will be completely avoided, but displacement of people may be associated in the use of existing land or land taken in other methods including voluntary donation, direct purchase or negotiated settlement from GoB financing for infrastructure development, rehabilitation and improvement. The project beneficiaries may also include small ethnical communities at some locations as it targets the potential dairy and livestock hubs across the country.

93. The Bank policy on social safeguards including OP/BP 4.12 on Involuntary Resettlement and OP/BP 4.10 on Indigenous Peoples have been triggered to the Project. DLS has therefore developed a Resettlement Policy Framework and Small Ethnic Community Development Framework included in the ESMF covering involuntary resettlement and tribal peoples' issues associated with the project design and implementation.

94. The ESMF provides guidance for social impacts screening and, where necessary, to carry out detailed, site-specific social impact assessments and subsequently prepare social impact management plans for project activities once specific program and site locations are identified. The ESMF includes a Grievance Redress Mechanism (GRM) and guidelines for social inclusion and gender, consultation and participation, and social safeguards. Given DLS' limited capacity in managing social issues, the project will invest in improving related counterpart social safeguard capacity. The PMU will be responsible for management of social development and safeguards issues associated with the project and will appoint own safeguards focal persons, a senior Social Development Specialist, in addition to safeguard resources with D&SC and CBSPs.

95. Gender and child labor. The project focuses gender and youth inclusive approach. The DLS targets 50 percent of the beneficiaries from able and interested women and 20 percent of the beneficiaries from youth women and men. However, careful screening will be in place to avoid child labor employment under project ventures. Appropriate motivational campaign will be in place to avoid gender-based violence for an enabling environment and working conditions for the women. The project will be a platform for facilitating the women and youth for more productive participation in livestock.

III. Other Safeguards

Not Applicable

IV. Grievance Redress Mechanisms

96. Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, because of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management

has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service, please visit *www.worldbank.org/grs*. For information on how to submit complaints to the World Bank Inspection Panel, please visit *www.inspectionpanel.org*.

V. KEY RISKS

Overall Risk Rating and Explanation of Key Risks

97. The overall risk rating is Substantial. The most concerning issue is the country's political and governance environment and ensuing uncertainty over accountability issues and transparency. To mitigate this, a Governance and Accountability Action Plan and GRM will be prepared and implemented to address these risks.

Table 2: Systematic Operations Risk-rating Tool (SORT): Risk Ratings Summary Table

Risk Category Rating	Rating
1. Political and Governance	High
2. Macroeconomic	Moderate
3. Sector Strategies and Policies	Moderate
4. Technical Design of Project or Program	Substantial
5. Institutional Capacity for Implementation and Sustainability	Substantial
6. Fiduciary	Substantial
7. Environment and Social	Substantial
8. Stakeholders	Substantial
9. Other: Climate and Disaster Risk	High
OVERALL	**Substantial**

98. Political and Governance (High). Governance and accountability risks related to the expected significant equipment acquisitions and multiple small-scale infrastructure investments under this project will need to be mitigated through transparent fiduciary (FM and procurement) mechanisms, monitoring and capacity building of implementing agencies as well as beneficiary POs and enterprises. The project will develop GRM and strengthen capacities among the various stakeholders involved in the sub-sector.

99. Technical Design of Project or Program (Substantial). The project is designed to implement key elements of the GoB's strategy for agriculture development in Bangladesh. Thus, the design is not only comprehensive and supports the country's livestock systems and value chains, but also fits country's diversified and challenging context, and relevant risk mitigation measures have been incorporated.

100. Institutional capacity and Stakeholders (Substantial). The PIM will include a stakeholder mapping to: (i) provide strong technical support to POs to prepare and implement their investments; (ii) focus and enhance DLS to provide public goods services (regulations, monitoring, quality assurance and control, food safety, disease surveillance) while leveraging private EASPs to provide more of the VSs, vaccinations, AIs; (iii) incorporate proactive, gender-sensitive citizen engagement throughout project design and implementation; and (v) undertake a detailed institutional capacity assessment to identify capacity building needs for both the DLS and local communities.

101. Fiduciary (Substantial). Bangladesh ranks 2nd worst in South Asia and the 13th worst in the world and the country consistently ranks among the bottom ten in Transparency International's Corruption Perception Index 2015 (Global Corruption Perception Index 2015). Bangladesh remains well behind many countries in south Asia in doing business (Doing Business Report, 2017), and this may hamper efficiency of livestock services delivery and development of the livestock value chains. Procurement Risk and Risk Mitigation Plan have been detailed in PPSD. This will require adequate fiduciary management and monitoring systems as well as capacity. The implementing entities will be strengthened to ensure that all the applicable Bank's Fiduciary Guidelines are followed under the project.

102. Environmental and Social (Substantial). With the increase of livestock and poultry bird numbers large amount of additional animal waste that can cause severe ecological harm and diseases. Increase in livestock number and production also increases demand for feed crops thus requiring intensification of agricultural land use and resulting in a host of environmental costs including increased land degradation and pollution, and impacts on atmospheric constituents, and climate. The project is not expected to be close to any environmentally sensitive areas.

103. The substantial risk rating would also include the limited safeguards capacity of the Implementing Agency, as mentioned in the concept document; and diversity of activities and subprojects across different implementing entities which can only be identified and prepared during implementation. There is a moderate likelihood that exogenous environmental risks could adversely affect the achievement of the operation's objectives or the sustainability of results. Likely environmental risks include extreme events such as heat waves, flooding and storm surges and other environmental issues like air and water pollution, contamination of feeds and prevalence of pests and vector borne diseases in the project areas. These risks are expected to be limited.

104. The proposed project is intended to have positive social and economic effects among beneficiaries. The project is likely to have limited potential social impacts specifically associated with the small-scale infrastructures development and rehabilitation. Acquisition of private land using eminent domain law of the country will be completely avoided but displacement of people may be associated in the use of existing land or land taken in other methods including voluntary donation, director purchase or negotiated settlement in a limited scale. Beneficiaries may also include tribal communities at some locations as it targets the potential dairy and livestock hubs across the country. Due to cultural norms and access to resources, accommodating inclusive participation of targeting farmers in program design and in POs, including women, landless, small and marginal farmers will be a challenge as they are less informed and enjoy limited access to policy advocacy, technology and markets.

105. Other: Climate and Disaster Risk (High). The preliminary Climate and Disaster Risk Screening indicates that the livestock sub-sector in Bangladesh is currently highly vulnerable to the negative impact of climate change. Extreme heat, floods, cyclones, sea level rise and salinization as well as increasingly irregular rainfall all affect livestock production, ranging from moderate to severe impacts. The project mitigation activities include CSA practices, institutional capacity, and livestock insurance.

VI. RESULTS FRAMEWORK AND MONITORING

Results Framework

COUNTRY: Bangladesh

Livestock and Dairy Development Project

Project Development Objectives(s)

The project development objective is to improve productivity, market access, and resilience of small-holder farmers and agro-entrepreneurs operating in selected livestock value chains in target areas.

Project Development Objective Indicators

Indicator Name	DLI	Baseline	Intermediate Targets						End Target
			1	2	3	4	5	6	
Improve Productivity									
Farmers adopting improved agricultural technology (CRI, Number)		0.00	0.00	100,000.00	200,000.00	400,000.00	500,000.00		500,000.00
Farmers adopting improved agricultural technology - Female (CRI, Number)		0.00	0.00	50,000.00	100,000.00	200,000.00	250,000.00		250,000.00
Increased productivity of targeted species by direct beneficiaries (Percentage)		0.00							35.00
Dairy Cattle (Percentage)		0.00	0.00	5.00	20.00	20.00	40.00		40.00
Beef fattening		0.00	0.00	10.00	18.00	18.00	35.00		35.00

Indicator Name	DLI	Baseline	Intermediate Targets						End Target
			1	2	3	4	5	6	
(Percentage)									
Small ruminant fattening (Percentage)		0.00	0.00	5.00	15.00	15.00	25.00		25.00
Sonali Poultry (Percentage)		0.00	0.00	5.00	10.00	10.00	20.00		20.00
Market Access									
Increase in market access reflected in incremental sales (aggregated over all targeted value-chains) in real-value in the project areas (see footnote 1) (% of sales increase among female producers). (Percentage)		0.00	0.00	0.00	25.00	0.00	50.00		50.00
Percentage increase for female producers (Percentage)		0.00	0.00	0.00	20.00	20.00	30.00		40.00
Risk management and resilience									
Farmers and value chain actors have adopted practices to improve resilience to selected risks (Number)		0.00	0.00	20,000.00	50,000.00	100,000.00	150,000.00	200,000.00	150,000.00
Farmers and value chain actors implement food safety measures, system for their animals		0.00	0.00	40,000.00	70,000.00	100,000.00	150,000.00		150,000.00

Indicator Name	DLI	Baseline	Intermediate Targets						End Target
			1	2	3	4	5	6	
(Number)									
Livestock insurance products and services developed (Number)		0.00	0.00	0.00	0.00	0.00	2.00		2.00

Intermediate Results Indicators by Components

Indicator Name	DLI	Baseline	Intermediate Targets						End Target
			1	2	3	4	5	6	
Component A: Productivity Improvement									
Producer organization facilitated and operational (Number)		0.00	1,000.00	2,000.00	3,000.00	4,000.00	5,500.00		5,500.00
Producer organization facilitated and operational - led by females (Number)		0.00	500.00	1,000.00	1,500.00	2,000.00	2,750.00		2,750.00
Farmers have received business development siklls training, inputs, marketing support and financial services (Number)		0.00	10,000.00	50,000.00	100,000.00	150,000.00	190,000.00		190,000.00
Farmers have received business development siklls training, inputs, marketing support and financial services - female (Number)		0.00	5,000.00	25,000.00	50,000.00	75,000.00	95,000.00		95,000.00

Indicator Name	DLI	Baseline	Intermediate Targets						End Target
			1	2	3	4	5	6	
Farmers have accessed livestock services, CSA technoligies and practices (Number)		0.00	100,000.00	300,000.00	500,000.00	750,000.00	1,000,000.00		1,000,000.00
Of Which Female (Number)		0.00	80,000.00	240,000.00	300,000.00	300,000.00	400,000.00		400,000.00
Reduced GHG emission per unit of milk produced in project areas (Percentage)		0.00	0.00	15.00	15.00	30.00	40.00		40.00
Component B: Market Linkages and Value-Chain Development									
PPs established and financed (Number)		0.00	0.00	1,000.00	2,000.00	3,500.00	5,000.00		5,000.00
PPs established and financed - of female (Number)		0.00	0.00	500.00	1,000.00	1,750.00	2,500.00		2,500.00
Slaughtering facilities/milk processing/cooling facilities renovated and made climate smart (Number)		0.00	0.00	0.00	200.00	300.00	700.00		700.00
Systems and devices for renewable energy production and energy efficiency gains established (Number)		0.00	0.00	300.00	400.00	500.00	1,000.00		1,000.00
Increase average intake (gram/day) of dairy, meat, poultry and egg, especially among climate vulnerable areas		0.00	0.00	10.00	20.00	30.00	40.00		40.00

Indicator Name	DLI	Baseline	Intermediate Targets						End Target
			1	2	3	4	5	6	
targetedd for nutrition improvement activities (Percentage)									
Increase average intake (gram/day) of dairy, meat, poultry and egg, especially among climate vulnerable areas targetedd for nutrition improvement activities - Female (Percentage)		0.00	0.00	10.00	20.00	30.00	40.00		40.00
Students under School Milk Program (Number)		0.00	0.00	100,000.00	200,000.00	300,000.00	360,000.00	300,000.00	360,000.00
Students under school milk program - number of girls (Number)		0.00	0.00	100,000.00	100,000.00	150,000.00	180,000.00		180,000.00
Component C: Improving Risk Management and Climate Resilience of Livestock Production Systems									
Improvement in the management and delivery capacity of livestock services (staffin at operational levels, knowledge improvement (vocational and academic training , study tours, seminars, etc.), avail (Number)		0.00	0.00	30.00	30.00	50.00	60.00		60.00
Graduates/Trainees supported /trained through project's		0.00	0.00	1,000.00	2,000.00	3,000.00	4,000.00		4,000.00

Indicator Name	DLI	Baseline	Intermediate Targets						End Target
			1	2	3	4	5	6	
assistance to academic and vocational training (Number)									
Graduates/Trainees supported /trained through project's assistance to academic and vocational training - Female (Number)		0.00	0.00	500.00	1,000.00	1,500.00	2,000.00		2,000.00
Stakeholders (persons) reached with food safety information through training, mobile apps, SMS and video-based tools (Number)		0.00	0.00	0.00	500,000.00	1,000,000.00	1,400,000.00		2,000,000.00
Total farmers in the pilot areas receiving livestock insurance awareness and/or training (Percentage)		0.00	0.00	25,000.00	100,000.00	250,000.00	500,000.00		500,000.00
Of which females (Percentage)		0.00	0.00	10,000.00	50,000.00	125,000.00	250,000.00		250,000.00
Number of cattle included in the pilot animal identification and recording system (Number)		0.00	0.00	0.00	50,000.00	100,000.00	200,000.00		200,000.00
Component D: Management and Monitoring and Evaluation									
Additional full jtime equivalent (FTE) jobs created in project areas		0.00	0.00	0.00	80,000.00	120,000.00	150,000.00		150,000.00

Indicator Name	DLI	Baseline	Intermediate Targets						End Target
			1	2	3	4	5	6	
(Number (Thousand))									
Additional full time equivalent (FTE) jobs created in project areas - Females (Number (Thousand))		0.00	0.00	0.00	40,000.00	60,000.00	75,000.00		75,000.00
Additional full time equivalent (FTE) jobs created in project areas - Youth (Number (Thousand))		0.00	0.00	0.00	16,000.00	24,000.00	30,000.00		30,000.00
Primary National Livestock Monitoring Information System established and operational (Number)		0.00	0.00	1.00	2.00	3.00	3.00		3.00
Targeted livestock producers satisfied with the livestock services received from the livestock services (Percentage)		0.00	0.00	40.00	50.00	60.00	70.00		70.00
Targeted livestock producers satisfied with the livestock services - of which females (Percentage)		0.00	0.00	40.00	50.00	60.00	70.00		70.00
Farmers reached with agricultural assets or services (CRI, Number)		100,000.00	100,000.00	500,000.00	1,000,000.00	1,500,000.00	2,000,000.00		2,000,000.00
Farmers reached with agricultural assets or		0.00	50,000.00	250,000.00	500,000.00	750,000.00	1,000,000.00		1,000,000.00

Indicator Name	DLI	Baseline	Intermediate Targets						End Target
			1	2	3	4	5	6	
services - Female (CRI, Number)									

Indicators to be Mapped	Baseline	Intermediate Targets						End Target
		1	2	3	4	5	6	
Farmers adopting improved agricultural technology (CRI, Number)	0.00	0.00	100,000.00	200,000.00	400,000.00	500,000.00		500,000.00
Farmers adopting improved agricultural technology - Female (CRI, Number)	0.00	0.00	50,000.00	100,000.00	200,000.00	250,000.00		250,000.00
Increased productivity of targeted species by direct beneficiaries (Percentage)	0.00							35.00
Dairy Cattle (Percentage)	0.00	0.00	5.00	20.00	20.00	40.00		40.00
Beef fattening (Percentage)	0.00	0.00	10.00	18.00	18.00	35.00		35.00
Small ruminant fattening (Percentage)	0.00	0.00	5.00	15.00	15.00	25.00		25.00
Sonali Poultry (Percentage)	0.00	0.00	5.00	10.00	10.00	20.00		20.00
Increase in market access reflected in incremental sales (aggregated over all targeted value-chains) in real-value in the project areas (see footnote 1) (% of sales increase among female producers).	0.00	0.00	0.00	25.00	0.00	50.00		50.00

Indicators to be Mapped	Baseline	Intermediate Targets						End Target
		1	2	3	4	5	6	
(Percentage)								
Percentage increase for female producers (Percentage)	0.00	0.00	0.00	20.00	20.00	30.00		40.00
Farmers and value chain actors have adopted practices to improve resilience to selected risks (Number)	0.00	0.00	20,000.00	50,000.00	100,000.00	150,000.00	200,000.00	150,000.00
Farmers and value chain actors implement food safety measures, system for their animals (Number)	0.00	0.00	40,000.00	70,000.00	100,000.00	150,000.00		150,000.00
Livestock insurance products and services developed (Number)	0.00	0.00	0.00	0.00	0.00	2.00		2.00
Intermediate Outcome Indicators								
Tests of food and feed samples have been carried out at laboratory facilities (Number)	0.00	0.00	200.00	300.00	300.00	500.00		500.00
Upazilas in pilot areas where traceability system is established and insurance livestock risk mitigation electronic system is functioning and collecting data (Number)	0.00	0.00	0.00	10.00	30.00	50.00		50.00

Monitoring & Evaluation Plan: PDO Indicators					
Indicator Name	**Definition/Description**	**Frequency**	**Datasource**	**Methodology for Data Collection**	**Responsibility for Data Collection**
Farmers adopting improved agricultural technology		Biannually	MIS and progress report	Household Survey	DLS/Implementing Agency
Farmers adopting improved agricultural technology - Female		Biannually	MIS and progress report	Household Survey	DLS/Implementing Agency
Increased productivity of targeted species by direct beneficiaries					
Dairy Cattle		Annually	MIS and Progress report		DLS/Implementing Agency
Beef fattening		Annually	Sample survey		DLS/Implementing Agency
Small ruminant fattening		Annually	Sample survey		DLS/Implementing Agency
Sonali Poultry		Annually	Sample Survey		DLS/Implementing Agency
Increase in market access reflected in incremental sales (aggregated over all targeted value-chains) in real-value in the project areas (see footnote 1) (% of sales increase among female producers).		Annually	Sample Survey		DLS/Implementing Agency

Percentage increase for female producers		Annually	Sample Survey		DLS/Implementing Agency
Farmers and value chain actors have adopted practices to improve resilience to selected risks		Biannually	MIS and progress report		DLS/Implementing Agency
Farmers and value chain actors implement food safety measures, system for their animals		Biannually	MIS and progress report		DLS/Implementing Agency
Livestock insurance products and services developed		Bi Annually	MIS and Progress Reports		DLS and Implementing Agency

Monitoring & Evaluation Plan: Intermediate Results Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Producer organization facilitated and operational		Biannually	MIS and progress reports		DLS/Implementing Agency
Producer organization facilitated and operational - led by females		Biannually	MIS and progress reports		DLS/Implementing Agency
Farmers have received business development siklls training, inputs, marketing support and financial services		Biannuall	MIS and progress reports		DLS/Implementing agency

Farmers have received business development siklls training, inputs, marketing support and financial services - female		Biannually	MIS and progress report		DLS/Implementing agency
Farmers have accessed livestock services, CSA technoligies and practices		Biannually	MIS and Progress Report		DLS/Implementing Agency
Of Which Female		Biannually	MIS/Progress Report		DLS/Implementing Agency
Reduced GHG emission per unit of milk produced in project areas		Annual	MIS and Progress Reports		DLS/Implementing Agency
PPs established and financed		Biannually	MIS/Progress Report		DLS/Implementing Agency
PPs established and financed - of female		Biannually	MIS/Progress Report		DLS/Implementing Agency
Slaughtering facilities/milk processing/cooling facilities renovated and made climate smart		Biannually	MIS/Progress Reports		DLS/Implementing Agency
Systems and devices for renewable energy production and energy efficiency gains established		Biannually	MIS/Progress Reports		DLS/Implementing Agency
Increase average intake (gram/day) of dairy, meat, poultry and egg, especially among climate vulnerable areas targetedd		Baseline, Mid-term and end of	MIS/Progress Reports		DLS/Implementing Agency

for nutrition improvement activities		project			
Increase average intake (gram/day) of dairy, meat, poultry and egg, especially among climate vulnerable areas targetedd for nutrition improvement activities - Female		Baseline, Mid-Term and End of the Project	Household Survey		DLS/Implementing Agency
Students under School Milk Program		Biannually	MIS/Progress Report		DLS/Implementing Agency
Students under school milk program - number of girls		Biannually	MIS/Progress Report		DLS/Implementing Agency
Improvement in the management and delivery capacity of livestock services (staffin at operational levels, knowledge improvement (vocational and academic training , study tours, seminars, etc.), avail		Annually	Annual progress reports rated satisfactory by the World Bank		WB/Implementing Agency
Graduates/Trainees supported /trained through project's assistance to academic and vocational training		Biannually	MIS/Progress		DLS/Implementing Agency
Graduates/Trainees supported /trained through project's assistance to academic and vocational training - Female		Biannually	MIS/Progress Reports	MIS and progress Report	DLS/Implementing Agency
Stakeholders (persons) reached with food safety information through training, mobile apps, SMS and video-based tools		Biannually	MIS/Progress Reports		DLS/Implementing Agency
Total farmers in the pilot areas receiving livestock insurance awareness and/or		Biannually	MIS/Progress Reports	MIS and progress Report	DLS/Implementing

training					Agency
Of which females		Biannualy	MIS and Progress Reports		DLS and Implementing Agency
Number of cattle included in the pilot animal identification and recording system		Biannually	MIS and progress report	MIS and progress report	DLS/Implementing Agency
Additional full jtime equivalent (FTE) jobs created in project areas		Annual	Household survey		DLS/Implementing Agency
Additional full time equivalent (FTE) jobs created in project areas - Females		Biannually	Household Survey		DLS/Implementing Agency
Additional full time equivalent (FTE) jobs created in project areas - Youth		Biannually	Household Survey		DLS/Implementing Agency
Primary National Livestock Monitoring Information System established and operational		Annually	Progress Reports		DLS/Implementing Agency
Targeted livestock producers satisfied with the livestock services received from the livestock services		Baseline, Mid-term and end of the project	Household Survey		DLS/Implementing Agency
Targeted livestock producers satisfied with the livestock services - of which females		Baseline, Mid-term and end of the project	House hold survey		DLS/Implementing Agency

Farmers reached with agricultural assets or services		BiAnnually	MIS and Progress Report	MIS and Progress Report	DLS/Implementing Agencies
Farmers reached with agricultural assets or services - Female		Biannually	MIS and Progress Report	MIS and Progress Report	DLS/Implementing Agency

ANNEX 1: IMPLEMENTATION ARRANGEMENTS AND SUPPORT PLAN

Strategy and Approach for Implementation Support

1. The Bank's implementation support plan (ISP) for DRMP lays out the approach to be followed to help the project implementation agencies achieve the expected project results, based on the project's nature and risk profile. The ISP identifies specific actions to: (a) better manage key risks identified in Systematic Operations Risk Rating Tool (SORT); (b) support increased Department of Fisheries and Livestock (DLS) institutional development; and (c) ensure compliance with the IDA agreement signed between the Government of Bangladesh (GoB) and the Bank.

2. The implementation support strategy combines periodic supervision with timely technical assistance and policy advice as necessary. The ISP includes: (a) DLS-Bank reviews every six months; (b) interim technical discussions and field visits by Bank and DoF staff; and (c) monitoring and reporting on DRMP implementation progress and achievement of results;(c) third-party impact evaluation; (f) annual internal and external financial audits and financial management reporting; and (g) periodic procurement post-reviews

3. Six-monthly joint review missions: Six-monthly joint review missions: The DLS and the Bank task team jointly conduct DRMP implementation reviews every six-months following Effectiveness. These joint reviews would initially focus on key start-up and capacity-building activities to facilitate and accelerate early stages of DRMP implementation. The DLS/Project Management Unit (PMU) would prepare and submit to the Bank an Implementation Progress Report in an agreed format at least 15 days prior to the start of each joint review. During the joint review, the DoF and the Bank task team would: (a) review DRMP progress in the context of the Project Implementation Plan (PIM) and associated Procurement Plan; (b) identify key issues affecting project performance (both positive and negative); and (c) agree on any actions as needed to sustain and/or accelerate project implementation. Documentation of the joint review consists of an Aide Memoire – which summarizes items (a)-(c) above – and a Management Letter from the Bank to DLS.

4. In addition to the joint review missions, to ensure smooth implementation, the Bank task team (TT) would follow a problem-solving approach and meet periodically (monthly) with the DLS/PMU to monitor and assess the implementation progress, identify issues and measures to address them, set-up an action plan. The Bank task team would include the Bank Task Team Leader (s) and different specialist including Financial Management (FM), Procurement, Monitoring and Evaluation (M&E), Environmental and Social Safeguard, and core technical experts (both Bank staff and consultants) as identified over the course of DRMP implementation. Bank task team composition would vary based on the requirements of each joint reviews.

Implementation Support Plan

5. During the joint reviews and any interim reviews, detailed inputs from the Bank task team would consist of the following:

a. **Technical inputs**: would be provided to the DLS/PMU and those Divisions/PIUs visited during the reviews to facilitate DRMP implementation. The Bank task team would maintain regular phone and email contact with the DoF to facilitate ongoing work-flow, such as: (i) review of terms of reference; (ii) prior review of procurement; (iii) identification and deployment of international expertise under DRMP; and (iv) other review and advice as may be required. The DLS would review and update the PIM as needed during project implementation and submit these updates to the Bank task team for review and agreement.

b. **Fiduciary inputs**: The TT would support the DLS/PMU through training and other capacity-building needs with respect to FM and procurement. Procurement and FM compliance would be a part of the joint reviews described above. The Bank task team would also ensure any timely support required by DLS to meet the agreed fiduciary requirements as given in the Financing Agreement. The procurement plan will be updated as required and will be the basis of Bank's procurement supervision plan. The Bank's electronic procurement planning and monitoring system (STEP) will be used to prepare and regular updating and getting no objection of the procurement plans of this project. Respective PMU staff will receive training on STEP organized by Bank, during its use in the Project.

c. **Safeguards**: The TT would monitor Environmental and Social Safeguards compliance during the joint reviews and provide technical assistance to DLS specialists as needed.

A summary of implementation support is provided below in Table 1 (time-bound actions for effectiveness and start-up) and Table 2 (Bank staff time for supervision and support).

Implementation Support Plan

Table 1. Specific time-bound actions and deliverables for project effectiveness and start-up

Item	What	When	Who/Partners	Comments
Project Preparation				
1.	Disclosure of safeguards documents	Before appraisal	WB	As per Decision Meeting (DM)
2.	DPP – Detailed Project Plan	May 2018	GoB	
3.	PPSD – Project Procurement Strategy for Development	Before negotiations	GoB WB	Includes procurement and financial management manual
4.	PIM – Project Implementation Manual	Before negotiations	GoB	As per DM: should include good practices being promoted and pathways for farmer adoption
5.	Designated accounts established	By effectiveness	DLS	
6.	Procurement packages – minimum 30% of total procurement. Priority for: a. Design & Supervision Consultant Firm b. Capacity building service providers c. Procurement consultants d. Financial management consultant e. Logistic support for PMU (IT etc.)	Prepared before Board approval Contracts to be signed within 3 months of project effectiveness	GoB supported by WB PMU	As per DM
7.	PMU: - Project Director appointed and in place - PMU core staff appointed	No later than one (1) month after the Effective Date	GoB GoB	Part of project advance (PA) process
8.	Establish 8 Project Implementation Units in 8 Divisions	No later than one (1) month after the Effective Date	PMU	Part of project advance (PA) process
9.	Capacity Needs Assessment of sub-sector	On effectiveness	GoB	Part of project advance (PA) process
Component D - Project management, Monitoring and Evaluation				
10.	Establish Project Steering Committee (PSC)	No later than one (1) month after the Effective Date	GoB	
11.	Establish Project Implementation Committee (PIC)	No later than one (1) month after the Effective Date	GoB	

Item	What	When	Who/Partners	Comments
12.	Procurement and Fiduciary trainings	1st 6 months	PMU supported by WB	
13.	Selecting/contracting all PMU staff	Year 1	GoB	
14.	M&E firm for regular process monitoring contracted	1st 6 months after effectiveness	PMU	MIS system, process monitoring, and periodic assessments
15.	Impact evaluation firms contracted -firm for base line study -firm for mid-term study -end of the project evaluation	-1st 6 months after effectiveness -6 months before the MTR of the project. -6 months before the project completion	PMU	 -baseline study -Mid-line assessment -Impact evaluation
Component A - Productivity Improvement **Sub-component A.1: Producer Organizations**				
16.	Selection/contracting Firm/NGO for Community - Farmers/Producers' Group Mobilization for Farm - Agribusiness Development	1st 6 months after effectiveness	PMU	
17.	Participatory mapping/identification of Farmers/Producers' Groups	Year 1	Contracted Community mobilization firm	
18.	Selection/contracting Capacity Building (CB) Service Provider (LFFS and other extension methods)	1st 6 months after effectiveness	PMU	
19.	Curricula development of LFFS - new technologies, innovations, food safety, basic administration	Year 1	Knowledge platform (design) and Contracted CB firm (development)	
20.	Development of Livestock Extension Manual	Year 1	Knowledge platform (design) and Contracted CB firm (development)	
21.	LFFS Master trainer formation program	Year 1	Contracted CB firm	
22.	Training of Trainers for LFFS and other extension methods	Year 1	Contracted CB firm	
Sub-component A.2: Climate Smart Production Practices				

Item	What	When	Who/Partners	Comments
23.	Establish Livestock Service Network	Year 1	PMU	
Component B - Market Linkages and Value Chain Development **Sub-component B.1: Market linkages and Value Chain investments**				
24.	Selection/contracting of Firm/NGO for TA provision on Business Planning, Technology and Marketing and Related Services	1st 6 months after effectiveness	PMU	
Sub-component B.2: Critical and Climate Resilient Public Infrastructure for Livestock Development				
25.	Selection/contracting of Firm for Design and Supervision for Civil Works and Procurement (mainly redesign of wet markets)	1st 6 months after effectiveness	PMU	
26.	Selection of consulting firm for feasibility studies for redesign wet markets, and slaughter facilities in districts and metropolitans	Months 6-12 after effectiveness	PMU	
27.	Selection/contracting firm for the detailed engineering and supply of slaughtering and meat processing technology for wet markets, district level and metropolitans	Months 6-18 after effectiveness	PMU	
Sub-component B.3: Consumer Awareness and Nutrition				
28.	Organization and contracting firms/institutions for execution of School Milk Program	1st 6 months after effectiveness	PMU	
29.	Selection/contracting of Firm for Design/Implementation of Media Campaign and promotional activities on nutrition, public health and food safety	1st 6 months after effectiveness	PMU	
Component C - Improving Risk Management and Climate Resilience of Livestock Production Systems **Sub-component C.1: Institutional Capacity Development and Knowledge Platform**				
30.	Contract Human Resource Development Plan	1st 6 months after effectiveness	PMU	Availability assumed of comprehensive Capacity Needs Assessment of sub-sector (PPA)
31.	Contract Senior Management Training	Year 1	PMU	
32.	Establish multi-stakeholder Knowledge Platform (recruit manager and assistant)	Year 1	PMU	

Item	What	When	Who/Partners	Comments
33.	Contract consultancy to Design Livestock Information System	Year 1	PMU Knowledge platform to prepare ToRs	
34.	Establish knowledge partnership with Netherlands	1st 6 months after effectiveness	MoFL, NL Embassy, WB	Conditional on approval NL Embassy
Sub-component C.2: Food Safety and Public Health				
35.	Contracting consultancy/knowledge platform for Risk analysis of livestock VC to develop legislation for food safety enforcement at all VC levels	Year 1	PMU	
36.	Contracting consultancy/knowledge platform for GAP analysis of existing legislation for food safety enforcement	Year 1	PMU	
37.	Contracting consultancy for Drafting legal amendments and regulations for stronger food safety enforcement in relevant VC	Year 1	PMU	
38.	Organizing Multi Stakeholder consultation on legal amendments and regulations for food safety enforcement	1st 18 months after effectiveness	PMU	
39.	Contracting firm for designing and obtaining base line data on the current level of food safety incidents on the relevant VC	Year 1	PMU	
Sub-component C.3: Livestock Insurance – Phase 1 Actions				
40.	Contract consultancy to Design online Livestock insurance registration data-base system (software/hardware)	Year 1	PMU	WBG to assist to specify TOR for a specialist IT Consultancy company
41.	Contract consultancy to Design Livestock Mortality DataBase System for livestock insurance Data and to implement (+ hardware/software)	Year 1	PMU	WBG to assist to specify TOR for a specialist IT Consultancy company
42.	Livestock Insurance Demand Assessment Studies (Farmers/Distributers/Processors etc.)	Year 1	PMU	WBG to assist to specify TOR for a specialist local company involved in socio-economic field and farmers surveys

Item	What	When	Who/Partners	Comments
43.	Contract consultancy to Design Premium subsidy processing database system	1st 18 months after effectiveness	PMU	WBG to assist to specify TOR for a specialist IT Consultancy company with insurance-sector IT experience
44.	Consultancy Contract for a specialist Management Training Specialist Company to design and implement capacity building and training courses in livestock insurance for DLS, Insurers, Distributors, IDRA and other stakeholders	1st Year (on-going)	PMU	WBG to assist to specify TOR for a specialist Management Training Specialist.
45.	Contract consultancy to design a livestock insurance communications strategy (awareness creation, promotion, training and extension)	1st 18 months after effectiveness	PMU	WBG to assist to specify TOR for a specialist company to design a communications strategy for the LRMP

Table 2. Bank Staff Week (SW) Estimates for Project Implementation Support

Time	Focus	Skills Needed	Resource Estimate (SWs)	Annual Number of Trips
First 12 months	Technical support	M&E Specialist	2	1
		Livestock Specialists	2	1
		Value Chain Specialist	2	1
		Veterinary/One Health	2	1
		Capacity Development/Institutional/ Education	2	1
		Research/Innovation	1	1
		Food safety	2	1
		Livestock Insurance	3	2
	Fiduciary training and supervision	FM Specialist	2	N/A
		Procurement Specialist	2	N/A
	ESMF monitoring and reporting	Social Dev. Specialist	2	N/A
		Environment Specialist	2	N/A
	Team Leadership	TTL	3	N/A
		Co-TTL	2	1
		Co-TTL	2	1
Annually for each year of implementation	Technical Support	M&E Specialist	2	1
		Livestock Specialists	2	1
		Value Chain Specialist	2	1
		Veterinary/One Health	2	1
		Capacity Development/Institutional/ Education	2	1
		Research/Innovation	1	1
		Food safety	2	1
		Livestock Insurance	3	2
	Fiduciary Monitoring and Reporting	FM Specialist	2	N/A
		Procurement Specialist	2	N/A
	ESMF monitoring and reporting	Social Development Specialist	2	N/A
		Environment Specialist	2	N/A
	Team Leadership	TTL	3	N/A
		Co-TTL	2	1
		Co-TTL	2	1

ANNEX 2: GREENHOUSE GAS ACCOUNTING

1. **Corporate mandate**. The World Bank has adopted, in its 2012 Environment Strategy, a corporate mandate to conduct greenhouse gas (GHG) emissions accounting for investment lending in relevant sectors. The ex-ante quantification of GHG emissions is an important step in managing and ultimately reducing GHG emission, and it is becoming a common practice for many international financial institutions.

2. **Methodology.** To estimate the impact of agricultural investment lending on GHG emission and carbon sequestration, the World Bank has adopted the Ex-Ante Carbon-balance Tool (EX-ACT), developed by FAO in 2010. EX-ACT allows the assessment of a project's net carbon-balance, defined as the net balance of CO_2 equivalent GHG emitted or sequestered because of project implementation compared to a without-project scenario. EX-ACT estimates the carbon stock changes (emissions or sinks), expressed in equivalent tons of CO_2 per hectare and year.

Tier2 emission factors and emission reduction potential for dairy cattle and other cattle were derived from calculations based on the Global Livestock Environment Assessment Model (GLEAM) developed at FAO and published *here*. In its current version, however, EX-ACT doesn't allow to use such external emissions factors.

3. Data sources. The primary data sources were the Technical Note 1 and the PAD.

4. **Regional and project characteristics.** The project region (which is the entire national territory) has a tropical wet climate. The dominant soil type is Wetland Soils. The project implementation phase is 5 years of actual implementation and the capitalization phase is assumed to be 15 years.

5. Project boundary and activity data.

a) Livestock numbers of small ruminants (sheep, goats) and poultry will change substantially over the course of the project. For dairy cattle, due to a projected focus on interventions that aim to increase productivity as opposed to increase herd size, numbers of heads are not projected to change significantly. Table 1 presents the details.
b) Livestock technical mitigation options in project areas are expected to affect up to 60 percent of dairy cattle, 50 percent of dairy cattle and 35 percent of sheep and goats. Table 2 presents the details. The percentages were adjusted artificially in EX-ACT to reflect the Tier2 emission reductions computed with GLEAM.
c) The project will support the restauration of about 10,000 ha of degraded grasslands.
d) Feed demand will fuel the conversion of about 50,000 ha of rice into maize production.

Table 1. Animal numbers

Livestock categories	number (heads)				Key Assumptions
	Country	Project - start	Project - without	Project - with	
Dairy cattle	3,738,198	747,640	771,504	776,349	(i) Project addresses 1/5 of the animal population; (ii) historical growth trend for with and without project scenario, (iii) 120% of the historical growth trend for project scenario, given the growth in production.
Other cattle	20,499,461	4,099,892	4,230,759	4,230,759	(i) Project addresses 1/5 of the animal population; (ii) historical growth trend for with and without project scenario (iii) 100% of the historical growth trend for project scenario, as production growth is mostly achieved through productivity gains.
Sheep	3,537,856	707,571	780,747	743,439	(i) Project addresses 1/5 of the animal population; (ii) historical growth trend for without project scenario; (iii) half of the historical growth trend for project scenario, as productivity is mostly achieved through productivity gains.
Goats	26,264,330	5,252,866	5,423,278	5,337,528	(i) Project addresses 1/5 of the animal population; (ii) historical growth trend for without project scenario; (iii) half of the historical growth trend for project scenario, as productivity is mostly achieved through productivity gains.
Sheap and Goats	29,802,186	5,960,437	6,204,025	6,080,967	cf. above. Sheep and Goats agregated to fit EX-Act
Poultry	337,987,124	67,597,425	76,592,582	78,501,367	(i) Project addresses 1/5 of the animal population; (ii) historical growth trend for without project scenario; (iii) 120% of the historical growth trend for project scenario, as productivity gap in poultry is limited.

Table 2 Livestock technical mitigation options

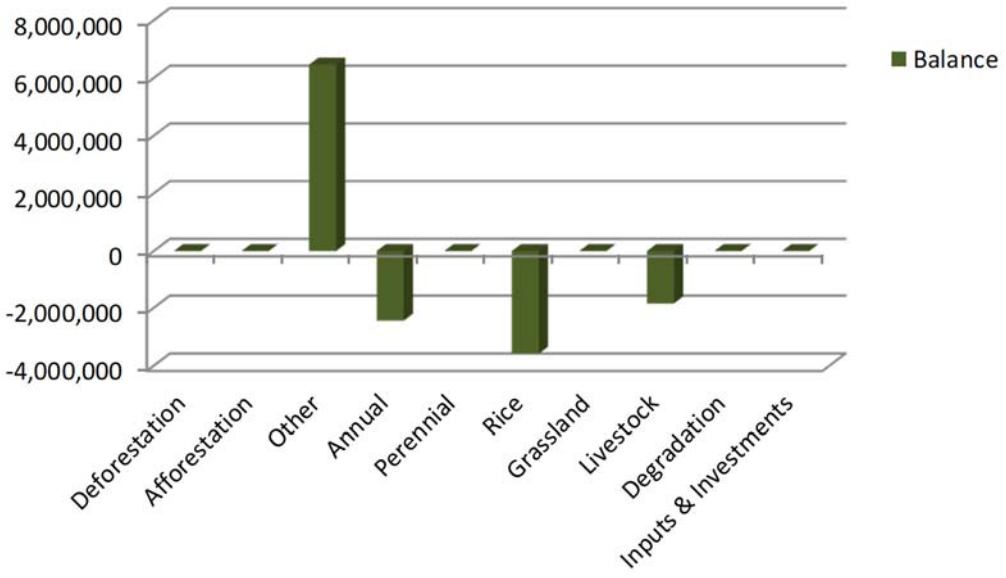
Livestock categories	Technical mitigation option (%)								
	Feeding practices			*Specific Agents*			*Breeding*		
	Start	Without	With	Start	Without	With	Start	Without	With
Dairy cattle	10%	15%	60%	0%	0%	1%	5%	8%	25%
Other cattle	5%	8%	50%	0%	0%	0%	3%	5%	25%
Buffalo	0%	0%	0%	0%	0%	0%	0%	0%	0%
Sheep and goats	5%	8%	35%	0%	0%	0%	3%	5%	10%

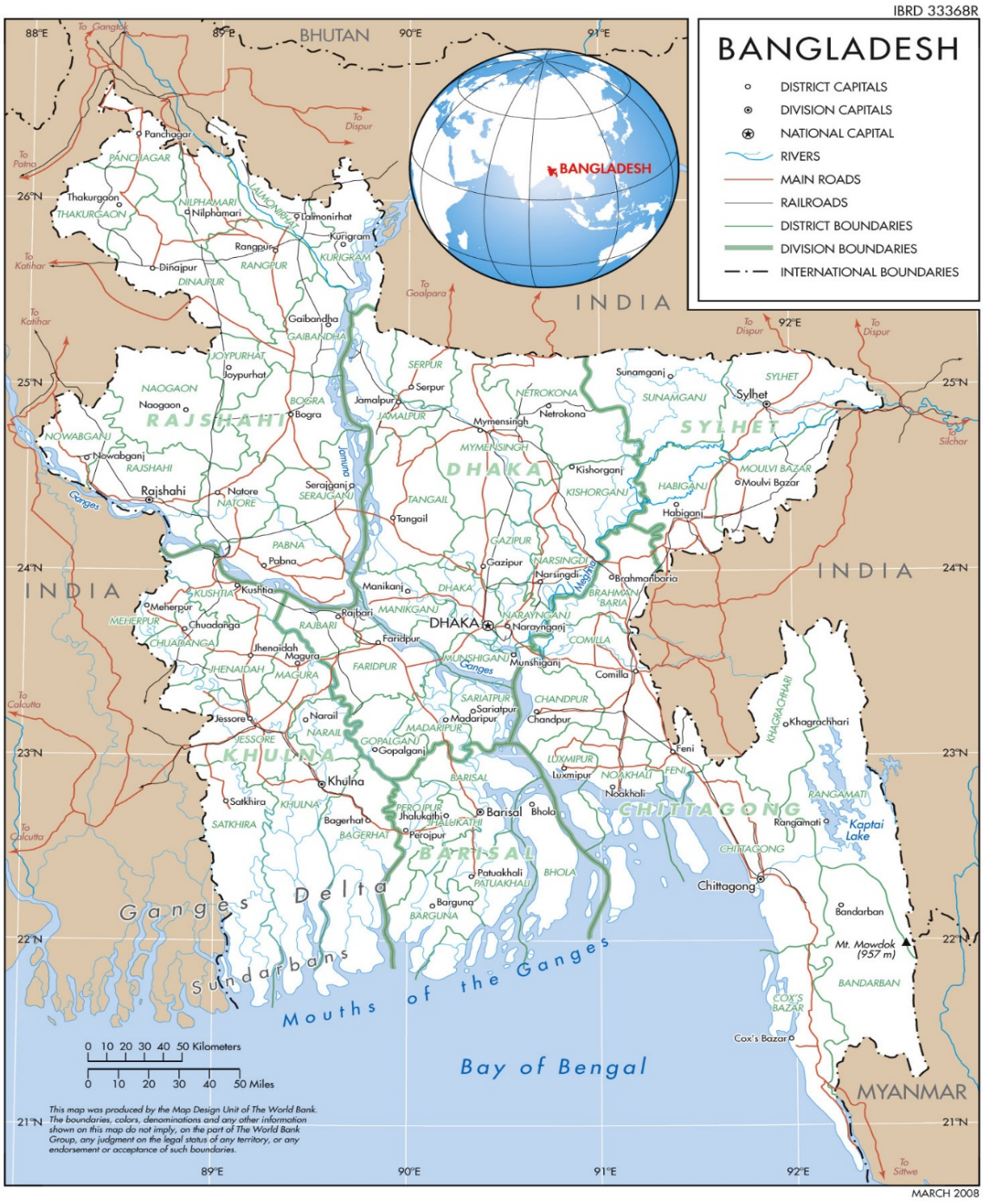
6. **Results.** The net carbon balance quantifies GHGs emitted or sequestered because of the project compared to the without-project scenario. Over the project duration of 5 years, the project constitutes a carbon emission savings of about 1.4 million tCO_2-eq. (or ca. 70,000 tCO_2-eq. per year). Emissions per unit of animal product are however substantial. See Table 4 and Figure 1 for a summary of these results.

Table 3. Results of the ex-ante GHG analysis

Component of the project	Gross fluxes Without	With	Balance
	All GHG in tCO_2eq Positive = source / negative = sink		
Land Use Changes			
Deforestation	0	0	0
Afforestation	0	0	0
Other	3,421,367	9,885,352	6,463,985
Agriculture			
Annual	-976,500	-3,417,750	-2,441,250
Perennial	0	0	0
Rice	4,299,750	716,625	-3,583,125
Grassland & Livestocks			
Grassland	0	0	0
Livestock	169,653,870	167,804,542	-1,849,327
Degradation	0	0	0
Inputs & Investments	0	0	0
Total	176,398,486	174,988,769	**-1,409,717**

Figure1. GHG balance by category of emission (tCO_2eq.)




IBRD 33368R
BANGLADESH
DISTRICT CAPITALS
DIVISION CAPITALS
NATIONAL CAPITAL
RIVERS
MAIN ROADS
RAILROADS
DISTRICT BOUNDARIES
DIVISION BOUNDARIES
INTERNATIONAL BOUNDARIES
BHUTAN
INDIA
MYANMAR
BANGLADESH
DHAKA
Ganges Delta
Sundarbans
Mouths of the Ganges
Bay of Bengal
Kaptai Lake
Mt. Mowdok (957 m)
0 10 20 30 40 50 Kilometers
0 10 20 30 40 50 Miles
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