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Report No: PAD1624

GLOBAL AGRICULTURE AND FOOD SECURITY PROGRAM TRUST FUND

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED GRANT

IN THE AMOUNT OF US$8.0 MILLION

TO THE

KINGDOM OF BHUTAN

FOR A

FOOD SECURITY AND AGRICULTURE PRODUCTIVITY PROJECT

April 20, 2017

Agriculture Global Practice
South Asia Region

CURRENCY EQUIVALENTS

Exchange Rate Effective April 20, 2017
Currency Unit = Bhutanese Ngultrum (BTN)
BTN 64.6 = US$1.00

FISCAL YEAR
July 1 – June 30

ABBREVIATIONS AND ACRONYMS

AFD	Administration and Finance Division
AMC	Agriculture Machinery Centre
BAS	Budget and Accounting System
BCC	Behavior Change Communication
BTN	Bhutan Ngultrum
Chiwog	Village level with Tshogpa (elected head of village)
CPS	Country Partnership Strategy
CRP	Community Resource Person
DA	Designated Account
DAMC	Department of Agriculture Marketing and Cooperatives
DAOs	District Agriculture Officers
DoA	Department of Agriculture
DRDP	Decentralized Rural Development Project
Dzongda	District Administrator
Dzongkhag	District Administrative Level
EA	Extension Agent
EIRR	Economic Internal Rate of Return
EMP	Environmental Management Plan
ESMF	Environment & Social Management Framework
Ex-ACT	Ex-Ante Carbon-balance Tool
FAO	Food and Agriculture Organization
FCBL	Food Corporation of Bhutan Limited
FG	Farmer Group
FIRR	Financial Internal Rate of Return
FM	Financial Management
FMCL	Farm Machinery Corporation Limited
FSAPP	Food Security and Agriculture Productivity Project
FYP	Five-Year Plan
GAFSP	Global Agricultural and Food Security Program
GDP	Gross Domestic Product
Gewog	Block (Lowest Level of Government Administrative System)
GHG	Greenhouse Gas
HHs	Households
IFAD	International Fund for Agriculture Development
IRR	Internal Rate of Return
ISRs	Implementation Status Reports
M&E	Monitoring and Evaluation
MoAF	Ministry of Agriculture and Forests
MOU	Memorandum of Understanding
MTR	Midterm Review
NHPC	National Post Harvest Centre
NPV	Net Present Value
NSC	National Seed Centre
OGTP	One Gewog Three Products
O&M	Operations & Maintenance
PAD	Project Appraisal Document
PDO	Project Development Objectives
PG	Producer Group
PMU	Project Monitoring Unit
PST	Project Support Team
RDC	Research Development Centre
RGoB	Royal Government of Bhutan
RNR	Renewable Natural Resources
RRCDP	Remote Rural Communities Development Project
TOT	Training of Trainers
WUAs	Water Users Associations

Regional Vice President:	Annette Dixon
Country Director:	Qimiao Fan
Senior Global Practice Director:	Juergen Voegele
Practice Manager:	Shobha Shetty
Task Team Leader:	Winston Dawes
Co-Task Team Leader:	Imtiaz Alvi

THE KINGDOM OF BHUTAN
Food Security and Agriculture Productivity Project

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PAD DATA SHEET

Bhutan

Food Security and Agriculture Productivity Project (P155513)

PROJECT APPRAISAL DOCUMENT

SOUTH ASIA

0000009243

Report No.: PAD1624

Basic Information		
Project ID P155513	EA Category B - Partial Assessment	Team Leader(s) Winston Dawes/Imtiaz Alvi
Lending Instrument Investment Project Financing	Fragile and/or Capacity Constraints [ ] Financial Intermediaries [ ] Series of Projects [ ]	
Project Implementation Start Date 1-Jul-2017	Project Implementation End Date 30-Dec-2022	
Expected Effectiveness Date 15-Jun-2017	Expected Closing Date 30-Dec-2022	
Joint IFC No		

Practice Manager	Senior Global Practice Director	Country Director	Regional Vice President
Shobha Shetty	Juergen Voegele	Qimiao Fan	Annette Dixon

Approval Authority
Approval Authority
RVP Decision
please explain
The Project is financed through the Global Agriculture and Food Security Program (GAFSP) Trust Fund, Borrower funds and Beneficiary contribution only.

Borrower: The Kingdom of Bhutan			
Responsible Agency: Ministry of Agriculture and Forests			
Contact:	Kencho Thinley	Title:	Chief Planning Officer, Policy and Planning Division
Telephone No.:	+975 2-322545	Email:	kthinley@moaf.gov.bt

Project Financing Data(in US$ Million)					
[ ]	Loan	[ ]	IDA Grant	[ ]	Guarantee
[ ]	Credit	[X]	Grant	[ ]	Other

Total Project Cost:	9.35	Total Bank Financing:	0.00
Financing Gap:	0.00		

Financing Source	Amount
Borrower	1.12
Global Agriculture and Food Security Program	8.00
LOCAL BENEFICIARIES	0.23
Total	9.35

Expected Disbursements (in US$ Million)

Fiscal Year	2017	2018	2019	2020	2021	2022	0000	0000	0000	0000
Annual	0.50	1.00	2.00	2.00	2.00	0.50	0.00	0.00	0.00	0.00
Cumulative	0.50	1.50	3.50	5.50	7.50	8.00	0.00	0.00	0.00	0.00

Institutional Data

Practice Area (Lead)

Agriculture

Contributing Practice Areas

Environment & Natural Resources, Health, Nutrition & Population, Social, Urban, Rural and Resilience Global Practice, Water

Cross Cutting Topics

[X] Climate Change

[ ] Fragile, Conflict & Violence

[X] Gender

[X] Jobs

[ ] Public Private Partnership

Sectors / Climate Change

Sector (Maximum 5 and total % must equal 100)

Major Sector	Sector	%	Adaptation Co-benefits %	Mitigation Co-benefits %
Agriculture, fishing, and forestry	Agricultural extension and research	10	39	39
Agriculture, fishing, and forestry	General agriculture, fishing, and forestry	25	42	42
Public administration, law, and justice	Public administration, agriculture, fishing, and forestry	50	50	50
Industry and trade	Agro-industry, marketing, and trade	15		
Total		100		

☐ I certify that there is no Adaptation and Mitigation Climate Change Co-benefits information applicable to this project.

Themes

Theme (Maximum 5 and total % must equal 100)

Major Theme	Theme	%
Rural development	Rural services and infrastructure	25
Environment and natural resources management	Water resource management	20
Human development	Nutrition and food security	20
Rural development	Rural markets	20
Trade and integration	Trade facilitation and market access	15
Total		100

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Proposed Development Objective(s)

The Project Development Objective (PDO) is to increase agricultural productivity and enhance access to markets for farmers in selected gewogs in south-west Bhutan.

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Components

Component Name	**Cost (US$ Millions)**
Component 1: Strengthening Farmer and Producer Groups	1.08
Component 2: Enhancing Farmer Productivity	5.21
Component 3: Enhancing Access to Markets	1.00
Component 4: Project Management	0.71

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Systematic Operations Risk- Rating Tool (SORT)

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

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Compliance

Policy		
Does the project depart from the CAS in content or in other significant respects?	Yes [ ]	No [X]
Does the project require any waivers of Bank policies?	Yes [ ]	No [X]
Have these been approved by Bank management?	Yes [ ]	No [X]
Is approval for any policy waiver sought from the Board?	Yes [ ]	No [X]
Does the project meet the Regional criteria for readiness for implementation?	Yes [X]	No [ ]

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	X	
Natural Habitats OP/BP 4.04		X
Forests OP/BP 4.36	X	
Pest Management OP 4.09	X	
Physical Cultural Resources OP/BP 4.11		X
Indigenous Peoples OP/BP 4.10		X
Involuntary Resettlement OP/BP 4.12	X	
Safety of Dams OP/BP 4.37		X
Projects on International Waterways OP/BP 7.50	X	
Projects in Disputed Areas OP/BP 7.60		X

Legal Covenants

Name	Recurrent	Due Date	Frequency
Project Steering Committee		3 months after the Effective Date	

Description of Covenant

Recipient to establish, and thereafter maintain throughout the period of implementation of the Project, a Project Steering Committee with a mandate, terms of reference and composition satisfactory to the World Bank.

Name	Recurrent	Due Date	Frequency
Project Management Unit	X		Continuous

Description of Covenant

Recipient to maintain a Project Management Unit in a manner satisfactory to the World Bank

Name	Recurrent	Due Date	Frequency
Project Support Teams	X		Continuous

Description of Covenant

Recipient to maintain a Project Support Team within each of the Participating Research Development Centers (RDCs) consisting of competent staff, all with experience and qualification, in numbers and under terms of reference satisfactory to the World Bank.

Name	Recurrent	Due Date	Frequency
Implementation at Dzongkhag and Gewog levels	X		Continuous

Description of Covenant

Recipient to ensure that Participating Dzongkhags and Selected Gewogs shall be responsible, in collaboration with Participating RDCs as well as district and other relevant officers of the activities described in Section I.A.5 of Schedule 2 to the Grant Agreement.

Name	Recurrent	Due Date	Frequency
Project Operations Manual	X		Continuous

Description of Covenant

Recipient to carry out the Project in accordance with the Project Operations Manual prepared in form and substance acceptable to the World Bank.

Name	Recurrent	Due Date	Frequency
Cost-Sharing Arrangements	X		Continuous

Description of Covenant

Recipient to: (i) select Eligible Beneficiaries to receive goods in accordance with procedures acceptable to the World Bank as set forth in the Project Operations Manual; (ii) require each Eligible Beneficiary to provide, depending on the type of such goods as set forth in the Project Operations Manual, either a monetary contribution or an in-kind contribution consisting of the labor required for the installation of such goods, as the case may be; and (iii) to ensure that such goods are utilized by each Eligible Beneficiary in such manner as to accomplish the objectives of the Project and protect the interests of the Recipient and the World Bank.

Name	Recurrent	Due Date	Frequency
Safeguards (1/2)	X		Continuous

Description of Covenant

Recipient to implement the Project and cause the Project to be implemented in accordance with the Environmental and Social Management Framework (ESMF) including mitigation measures set forth therein and the required plan(s) and assessment(s), including Environmental and Social Management Plan(s) (ESMP(s), Land Acquisition and Rehabilitation Plan(s) (LARP(s), and/or Gender and Vulnerable Community Development Plan(s) (GVCDP(s)) prepared, and/or to be prepared in accordance with the provisions set forth in the ESMF, and in each case, in a manner satisfactory to the World Bank.

Name	Recurrent	Due Date	Frequency
Safeguards (2/2)	X		Continuous

Description of Covenant

Recipient to ensure that the environmental and social screening criteria set forth in the ESMF are applied in a manner satisfactory to the World Bank and refrain from tendering any civil works contract until and unless: (i) the proposed activities have been screened in accordance with the ESMF; (ii) the respective environmental and social assessments and plans have been prepared in a manner and substance acceptable to the World Bank; and (iii) the Safeguard Documents have been publicly disclosed.

Name	Recurrent	Due Date	Frequency
Grievance Redress Mechanism		6 months after the Effective Date	

Description of Covenant

Recipient to establish, and thereafter maintain and operate a grievance redress mechanism (the "GRM") at the local level for the handling of any stakeholder complaints arising out of the implementation of Project activities in accordance with guidelines as set forth in the Project Operations Manual.

Name	Recurrent	Due Date	Frequency
Audited Financial Statements	X	June 30	Annual

Description of Covenant

Recipient to have its Financial Statements for the Project audited in accordance with the provisions of Section 2.07 (b) of the Standard Conditions.

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Conditions

Source of Fund	Name	Type
GAFSP	Project Management Unit	Effectiveness

Description of Condition

The Recipient has established the Project Management Unit in accordance with Section I.A.3 of Schedule 2 to the Grant Agreement

Source Of Fund	Name	Type
GAFSP	Project Support Teams	Effectiveness

Description of Condition

The Recipient has established a Project Support Team within each of the Participating RDCs in accordance with Section I.A.4 of Schedule 2 to the Grant Agreement

Source Of Fund	Name	Type
GAFSP	Project Operations Manual	Effectiveness

Description of Condition

The Recipient has adopted the Project Operations Manual in accordance with Section I.B.1 of Schedule 2 to the Grant Agreement

Team Composition

Bank Staff

Name	Role	Title	Unit
Winston Dawes	Team Leader (ADM Responsible)	Senior Rural Development Specialist	GFA06
Imtiaz Alvi	Co-Task Team Leader	Senior Rural Development Specialist	GFA06
Giovanni Bo	Lawyer	Counsel	LEGCF
Tanvir Hossain	Procurement Specialist (ADM Responsible)	Senior Procurement Specialist	GGO06
Savinay Grover	Financial Management Specialist	Senior Financial Management Specialist	GGO24
Bandita Sijapati	Social Safeguards Specialist	Consultant	GSURR
Farhat Jahan Chowdhury	Environmental Safeguards Specialist	Consultant	GEN06
John Prakash Badda	Team Member	Program Assistant	GFA06
Mio Takada	Team Member	Agricultural Economist	GFA06
Purna Bahadur Chhetri	Team Member	Senior Agricultural Specialist	GFA12
Raj Ganguly	Team Member	Senior Agribusiness Specialist	GFA06
Saleha Waqar	Team Member	Consultant	GFA06

Extended Team

Chris Landon-Lane	Team Member	Agricultural Specialist, Consultant	

Shyam Ranjitkar	Team Member	Water Resources Engineer, Consultant

Locations

Country	First Administrative Division	Location	Planned	Actual	Comments

Consultants

Consultants Required?	Consulting services will be determined

I. STRATEGIC CONTEXT

A. Country Context

1. **Bhutan is a landlocked nation located high in the eastern Himalayan mountain range in an ecologically fragile area vulnerable to internal and external shocks.** The country, which has a population of approximately 760,000, is divided into three altitude zones: the sub-Himalayan foothills, the inner Himalayas, and the greater Himalayas. Altitudes range from about 150 meters in the south to about 7,000 meters in the north. Bhutan's forests cover approximately 70 percent of the country's land area (38,394 km^2), which is the highest proportion of forest cover of any Asian country. Only 7.8 percent of the total land area is arable, and the area under cultivation is only about 3 percent. In addition, large areas are exposed to monsoons, floods, droughts, landslides, and earthquakes. The country's topography and ecology are similar in the west and east. Its proximity to India, Bangladesh, and China offers trading advantages.

2. **Poverty has declined significantly, falling from around 23 percent in 2007 to 12 percent in 2012**. According to the Bhutan Poverty Assessment (2014), the primary drivers for the rapid reduction of poverty have been: (a) accelerating commercialization of agriculture, (b) rapid development of rural infrastructure (roads, schools, health centers, and electrification), and (c) spillovers from the recent construction of massive hydro-electric projects. Poverty in Bhutan is largely a rural phenomenon. Rural poverty is 16.7 percent, while urban poverty is 1.8 percent.

3. **Poor nutrition, food insecurity, and malnutrition pose major risks to Bhutan's population.** Despite the country's economic growth, nearly 27 percent of Bhutanese households consume less than the daily minimum calorific requirement of 2,124 kcal. About 35 percent of households face yearly food shortages (over 50 percent for more than 4 months each year). Thirty four percent of children under the age of 5 are subject to stunting, impairing cognitive and physical growth and predisposing the child to metabolic diseases later in life. It is estimated that 35 percent of children 6-59 months of age and 43.8 percent of women of reproductive age are anemic or iron deficient (National Nutrition Survey, 2015). Dietary diversity and variation are also limited; the food plate is based largely on carbohydrates and fats, with insufficient micro-nutrient rich vegetables, fruits, and high protein-based foods.

4. **The country's size and mountainous terrain present numerous constraints, especially in the agriculture sector.** Development of the renewable natural resources (RNR) sector, which comprises agriculture, livestock, and forestry, has been relatively slow in Bhutan. The key reasons are low levels of technology adoption, predominance of subsistence farming, large tracts of fallow land, and lack of market access. The slow growth of agriculture has led to heavy reliance on imports of farm products and inputs from India. The Royal Government of Bhutan (RGoB) has therefore assigned significant priority to agricultural development in the 11th Five-Year Plan (FYP). The RGoB considers agriculture to be one of the country's five jewels, recognizing the importance of the farm sector to the national economy, and its significant role in meeting food and nutrition security, poverty reduction, and equitable and sustainable economic development goals.[1]

[1] *"The Five Jewels of Economy: Dzongdas' Roles"* Speech from Lyonchhoen Tshering Tobgay, Prime Minister of Bhutan during the Conference of Dzongdas, Kuensel, August 12, 2014

5. **The agricultural trade deficit has been increasing over time.** The relatively small proportion of land suitable for cultivation, the lack of a well-developed transport and marketing network, and widespread migration of rural populations to urban centers in recent years have all contributed to a significant and growing trade deficit in the agriculture sector. While exports of agricultural products grew in value at an average rate of 15 percent per annum from 2008 to 2014, imports of agricultural products over the same period grew by 16 percent per annum.[2] The absolute value of the agricultural deficit rose from Nu 2.3 billion in 2008 to nearly Nu 6 billion in 2014, representing a 17 percent annual increase. Further constraints to reducing the trade deficit have included the shortage of water available for crop production, low yields and high comparative production costs for many commodities, losses due to human-wildlife conflicts, and cultural attitudes towards the production of livestock for meat.

6. **Ongoing challenges in Bhutan pose additional constraints to improving rural livelihoods.** Farmers lack physical access to markets, credit, quality seeds and other inputs, machines and equipment, as well as the skills necessary to adopt modern agricultural practices. Irrigation, road, and post-harvest storage infrastructure are all lacking as well. Markets are characterized by a general scarcity of traders and wholesalers. Agricultural lands are being converted to serve other development purposes. Widespread outmigration to urban areas, particularly by youth and men, leads to labor shortages and excessive time burdens on women who remain behind on the farm. Producers have little if any awareness of sustainable approaches to managing pest and wildlife encroachment. The population in rural areas is especially vulnerable to natural disasters and the impacts of climate change.

B. Sectoral and Institutional Context

7. **Bhutan is predominantly an "agriculture-based society."** Smallholder subsistence farmers with average size farms of 1.2 hectares dominate the agriculture sector. They occupy most of the country's arable land and produce most of the crop and livestock products. As per the Labor Force Survey Report (2015), the agriculture sector provides livelihoods to 58 percent of the total population, accounting for 16.8 percent of the total GDP in constant prices. As the contribution of the agriculture sector to GDP has been declining, from 26.1 percent in 2001, the sector has been unable to adequately address poverty or to contribute to food security. Bhutan imports 34 percent of its cereal needs, and close to one-third of the population suffers from food insecurity. Out of a total of 205 gewogs (blocks), 51 gewogs (25 percent), mainly in the east and south, were classified as "vulnerable" to food insecurity. This has also exacerbated malnutrition and the incidence of stunting (30 percent).

8. **The agriculture sector has a significant role in the Eleventh Five-Year Plan (FYP).** The Ministry of Agriculture and Forests (MoAF) has a mandate to improve food security and nutrition, improve rural livelihoods to overcome poverty, and promote sustainable management and utilization of natural resources. In addition to this, the RGoB's strategy for the Agriculture Sector in the 11th FYP includes: (a) a targeted and commodity focused approach which reduces imports and promotes exports; (b) a transition from subsistence to commercial agriculture that

[2] The use of an annual increase percentage is only indicative since the use of different baseline years would result in a change in the number quoted.

generates income and attractive employment opportunities, particularly for youth; (c) an enabling policy and legal framework; and (d) the promotion of private sector and contract farming.

9. **Climate change and natural disasters are major threats to farming.** Owing to Bhutan's fragile mountain environment and high dependence on agriculture, the country is highly vulnerable to the impacts of climate change and will confront a disproportionate share of threats from climate hazards and extreme events such as flash floods, glacial lake outburst floods, and landslides. Increasing resilience to the impacts of climate change on water security and climate-resilient agriculture to achieve food and nutrition security is therefore a major priority.

10. **Shortage of irrigation water is a serious challenge to increasing food production.** Most irrigation channels are not functional. Out of a total of 79,740 target acres under the 11th FYP, only 47,424 acres are currently irrigated. Some irrigation channels have begun to experience competing uses from non-paddy and cereal crops. In an increasing number of cases, this has led to fallowing or under-utilization of irrigation channels, which in turn has resulted in decreases in domestic rice production. Lack of irrigation was cited as one of the major reasons that 16.3 percent of farmers left land idle according to the Agriculture Census of 2009. Water sources are completely dried up in a number of areas.

11. **Prior initiatives to enhance agricultural production and marketing lacked adequate coordination.** Marketing improvements focused primarily on infrastructure provision (farm roads, irrigation schemes, and market sheds). The resulting improvements lacked sustainability and produced limited income increases for producers, which in turn created little incentive for farmers or marketers to form cooperatives or groups, or for investment in developing businesses in the sector. In addition, the inclusive targeting approach of reaching as many gewogs and households as possible failed to capitalize on potential high production areas in combination with ready markets. Marketing infrastructure is currently very limited, and the marketing arm of the MoAF, (previously the state-owned Food Corporation Bhutan Limited (FCBL)), is undertaking efforts to market RNR products.

12. **Funding from Global Agriculture and Food Security Program (GAFSP) is critical for helping Bhutan achieve food security and alleviate poverty.** In November 2014, the GAFSP Steering Committee awarded the RGoB a grant in the amount of US$8 million to fund the proposed Food Security and Agriculture Productivity Project (FSAPP). In December 2014, the RGoB confirmed and formally nominated the World Bank as the supervising entity for the execution of this grant. Through the financial support of the GAFSP, the project is expected to benefit a high proportion of impoverished smallholder farmers and malnourished women and children, while contributing to the overall development of the agriculture sector.

C. Higher Level Objectives to which the Project Contributes

13. **The proposed project is well aligned with the World Bank's Country Partnership Strategy (CPS; FY2015-19), which emphasizes the commercialization of agriculture as a driver in overall poverty reduction**. It is also in line with RGoB's 11th FYP, which is committed to addressing issues related to gender equity, food security and nutrition, environmental sustainability, and good governance. The World Bank has invested substantially in supporting the agriculture sector to enhance productivity through two projects: the Decentralized Rural

Development Project (DRDP) and the Remote Rural Communities Development Project (RRCDP). There is now a need to scale up the best practices and build on the gains made through these projects by adopting a more integrated and focused approach to Bhutan's agriculture sector that encompasses nutrition concerns and support for taking the next steps toward modernization, commercialization, and market development.

14. **The proposed Project also directly addresses the World Bank's twin goals of eradicating extreme poverty and promoting shared prosperity**. The Project will target poor communities by focusing initially on selected areas where food insecurity is high and there is substantial potential to increase agricultural productivity. Citizen engagement and gender inclusion, which are at the core of the proposed design, will ensure that the benefits of the Project contribute to shared prosperity in the target communities.

II. PROJECT DEVELOPMENT OBJECTIVES

A. PDO

15. The Project Development Objective (PDO) is *to increase agricultural productivity and enhance access to markets for farmers in selected gewogs in south-west Bhutan*.

PDO Level Results Indicators

16. The achievement of the PDO will be measured by three indicators: (i) an increase in the productivity of targeted crops by at least 20 percent in project areas, (ii) an increase in both the volume and value of produce marketed by at least 20 percent, and (iii) the number of direct project beneficiaries, of whom approximately 30 percent will be women.

Project Beneficiaries

17. The project aims to directly benefit approximately 10,400 households (52,000 people).[3] About 30 percent of the direct beneficiaries will be women. The project will address priority needs of the entire population of the selected gewogs, all of whom are small and poor farmers. The project will also improve homegrown school feeding programs for 3,000 school children in 16 schools located in 11 project gewogs[4] by facilitating productive linkages among producer groups and the schools.

[3] The project aims to cover the entire rural population of the selected five dzongkhags (approximately 10,400 households). In the original proposal for GAFSP, the number of beneficiary households (households) was estimated at 39,000 across 78 gewogs in seven dzongkhags in the East. This, however, was a significant overestimation of the reach of the project given the size of the grant.

[4] These 3,000 school children are included in the total 10,400 HHs (52,000 people) covered under the project (approximately 6 percent of the total population).

III. PROJECT DESCRIPTION

A. Project Approach

18. The project supports RGoB's efforts to reduce rural poverty, food insecurity, and malnutrition. It also aims to increase resilience to climate change through climate smart agricultural productivity enhancement for food security and nutrition, and increased access to local and export markets for producers. The project seeks to address multiple problems faced by farmers and rural households through a set of integrated, consolidated, and area-specific interventions that respond to local constraints, opportunities, and potential. This entails: (a) focusing on the farmer as the primary beneficiary and lead actor in food security, nutrition, and agricultural commercialization, (b) increasing the productivity of food crops (rice, potato, vegetables, and pulses) and high-value crops (large cardamom, ginger, other spices, vegetables and citrus) to improve food security and nutrition (Component 1 and 2), and (c) linking farmers to agri-markets through a value chain approach (Component 3).

19. All project interventions will take gender into consideration and ensure equal participation in project activities, representation in farmer groups, and proactive involvement in decision making by women. This draws on the experience and practical lessons of previous projects and builds on the achievements of prior investments. Dietary diversity is assigned priority in project design with regards to the production of a variety of foods and their availability and affordability to consumers – nutrition outcomes are targeted through both the supply and demand sides.

20. The original proposal for GAFSP included access to finance. The final proposal omitted this element at the request of the RGoB given that a number of investments and interventions are already in place to address the financial needs and concerns of small and poor farmers. Additional financial sector reforms are moreover required before direct project level interventions would be feasible. The current banking sector does not provide adequate support to agribusinesses in Bhutan. Nevertheless, under the FSAPP, the targeted farmers will be trained in financial literacy to improve their capacity to access sources of finance from outside the project.

21. **Project Areas and Targeting**. The FSAPP will be implemented in Bhutan's five south-western dzongkhags: Chukha, Dagana, Haa, Samste and Sarpang. These were selected for two primary reasons: (a) they provide the best opportunities for the commercialization of certain high value crops, and the infrastructure investments already made in these dzongkhags through previous World Bank projects provide the platform to help farmers move towards commercializing; and (b) the incidence of poverty, malnutrition, low agricultural productivity, and inaccessible markets are as dire as it was in the originally selected eastern dzongkhags.

22. Within the five participating dzongkhags, the project will be implemented in 24 gewogs (out of a total of 58), selected on the basis of an assessment of the project areas and how they meet joint selection criteria. The criteria include: linkages to previous Bank supported interventions (DRDP and RRCDP); cropping patterns; productive potential; overall production level; number of cultivated land areas; and ease of access in terms of road infrastructure, potential value chain, and markets. During project implementation, a certain degree of flexibility will be required to remain responsive to any changes in the selected gewogs and participating dzongkhags. The indicative list is as follows.

Table 1. List of Gewogs by Dzongkhag

Dzongkhag	Proposed Gewogs
1. Chukha	Bongo, Dungna, Getana, Metakha, Sampheling
2. Dagana	Drujeygang, Kana, Karmaling, Lhamoizingkha, Nichula
3. Haa	Gakiling, Uesu, Samar, Sangbaykha
4. Samste	Dophuchen, Norbugang, Sangngagcholing, Tading, Tendruk
5. Sarpang	Gakidling, Shompangkha, Dekiling, Samtenling, Tareythang

23. **Reason for Changing Area of Intervention and Coverage Targets in the Original GAFSP Proposal.** The initial GAFSP proposal indicated that the project would be implemented in seven eastern dzongkhags covering 78 gewogs. The RGoB and the MoAF requested that the project area be changed to dzongkhags in the southwest to rationalize the limited resources available from development partners. During the 18 month interim between the initial submission of the GAFSP proposal and when it was awarded, a US$31.5 million seven year project was being prepared for the east by the International Fund for Agriculture Development (IFAD), which already had a significant presence in the area with two earlier completed projects and another ongoing one. The RGoB and the Bank therefore agreed that it would be strategically important to build upon the gains made by previous Bank supported projects.

24. By focusing on some of the poorest dzongkhags in the southwest, the project represents an opportunity to significantly reduce pockets of extreme poverty in the area, improve food security and nutrition, and build the capacity of smallholder farmers to move from subsistence farming to a more commercial agriculture – entrepreneurial and market-driven. Moving the project area to the southwest does not change the design or components of the project. The incidence of poverty, malnutrition, low agriculture productivity, and poor access to markets remain of equal concern. Moreover, investments aimed at high value export crops in general, and at large cardamom and citrus in particular, are more suitable in the southwest. Large cardamom production in the east is almost nonexistent, and mandarin trees are more productive in the southwest, where between 63 and 99 percent of trees are fruit-bearing.

B. Project Components

Component 1: Strengthening Farmer and Producer Groups (US$1.08 million)

25. The objective of this component is *to strengthen farmers' and producers' groups to better enable them to implement and sustain project interventions.* It is designed to address one of the key constraints to improved agricultural productivity and socio-economic conditions of farmers - weak farmers' groups that lack necessary and relevant skills, knowledge, practices, quality inputs and appropriate technologies.

1.1 Farmer Group Strengthening and Formation

26. Component 1 will build on and further strengthen the existing mechanism of farmer group (FG) formation and capacity development, relying on gewog RNR officials for the delivery of project interventions at the community level. The project will facilitate the formation and strengthening of 300 new and existing FGs in identifying and participating in project supported activities for increased productivity and enhanced market access. It will include capacity building for FGs in various aspects of farm business management such as business orientation, financial literacy, book-keeping, and market assessment. The project will provide Training of Trainers (TOTs) to RNR officials and Community Resource Persons (CRPs) in these thematic areas under the FAO-financed TA (see FAO TA section).

1.2 Strengthening Producer Groups

27. The project will also support the formation of 30 producer groups (PGs). The PGs will be organized into clusters of business enterprises capitalizing on the opportunities for product aggregation, value addition, and marketing in promising value chains. The project will build on the DAMC's approach to cooperative and producer group strengthening and provide support to the PGs in areas such as organizational governance, value chain analysis, business development, quality control, access to finance, and marketing. A Marketing/Value Chain Expert in the PMU will coordinate capacity building activities in close collaboration with Department of Agriculture Marketing and Cooperatives (DAMC).

1.3 Contributing to Improved Nutrition

28. Nutrition-related activities will focus on raising awareness about dietary diversity and health and nutrition among the farming communities, especially women of reproductive age, youth, and school children. Raising awareness about nutrition will take place through capacity building of FGs in conjunction with other training activities. The project will actively promote nutrition awareness among the targeted population through a Behavior Change and Communications (BCC) approach using the FGs as an entry point. Community Resource Persons (CRPs) will be trained in BCC to facilitate households' understanding of nutrition and actions needed to improve diets, using communication materials developed through a participatory diagnostic analysis of dietary behaviors. The CRPs' role at the community level will be coordinated with other capacity building activities targeting the FGs, capturing all potential windows of opportunity throughout the project to address nutrition issues.

Component 2: Enhancing Farmer Productivity (US$5.21 million)

29. The objective of this component *is to improve agricultural productivity vital for improving food security and nutrition.* The component will promote climate smart agriculture through productivity enhancement of rice, vegetables, pulses, and potatoes for improved food security and nutrition. The productivity of key high value crops such as spices (specifically large cardamom and ginger), vegetables, and citrus will also be promoted for both local and export markets. The overall purpose is to expand cultivated areas, increase climate smart cropping intensity, and increase productivity and production for potential commercial surplus. The approach under this component is holistic and area-specific, providing an integrated package of interventions based on the relevant farming systems and specific crops appropriate to the priorities of the farmers, farming systems and overall production potential in the selected area.

30. Based on this approach, Component 2 will focus on three main areas of intervention: water use efficiency, improved farm management and technical capacity building, and enhanced agri-inputs and technologies – all aimed at improving productivity. These are summarized below.

2.1 Water Use Efficiency

31. The project will support the development of four irrigation systems to irrigate 1,346 acres (545 ha) of land for the production and productivity increase of selected crops in the irrigated command area. To make irrigation more effective, the project will introduce appropriate technologies and cropping practices to make the best use of irrigation water through high efficiency irrigation systems. As per the farmers' demand, the project will develop an additional 250 acres (100 ha) of land through the provision of micro-irrigation (sprinkler, drip) schemes for improved horticulture and cash crops. Four water user associations (WUAs) and about 20 water user groups will be formed and strengthened for improved agronomic practices, water use efficiency, and in the operation and maintenance of irrigation systems.

2.2 Improved Farm Management and Technical and Institutional Capacity Building

32. To support farmers in adopting improved farm management practices, the project will provide the FGs with training and extension services as well as the technical assistance that is tailored for their needs and priorities. The project will also support capacity development to select agricultural institutions (that is, the Engineering Division, National Seed Center (NSC), and the National Post-Harvest Centre (NPHC) of the MoAF) to sustain the investments being made by the project and to ensure that the farmers' increasing demand for quality agricultural inputs is adequately addressed.

2.3 Improved Agricultural Inputs and Technologies

33. For farm productivity and production levels to increase in selected areas, FGs will be provided with agricultural inputs and farming technologies such as small farm machinery and equipment (on a cost sharing basis with established criteria), electric fencing, greenhouses, quality

and disease-free seeds, and improved planting materials, based on the specific needs of the farmers. Some of the inputs will be provided on a cost-sharing basis (that is, monetary contribution towards the cost of technology/equipment or in-kind contribution consisting of the labor required for installation, in accordance with the criteria set forth in the Project Operations Manual). The package of inputs to be provided will be tailored specifically to the needs of targeted groups and project areas. The use of improved farm and climate smart technologies for increasing the productivity of staple and high value crops will also be promoted. Because the migration of male youth has resulted in a substantially increased work burden for women in farming activities, the project will focus specifically on the needs of female farmers in the provision of small farm implements and machinery.

Component 3: Enhancing Access to Markets (US$1.0 million)

34. The component aims *to promote value chains for select high value nutrient-rich crops and enhanced linkages to domestic and export markets.* The primary focus will be to: (a) reduce post-harvest losses, (b) strengthen nutrition sensitive value chains of selected crops; and (c) enhance producers' knowledge, bargaining power, and access to agri-markets. It will include strengthening local producer-consumer linkages, and establishing productive relationships with public and private market players, school meal programs, and exporters. The overall commodity selection strategy will follow the 'One Gewog Three Product (OGTP)' approach of the MoAF that focuses on the top three commodities as per the current production scale. Component 3 include two sub-components, described below..

3.1 Post-Harvest and Market Infrastructure Support

35. Part (a) of this component will support farmers in minimizing post-harvest losses; improving commodity shelf life; enhancing product quality, storage/cold storage and packaging; and improving transportation to ensure higher market values. It will include training (ToTs, CRP training & training of farmers by CRPs), exposure visits, and provision of appropriate technologies (based on the cost sharing policy of the Department of Agriculture (DoA)). The PGs will receive training in entrepreneurship, business planning, book-keeping and accounting, among other skills necessary for commercial operations and sustainability.

36. Part (b) will support five food-processing groups for preparing, packaging, and marketing hygienically safe and nutritious food to domestic markets. Activities will include market research, training, exposure visits and skills enhancement in hygienically safe food preparation, packaging, labeling, pricing, and marketing. Appropriate technology and equipment will be provided through the cost sharing policy of the DoA (that is, monetary contribution towards the cost of technology/equipment or in-kind contribution comprising the labor required for the installation in accordance with the criteria set forth in the Project Operations Manual).

37. Part (c) will support the construction and rehabilitation of five farm shops as a pilot to develop them into commercially viable model enterprises. The shops will make quality inputs available to farmers, help small producers market their products, and provide a buy back facility for selected crops. No funds are expected to flow to the communities for the above activities. The DAMC and FCBL will collaborate closely in this component and provide the necessary technical

support to develop and operationalize the shops as commercially viable enterprises. The lessons from this pilot experience will later be incorporated in other farm shops being set up across Bhutan by the RGoB.

3.2 Linkages to Domestic and Export Markets

38. This component responds to the constraints confronting small farmers in accessing information as well as domestic and export agri-markets. Through this component, the project will provide support to DAMC for reviewing and upgrading the existing agri-market information system (the AgMarket website and IVR system) into a user-friendly system that small farmers and other stakeholders can easily access through computers, mobile phones, and other technologies. The system will be revamped to: (a) improve the flow of market information from local auction yards and distant markets to producers; and (b) systematically improve production planning and management of commodities. This will help local farmers' access information regularly and receive updates on market demand and prices of different agricultural commodities in local and distant markets, thus supporting informed decision-making. This platform can also be used to support the regular dissemination of information on agriculture-nutrition linkages supported by Component 1. In addition to supporting the DAMC portal, the Project will strengthen knowledge sharing, and enhance interactions and linkages among local producers, middle men, traders, and agri-markets through the use of mobile technology, where possible.

39. In addition, this component will address high value export commodities constrained by limited access to international markets and insufficient backward linkages with producers. The project will: (a) facilitate knowledge and information exchange between PGs, traders, exporters, and other concerned stakeholders for maximizing foreign exchange returns by arranging regular buyer-seller meetings and disseminating critical information on production, market, and policies; (b) inform exporters about international trade practices and trade negotiations, etc.; and (c) link the exporters to producers and intermediaries for efficiently functioning value chains.

40. The project will link the PGs to school meal programs, which face difficulties providing a balanced and nutritious diet to the students due to the limited availability of local produce. Recognizing that integrated homegrown school meal programs can help drive changes in the consumption patterns of future buyers by exposing children at a young age to a balanced diet, the project will facilitate productive linkages between the PGs and schools to allow the schools to purchase seasonal vegetables, fruits, and pulses from these groups using their own funds. The project will develop the capacity of: (a) PGs, in establishing partnerships with schools and accessing local markets to sell their produce, as needed; (b) schools, to improve school menus based on the crop calendar to help the PGs plan supplies accordingly; and (c) school cooks, to make use of seasonal foods and increase nutrient retention. The project also will arrange exposure and study visits for participants to see successful home-grown school meal programs.

Component 4: Project Management (US$0.71 million)

41. Component 4 will support all aspects of project management including: (a) management and coordination, (b) monitoring and evaluation, (c) technical assistance, and (d) a grievance redress system. The expected outcome of this component is an effective and transparent project

management system. The main functions and activities will be to: (a) provide overall governance and direction to the project; (b) provide strategic, management, and operational guidance and support to project staff for achieving the PDO and expected outputs; (c) regularly monitor and analyze the overall and component specific quality and pace of implementation, ESMF compliance, budget and expenditures, and address any issues, bottlenecks, and gaps to ensure that progress in project implementation is on track; (d) conduct a capacity needs assessment of project staff and provide requisite knowledge, management skills, exposure visits, and specific thematic/technical training in a systematic manner; (e) establish a robust monitoring and evaluation (M&E) and reporting system, including baseline surveys, a mid-term assessment, and end of project evaluation; (f) establish a clear and effective mechanism for grievance redress, including a system for receiving, recording, and addressing complaints and using them for course corrections as required; (g) strengthen project communication and knowledge management as well as document, collate, and disseminate project experiences and learning; and (h) support reviews, studies, and policy analysis that would contribute to the country's agriculture, food security, and nutrition policies and plans.

Project Costs and Financing

42. The total project costs are estimated at US$9.35 million. Funding sources include the GAFSP grant (US$8 million), contributions from the RGoB in the form of staff salaries and selected operating expenses (US$1.12 million), and beneficiaries participating in cost-sharing arrangements for the provision of equipment and materials, including labor (US$0.23 million). In relative terms, the GAFSP grant would finance 85.5 percent, RGoB 12 percent, and beneficiaries 2.5 percent of the total project costs. Allocations per component/subcomponent have been calculated, as follows: (a) Component 1 (Strengthening Farmer and Producer Groups) is US$1.08 million (13.5 percent of total grant funds); Component 2 (Enhancing Farmer Productivity) will be about US$5.21 million (65.1 percent), Component 3 (Enhancing Access to Markets) will be US$1 million (12.5 percent), and Component 4 (Project Management) will be US$0.71 million (8.9 percent).

Table 2. Project Cost by Financiers and Components

Component	RGoB US$	Beneficiaries (cost contribution)	GAFSP US$	GAFSP %	Total US$
1. Strengthening Farmers and Producer Groups	-	-	1,079,137	13.5	1,079,137
2. Enhancing Farmer Productivity	-	147,163	5,209,365	65.1	5,356,528
3. Enhancing Access to Markets	-	91,600	1,000,947	12.5	1,092,547
4.Project Management	1,120,841	-	710,550	8.9	1,831,391
Total Project Cost	1,120,841	238,763	8,000,000	100.0	9,359,603

Note. RGoB will finance the PMU and RDC staff salaries and office space under Component 4.

Lessons Learned from Previous Projects

43. During the past 10 years, the World Bank has actively supported Bhutan's agriculture sector through two main projects: the *Decentralized Rural Development Project* (DRDP, US$12 million, closed in December 2014) and the *Remote Rural Communities Development Project* (RRCDP, US$9 million, active). Through these projects, the Bank has supported investment projects in staple commodities (rice, maize, and potato); livestock (diary, poultry); high value crops (large cardamom and citrus); and rural infrastructure (irrigation and farm roads) in the southwest dzongkhags. These projects have sought to both reduce the incidence of poverty and to improve food security. Key lessons learnt from the implementation of these projects include the following:

(a) Successful project implementation requires a strong project management team, led by an experienced project coordinator, and a robust monitoring and evaluation system led by a competent M&E officer to monitor, collect, and document project data and accurately report on project achievements and impacts on beneficiaries.

(b) To reduce delays in the implementation of rural infrastructure (irrigation schemes or farm roads), procurement needs to be carried out centrally, and advance procurement action for contracts is recommended.

(c) Previous projects focused more on infrastructure development and overlooked the softer components on strengthening the beneficiaries in terms of creating ownership and management of assets for sustainability. Multiple fragmented interventions do not yield the same level of impact as focused saturated interventions.

(d) The encouragement of double cropping/crop diversification should accompany the provision of irrigation services. Organized community farmer groups such as the community-based seed producer groups have significantly increased seed production. This model could be replicated in future projects.

(e) Institutional strengthening and staff capacity building are key factors in the sustainability of project outcomes. For example, the training of National Seed Center (NSC) staff led to the propagation of high quality disease free basic seeds of potato, banana, and maize.

(f) Increased access to markets by building farm roads is a necessary but not sufficient condition for improving agricultural productivity. Organized marketing infrastructure, supply of quality agri-inputs, linkages to buyers, fair pricing, and guaranteed markets are all key ingredients for increasing agriculture production.

Linkages to Other Programs/Projects and Private Sector Engagement

44. **Private Sector Engagement.** Active consultations with local sellers, buyers, traders, middlemen, suppliers, national/international private companies, and NGOs were carried out while designing and developing the FSAPP, with particular focus on ensuring their engagement in market development and in creating market linkages for small producers. This project will link producer groups to local suppliers and traders as well as national and international private companies for timely access to quality inputs. The project will identify international buyers and

facilitate their linkages with national exporters. In addition, the project will work with national exporters to facilitate their linkage with PGs, and engage with both the national private sector and the government-owned auction yards, while accessing and developing a market information system. During the project period, stakeholder workshops with local suppliers and traders, and key private sector companies will be arranged on a regular basis, including those which are actively involved in various development projects in Bhutan such as the Mountain Hazelnuts Venture, which is funded by the GAFSP private sector window and IFC.

45. **World Food Program (WFP).** The project seeks to build on previous experiences and the ongoing work of partner agencies, including IFAD and WFP, especially with regard to nutrition interventions. One of the key nutrition interventions under this project will be to train cooks on such topics as the use of seasonal foods and value diverse food plate, food storage, procurement, recipes, and food safety, building on WFPs yearly training activities.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

46. The MoAF will coordinate the overall implementation of the project. A Project Steering Committee (PSC) will provide policy guidance, direction, and oversight. The PSC will be chaired by the DoA with representation of the Ministry of Finance, Gross National Happiness Commission (GNHC), Department of Agriculture Marketing and Cooperative (DAMC), Project Management Unit (PMU), Research and Development Centers (RDCs), five Dzongdas (Governors), and five beneficiary representatives (one from each dzongkhag). Biannual PSC meetings will be held in project dzongkhags on a rotational basis.

47. It was agreed that a Project Management Unit (PMU) will be set up in the DoA. The PMU will report to the Director, DoA. The PMU will comprise the following staff:

Table 3. Project Management Unit Staff

PMU Position	Type of Appointment
• Project Director, M&E Expert, FM Expert, Driver and Administrative staff	• Existing DoA staff on full-time basis
• Procurement Expert	• Full-time for 2 years (FAO-TA)
• Safeguards/Gender Expert	• Full-time for 2 years, (FAO-TA)
• Behavior Change Communication for Nutrition Expert	• Full-time for 2 years (FAO-TA)
• Value Chain Development/Marketing Expert	• Full-time for 3 years (FAO-TA)[5]

48. Three **Research and Development Centers (RDCs**) situated in Bajo, Bhur, and Yusipang will play a key role in project implementation. In each RDC, a Project Support Team (PST) will

[5] 3 years under FAO TA, to be renewed after that with government resources for the remaining period.

be set up to work closely with project staff in dzongkhags and gewogs. The dzongkhags annual work plan and budget will be collated as the RDC-wide annual work plan and budget, and the PST will be responsible for the implementation of this plan. In total, three PSTs will be established comprising the following staff.

Table 4. Program Support Team

Program Support Team (PST) Positions	Type of Appointment
• M&E Expert, Irrigation Engineer	• Existing RDC and Engineering Division staff on full time basis
• Infrastructure Engineer, Accountant, Procurement expert, Safeguards/Gender Expert	• Existing RDC staff on a 50 percent time share basis
• School Agriculture and Nutrition Coordinator	• Full-time for two years, and will divide his/her time between the three RDCs on needs basis (FAO-TA)
• Marketing Officer	• Existing DAMC staff on full-time basis

** In case, DAMC staff has the required experience and expertise for these positions, two experts each will be based in RDC as full time members of PST, otherwise the project will recruit these experts on competitive basis.*

49. **Dzongkhag and Gewog Administrations.** The administrations of five dzongkhags (Chhukha, Dagana, Haa, Samstse, Sarpang) and 24 gewogs will serve as implementation entities at the field level. Dzongkhag- and gewog-specific project annual work plans and budgets will be prepared and implemented with the active participation and involvement of PST-RDC; district officers, especially district agriculture officers (DoA) and district engineers (DE); Gewog Tshogde; Gup; Gewog Administrative Officer (GAO), Gewog Extension Agents (EA), and Tshogpas. The District Agriculture Officer will be responsible for implementing the respective dzongkhag's annual work plans and budgets.

50. **Grievance Redress Mechanism (GRM)**. A simple, effective, and easy to use GRM will be set up no later than six months after effectiveness that will enable the project to promote openness and transparency at the local level, increase project ownership, enable beneficiaries and stakeholders to share any concerns and suggestions and for project staff to adequately respond to them. All complaints and suggestions will be tagged and tracked. The status of the complaints and suggestions received and resolved will be regularly reported in the project progress report as well as reported to the project steering committee and used for course correction, if required.

51. **Technical Assistance.** FAO will provide the required technical assistance and support to strengthening institutions, at an estimated amount of US$1.15 million, as required by the PMU for successful implementation and sustainability of the project. This TA is designed to synergize with FSAPP's investment activities and be integrated in its four project components to serve as a catalyst to achieve project-specific results on the ground. Nutrition is the key technical area of focus for the TA. In addition, agriculture production and marketing, as well as capacity building of farmers' groups, will be supported to complement the current efforts of the MoAF in those areas.

52. The following activities will be supported by FAO TA: (a) Component 1 will include (i) training material development and TOT on farm business management; and (ii) nutrition

awareness and capacity building for improved diet, including BCC strategy formation and material development; (b) Component 2 will consist of (i) training in the design of micro-irrigation systems; (ii) capacity building in WUA strengthening; (iii) technical training in citrus propagation and disease control; (iv) technical training in cardamom propagation, disease control, and orchard management; and (v) training in new emerging technical areas of strategic importance and relevance to the project (such as adaptation to climate changes); (c) Component 3 will include (i) training on post-harvest technologies, packaging, food processing and safety, targeting five PGs engaged in food processing business; (ii) upgrading of market information system; and (iii) support for the linkages between PGs and schools for improved school feeding. It was also agreed that all contracted positions in the PMU and RDCs will be supported under FAO TA (see Implementation Arrangement section).

B. Results Monitoring and Evaluation

53. The M&E plan includes: (a) organizational arrangements, (b) mechanisms for progress monitoring, (c) M&E staffing, capacity building, and costing, and (d) reporting of processes, activities, outcomes, and results. The FSAPP PMU will have the overall responsibility for M&E operations, regular reporting, and dissemination of project results, and will receive the required support for these activities from the Bank. The PMU will receive supported from the PST at the RDC level. Based on lessons learnt from past projects where the lack of designated M&E officers made data collection and management very difficult, both the PMU and PSTs will have designated persons assigned to M&E. Formal M&E mechanisms and structures will be established at all levels of project implementation, including the dzongkhags and gewogs. The PMU will be responsible for monitoring implementation progress (physical and financial), and verifying and consolidating data. It will also be responsible for monitoring overall project implementation progress, outcome/results, and evaluations as well as commissioning and supervising baseline, satisfaction, impact evaluation, and other surveys**.** The PMU will be responsible for submitting biannual progress reports to the Bank.

54. **Main Features of the M&E System**. The main features of project M&E include: baseline data; biannual progress reports; regular reporting of progress to the Steering Committee (SC); an independent evaluation of implementation at project completion; an impact evaluation (IE) upon completion, and any other analysis, reviews, assessments, surveys, and evaluations required to better analyze the impact of the project. The IE will also assess the changes in income and economic status of beneficiaries as a result of project interventions. The results framework, attached in Annex 1, includes six GAFSP Core indicators. All reporting on the framework will be gender disaggregated.

55. **Baseline, Mid-term, and Program Evaluation**. Independent firms will be hired to conduct surveys required for project evaluation, including establishing a baseline at the start of the project and designing the end-of-project evaluation. At mid-term, an independent firm will carry out a technical audit and a beneficiary assessment. A household food and nutrition survey will be carried out in year five of the project and a rapid (non-experimental) impact evaluation will also be conducted to measure project impact in key areas, including household income, food security, and nutrition.

C. Sustainability

56. To ensure the continuity and sustainability of project outcomes and impacts, the project will take a multi-tiered approach: (a) a strong focus on community ownership and participation; (b) institutional strengthening at central, dzongkhag, gewog, and chiwog levels; (c) building technical, entrepreneurial, market-specific, and implementation capacities of farmers, farmers' groups, farm enterprises, and producer groups; and (d) eventual uptake of project approach and interventions into the overall agricultural policy in Bhutan.

- *Community Ownership and Participation*. The project will work with and through the farmers, FGs, and producers' clusters, and the integrated package of interventions for each area will be guided and influenced by the demand articulated through extensive consultations with project communities. Community contributions (cash or in-kind) will be part of all infrastructure investments to build ownership and accountability.

- *Institutional Strengthening and Supporting Buyer-Seller Relationships*. A key focus of the project is capacity building at the national, dzongkhag, gewog, chiwog, and community levels to ensure the uptake and absorption of project interventions by relevant project entities, stakeholders, and beneficiaries. This includes exposure visits, short courses, road shows, in-field training, learning and experience-sharing workshops, technical training, and skills development through a ToT model to ensure that beneficiaries of the training can continue to train others post-project for sustained knowledge transfer. Another focus is to develop sustainable linkages between market actors and farmers, which will include buyer-seller workshops.

- *Policy Uptake*. On the nutrition side, feeding into policy-making processes is key for project sustainability. This would potentially include supporting the RGoB FSN strategy and plan of action, an E-agriculture strategy (for example, by piloting Digital Green for BCC), and the school feeding policy under the Ministry of Education. If menus have been effectively adapted, and if food consumption practices have been improved through BCC, the project would have made a substantial contribution to post-project sustainability.

V. KEY RISKS

A. Overall Risk Rating and Explanation of Key Risks

Table 5. Risk Ratings Summary Table

Systematic Operations Risk- Rating Tool (SORT)	
Risk Category	**Rating**
1. Political and Governance	L
2. Macroeconomic	L
3. Sector Strategies and Policies	M
4. Technical Design of Project or Program	M
5. Institutional Capacity for Implementation and Sustainability	M
6. Fiduciary	M
7. Environment and Social	M
8. Stakeholders	M
9. Other	L
OVERALL	M

B. Overall Risk Ratings Explanation and Risk Mitigation Measures

57. **Sector Strategies and Polices**: The private sector crowding out by public institutions is area of concern. Public support for state owned enterprises like AMC and FCBL may crowd out smaller firms wishing to grow and may actually stifle private investment. RGoB enterprises and the MoAF supply driven approach distorts the market and crowds out competition (the AMC and FCBL are good examples of enterprises crowding out the private sector).

Risk Mitigation: A clear delineation of the roles and responsibilities of the public versus private sector will be set out from the beginning and efforts will be made throughout the project, in all relevant activities and at all levels to engage, involve, and facilitate the very nascent private sector of Bhutan so that both the public sector (that is, the MoAF) and private sector better understand and appreciate each other's role and contribution in promoting food security, nutrition, and commercialization of agriculture.

58. **Technical Design of Project:** The PMU and PST enhance the stability of the project. However, there is a risk that vulnerable beneficiaries, especially women, will not be adequately informed about the project or engaged in stakeholder consultations - and thus, excluded from project benefits.

Risk Mitigation: To address these risks, the ESMF includes measures for consultations, participatory planning, grievance redress, community development, and beneficiary feedback that consider gender considerations.

59. **Institutional Capacity and Implementation and Sustainability**: Local government capacity and resource constraints expose the project to unwanted risk. Lack of coordination and synergies across project activities due to the organizational structure within the MoAF and the wide geographical coverage of the project.

Risk Mitigation: The PMU at the central level and three Project Support Teams housed in the RDCs will be responsible for effective coordination and liaising across different departments, divisions, units, and other entities. Project design involves active local government support, especially at the dzongkhag and gewog levels. The project will allocate adequate project resources to guide and support local governments and train key local government staff assigned to the project to ensured sustainability.

60. **Fiduciary**: As part of the project's financial management system, additional measures will be required to minimize financial management risks during project implementation.

Risk Mitigation: These include adequate staffing at all levels, a well prepared and implemented operations manual, regular implementation support, and training.

61. **Stakeholders**: The proposed project may impinge on existing activities funded by other donor agencies

Risk Mitigation: Active coordination with development partners on the selection of targeted areas and beneficiaries will help mitigate this risk. The RGoB has already instituted mechanisms to harmonize development partners' assistance in the RNR sector. Active awareness building and communications actions will be undertaken to ensure understanding of the project at all levels. The project will liaise with and complement other projects, to the extent feasible.

VI. APPRAISAL SUMMARY

A. Economic Analysis

62. Project interventions are anticipated to result in a wide range of tangible and intangible benefits. The main quantifiable benefits include: (a) increases in overall agricultural productivity resulting from the dissemination and adoption of improved production technologies; (b) higher cropping intensities for paddy, maize, and pulses in areas where irrigation schemes are constructed/rehabilitated; (c) improved labor efficiency and reduced production costs due to mechanization of labor-intensive farm activities; (d) reduced production losses caused by human-wildlife conflicts through installation of electric fencing; (e) prevention of post-harvest losses with the establishment of farm-level and large storage facilities; (f) increased incomes from the commercialization of traditional cash crops for export markets (ginger, large cardamom, and citrus) through training in integrated pest management, provision of good quality planting materials, and group strengthening for collective marketing and purchasing; (g) increase in market prospects for vegetable farmers through off-season production and linkages with local traders, private sector, and institutional buyers; (h) nutritional benefits derived from increased availability of fresh produce in local markets and better preservation of their nutrient contents thought adequate storage and value addition; and (i) creation of employment opportunities, particularly in farm

machinery support services. Benefits for the country at large include increased self-sufficiency in staples and vegetables that would in turn translate into a more positive trade balance and a reduction of foreign exchange costs due to the reduced volume of imported foods from India and other countries, and an increase in export quantities of high-value crops.

63. The economic analysis shows satisfactory results, with a Net Present Value at US$6.7 million and a 22 percent Economic Internal Rate of Return (EIRR). The results were tested for sensitivity to variations in benefits and costs, and for various lags in the realization of benefits. A delay of 2 years in the generation of benefits or a reduction of 30 percent relative to the base scenario would reduce the EIRR to 15-16 percent, still comfortably above the discount rate. Cost overruns by 30 percent would have a similar impact, with the EIRR falling to 17 percent. All scenarios show satisfactory results.

B. Technical

64. The Project is designed to support several dimensions related to agriculture and rural institutions and services, and enhance agriculture productivity and food security of households, keeping farmers' groups in the center of the project, and paving the way for agricultural commercialization in Bhutan. The experience of development partners and past World Bank projects in supporting farmers' groups, agricultural income enhancement, improved agriculture planning and production, and prior attempts at commercializing agriculture in Bhutan has provided several lessons and best practices that informed the technical design of the FSAPP. In this regard, the project addressed the need for: (a) a designated PMU for the project with a dedicated M&E officer; (b) capacity building for FGs and support with improved technologies; (c) institutional strengthening, and (d) strengthening the capacity of beneficiaries in terms of creating ownership and managing assets for sustainability.

65. The project design also reflects the lesson that farm roads are a necessary but not sufficient condition to increased access to markets, which likewise relies on organized marketing infrastructure, supply of quality agricultural inputs, linkages to buyers, fair pricing, and guaranteed markets are all key ingredients for increasing agriculture production. In addition, the project's focus on women and youth as well as nutrition and climate sensitive agriculture is expected to meet the specific needs of remote rural communities.

C. Financial Management

66. Given the past experience of the MoAF in managing Bank-financed projects and the Bank's prior understanding of the Public Financial Management (PFM) systems in Bhutan, the project will be implemented using the existing systems of the RGoB for budgeting, accounting, internal control, and audit. The project will be implemented by the DoA, PMU, DAMC, and the RDCs of the MoAF in five dzongkhags and 24 gewogs.

67. The project will include budgets for five dzongkhags, three RDCs, the PMU-DoA, and DAMC under separate Project Letter of Credit/s (PLC) and a Financing Item Code (FIC). These agencies could then allocate funds to the other administrative agencies such as gewogs. The FIC and activity/sub-activity codes will allow for all project-related expenditures to be separately identified, accounted, and reported in the Public Expenditure Management System (PEMS) reports

as well as in the interim unaudited financial reports (IUFRs). Disbursement will be made on a half yearly basis in accordance with the IUFRs. The Royal Audit Authority will carry out the annual external audit as per the terms of reference agreed with the Bank.

68. As part of the project's financial management system, additional measures will be required to minimize financial management risks during project implementation. These include adequate staffing at all levels, a well prepared and implemented operations manual, regular implementation support, and training.

D. Procurement

69. Procurement will be carried out in accordance with the "World Bank Procurement Regulations for Borrowers under Investment Project Financing" dated July 1, 2016. As per the requirements of the World Bank's New Procurement Framework (NPF), a comprehensive Project Procurement Strategy for Development (PPSD) has been prepared with support of the Bank. The objective is to improve procurement efficiency.

70. The MoAF has finalized a Procurement Plan for the entire project, and this was approved in STEP (Systemic Tracking of Exchange in Procurement) on October 20, 2016. MAF/PMU will update the procurement plan in agreement with the World Bank annually or as required to reflect project implementation needs and improvements in institutional capacity.

E. Social Safeguards

71. The project is expected to generate positive social impacts by supporting select small and poor farmers through enhanced agricultural productivity and access to markets. Because project investments will be small and localized, significant adverse social impacts, such as large-scale acquisition of private lands, physical relocation of people, and/or adverse impacts on human populations and their sources of livelihoods, are not envisaged. Nonetheless, the project triggers OP 4.12 (Involuntary Resettlement) because a small quantity of land may be needed for project implementation, resulting in marginal impacts. No involuntary resettlement is envisaged under the project, and land acquisition, if any, will be small-scale. To the extent possible, the land will be acquired through voluntary land donation, or the project will use public lands or those already under the ownership of project beneficiaries. No land expenditures will be financed by the project using GAFSP funds. To provide guidance in project planning and implementation to deal with the issue of land take and possible impacts on structures and livelihood sources, a Land Acquisition and Rehabilitation Framework, satisfactory to the World Bank, has been prepared and incorporated into the section of the ESMF entitled "Land Acquisition."

F. Gender and Vulnerable Communities

72. Project benefits are expected to be considerable for the target gewogs, which include vulnerable groups and communities, especially women and the poor. However, there is a risk that these vulnerable beneficiaries, especially women, will not be adequately informed about the project or engaged in stakeholder consultations - and thus, excluded from project benefits. To address these risks, the ESMF includes measures for consultations, participatory planning,

grievance redress, community development, and beneficiary feedback that consider gender considerations.

73. Specific interventions to support women and other vulnerable groups include: (a) ensuring their participation in stakeholder consultations, planning, and implementation; (b) targeting women and other vulnerable groups during the establishment and mobilization of all types of farmer groups, (c) supporting farm level mechanization to reduce the burden of labor on women; (d) raising awareness about dietary diversity and nutrition, carried out through a network of community resource persons, particularly for women of reproductive age who require nutrition awareness for their own health and for their children; and (e) training and capacity building activities on gender for Community Resource Persons and other project personnel at the central, dzongkhag, and gewog levels. Moreover, to ensure that that the overall project benefits accrue to women, the project's monitoring and evaluation system will collect, analyze, and report gender-disaggregated information for all key indicators as well confirm that approximately 30 percent of the project beneficiaries are women.

G. Social Accountability and Citizen Engagement

74. The project focuses on farmers as the primary beneficiaries and lead players in all project related activities. Thus, citizen engagement and accountability are critical to its success. The key elements of citizen engagement include: (a) mechanisms for consultations with a wide variety of stakeholders during the entire project cycle and across value chains; (b) demand-driven farmer participation, community mobilization, and participatory training activities; (c) grievance redress mechanisms and measures for information disclosure and dissemination; (d) advocacy and awareness-raising around nutritional security and dietary diversity targeting farming communities; (e) community mobilization and information dissemination on food and nutritional security, among other topics, through discussion groups and other media platforms (for example, infographics, audio and text messaging); (f) regular beneficiary feedback; and (g) inclusion of citizen engagement indicators in the results framework.[6]

H. Environmental Safeguards

75. Considering the nature and magnitude of potential environmental impacts from relatively small-scale irrigation and market access interventions, the FSAPP is classified as a category 'B' project. The environmental safeguard policies triggered are Environmental Assessment (OP 4.01) and Forest (OP 4.36). However, as a matter of precaution to address any potential and unforeseen issues of pest and pesticide management, OP 4.09 is triggered. In addition, the International Waterways Policy (OP 7.50) is triggered because raw water for irrigation from the existing streams will be withdrawn, stored, and distributed to agricultural fields, and the project includes development of new micro-irrigation schemes.

[6] The indicators for citizen engagement include: percentage of beneficiaries satisfied with services provided by the project, number of farmers linked to markets; number of direct project beneficiaries (gender-disaggregated); number of water users with access to new/improved irrigation services; number of farmers who adopted an improved agricultural technology promoted by the project; number of beneficiaries receiving technical trainings and other capacity building support; number of people receiving improved nutrition services; and number of farmers who are members of an association, including producer groups and cooperatives.

76. The project is designed to enhance farm productivity, which is expected to generate minor to moderate adverse impacts from agrochemicals and irrigation water use. However, no long term or irreversible adverse environmental impacts are envisaged. Any unforeseen impacts can be avoided or minimized through concerted efforts. The main project-related environmental issues that will need to be addressed are: (a) land slide/soil erosion; (b) over-extraction or misuse of irrigation water; (c) soil degradation; (d) pesticide-related health and safety issues; (e) water pollution, and (f) workers and community health safety and sanitation.

77. *International Waterways Policy (OP 7.50).* The MoAF determined that 1,450 liters per second of water, less than 0.3 percent of the total flow during the monsoon season and 500 liters per second of water during the dry season, will be extracted from four streams: the Ratey Khola, the Laring Khola, the Taray Khola, and the Bir Khola. All of them are tributaries of the Brahmaputra River. The RGoB provided notification letters to the Governments of India and Bangladesh, as riparians to the Brahmaputra River, on March 23, 2016 through their respective diplomatic embassies in Thimphu. Comments were received from India on July 25, 2016, requesting information on the latitude and longitude of diversion sites and the daily discharge series. The RGoB provided a response on August 4, 2016. On November 18, 2016, the Bank received a response from Bangladesh indicating no objection to the implementation of the Project.

78. The MoAF prepared an ESMF for the project. The draft ESMF was finalized and disclosed publicly by the MoAF in April 2016.

I. World Bank Grievance Redress

79. 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 in order 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, as a result 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 (GRS), please visit http://www.worldbank.org/GRS. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

Annex 1: Results Framework

Project Development Objective	Project Outcome Indicators	Baseline	Target	Frequency	Source of Data	Responsibility
To increase agricultural productivity and enhance access to markets for farmers in selected gewogs in south-west Bhutan	1. Productivity of targeted crops[7] increased by at least 20 percent in project areas[8].	0	20	Annual	Project Progress Reports RNR Statistics Third Party Assessments	PMU, PST, RDCs, dzongkhag and Gewog administrations
	2. Increase in both volume and value of produce marketed by at least 20 percent.	0	20	Annual	Project Progress Reports Third Party Assessments	PMU, PST, RCDs, dzongkhag and Gewog administrations,
	3. Number of direct project beneficiaries of which 30 percent are women.	0	10,400 HHs[9] – 15,600– female beneficiaries	Annual	Project Progress Reports Third Party Assessments	PMU, PST, RCDs, dzongkhag and gewog administrations
Intermediate Results Indicators						
Component Objective	**Project Outcome Indicators**	**Baseline**	**Target**	**Frequency**	**Source of Data**	**Responsibility**
Component 1: Strengthening Farmers and Producers Groups						
To strengthen farmers' groups (including in nutrition), so they are better able to implement and sustain project interventions.	1.1 Number of beneficiaries receiving technical trainings and other capacity building support	0	300[10]	Quarterly	Project Progress Reports	PMU, PST, RCDs, dzongkhag and Gewog administrations
	1.2 Number of farmers[11] who are members of an association including producer groups, cooperatives etc. (disaggregated by gender) – GAFSP Core Indicator # 14	0	10,400[12]	Biannual	Project Progress Reports RNR Statistics Third Party Assessments	PMU, PST, RCDs, dzongkhag and Gewog administrations

[7] Rice, Vegetables, Potatoes, Large Cardamom, Citrus.
[8] Project areas = 24 gewogs in 5 dzongkhags in South-West Bhutan
[9] 1 HH = estimated 5 family members on average, Total beneficiary HHs – 10,400. 5 x 10,400=52,000 (total estimated beneficiary population); 30% of total beneficiary population that will be receiving direct project interventions will be female = 30% of 52,000 = 15,600
[10] 300 Farmer Groups – any farmer group (including WUAs and producer groups) formed/strengthened under the project. Each group should receive at least one training.
[11] Supported by the project in creating or strengthening farmer groups.
[12] 1 farmer per HH, total number of targeted HHs – 10,400 farmers

	1.3 Number of people receiving improved nutrition services and products through the project - GAFSP Core Indicator # 11 (new GAFSP indicators) 1.3.1 Number of people who received nutrition counseling/education, recipients of Ready-to-use-Therapeutic Foods, bio-fortified foods, Vitamin A and micronutrient supplements 1.3.2 Number of people receiving extension support for nutrition-relevant techniques	0	6,000[13]	Biannual	Project Progress Reports Third Party Assessments	PMU, PST, RCDs, dzongkhag and Gewog administrations
Component 2: Enhancing Farmer Productivity						
To improve agricultural productivity vital for improving food security and nutrition.	2.1 Targeted crop area provided with irrigation – GAFSP Core Indicator # 6 Area covered by Flood Irrigation Area covered by Micro irrigation	 0 0	 1,346 acres 250 acres	Biannual	Project Progress Reports RNR Statistics Third Party Assessments	PMU, PST, RCDs, dzongkhag and gewog administrations
	2.2 Number of water users[14] with new/improved irrigation services – GAFSP Core Indicator # 8	0	4,065[15]	Biannual	Project Progress Reports RNR Statistics Third Party Assessments	PMU, PST, RCDs, dzongkhag and Gewog administrations
	2.3 Number of farmers who have adopted an improved agricultural technology[16] promoted by the project in targeted project areas (gender disaggregated) – GAFSP Core Indicator # 4	0	10,400[17]	Biannual	Project Progress Reports Third Party Assessments	PMU, PST, RCDs, dzongkhag and Gewog administrations
	2.4 Total land area under cultivation for citrus and cardamom increased by 5percent	0	5	Biannual	Project Progress Reports RNR Statistics	PMU, PST, RCDs, dzongkhag and

[13] 60% of targeted 10,400 HHs = 6,240 HHs. Assuming at least one person receives services per HH = 6,240 persons ~ 6,000 persons – This 6,000 covers both 1.3.1 and 1.3.2. These were not targeted separately because they are both pathways leading to the same outcome, i.e. 1.3 (no. of people receiving improved nutrition services and products)

[14] Water Users = All farmers benefitting from project supported irrigation interventions

[15] 563 HHs benefitting from flood irrigation interventions, and 250 HHs benefitting under micro irrigation interventions (Total HHs = 813; average HH size = 5 persons, therefore total water users (beneficiaries) of irrigation= 813 x 5 =4,065 persons. All flood and micro irrigation schemes are new schemes.

[16] Improved Agricultural Technology = Including but not limited to - high efficiency irrigation, disease-free seeds and saplings, soil conservation, farm machinery, electric fencing, greenhouses, and any other technology provided by the project

[17] Calculated by assuming one farmer per HH. Total targeted HHs - 10,400.

					Third Party Assessments	Gewog administrations
Component 3: Enhancing Access to Markets						
To promote nutrition sensitive value chain development for high value (economically and nutrient-rich) crops in order to enhance market linkages for farmers.	3.1 Number of beneficiaries of project supported market infrastructure[18]	0	30[19]	Biannual	Project Progress Reports RNR Statistics Third Party Assessments	PMU, PST, RCDs, dzongkhag and Gewog administrations
	3.2 Number of producer groups receiving market information[20]	Baseline	30	Biannual	Project Progress Reports Third Party Assessments	PMU, PST, RCDs, dzongkhag and Gewog administrations
	3.3 Number of farmer groups linked to schools	0	10[21]	Biannual	Project Progress Reports Third Party Assessments	PMU, PST, RCDs, dzongkhag and Gewog administrations
	3.4 Number of children receiving the recommended 5 servings of fruits/vegetables per day	0[22]	2,100[23]	Biannual	Project Progress Reports Third Party Assessments	PMU, PST, dzongkhag and Gewog administrations
Component 4: Project Management						
	4.1 At least 2 Learning Notes and 3 Case studies published and disseminated	n/a	2 Learning Notes 3 Case Studies	Biannual	Published Reports	PMU, PST, RCDs, dzongkhag and Gewog administrations
	4.2 Progress reports are prepared and submitted on biannual basis and are of satisfactory quality.	n/a	Accurate and timely reports	Biannual	Biannual Project Progress Reports	PMU, PST, RCDs, dzongkhag and Gewog administrations
	4.3 Procurement of goods and works under this project is completed according to schedule.	n/a	Contracts awarded and completed on schedule.	Ongoing	Project Progress Reports, Procurement reviews	PMU, PST, RDCs

[18] Market Infrastructure = Including, but not limited to, improved handling equipment (crates, tarpaulin sheets), collection/packing center, small market sheds, improved storage structures e.g., zero energy cool chambers for vegetables/fruits and machines and materials for packaging and weighing, farm shops

[19] 30 Producer Groups. At least one form of market infrastructure per group

[20] Market information = Market prices, knowledge of markets present, and cost of market access

[21] Approximately 16 schools will be targeted with at least one producer/farmer group linked to each school (therefore at least 16 producer/farmer groups linked). 60% of 16 = 9.6 ~ 10 groups.

[22] This indicator measures children receiving five servings under the project. Therefore, baseline is zero.

[23] 70% of targeted 3000 school children = 2,100 school children

	4.4 Percentage of beneficiaries satisfied with services[24] provided by the project.	n/a	50	Mid and End of Project	Beneficiary Satisfaction Surveys	PMU

Annex 2: Cumulative Target Values

Indicator Name	Baseline	Y1 (2017)	Y2	Y3	Y4	Y5	Y6 (2022)	End-Target
PDO Indicators								
1. Productivity of targeted crops increased by at least 20 percent in project areas.	0	0	5	10	13	15	20	20
2. Increase in both volume and value of produce marketed by at least 20 percent	0	0	5	10	13	15	20	20
3. Number of direct project beneficiaries of which 30 percent are women.	0	5,000	10,000	20,000	30,000	45,000	52,000	52,000
Intermediate Outcome Indicators								
1.1 Number of beneficiaries receiving technical trainings and other capacity building support	0	25	50	100	175	225	300	300
1.2 Number of farmers who are members of an association including producer groups, cooperatives etc.	0	1,000	3,000	5,000	7,000	9,000	10,400	10,400
1.3 Number of people receiving improved nutrition services and products through the project	0	500	1,000	2,000	3,500	5,000	6,000	6,000
2.1 Targeted crop area provided with flood irrigation	0	200	500	700	900	1,200	1,346	1,346
2.1 Targeted crop areas provided with micro-irrigation	0	50	100	150	175	200	250	250
2.2 Number of water users with new/improved irrigation services	0	500	1000	2000	3,000	3,700	4,065	4,065
2.3 Number of farmers who have adopted an improved agricultural technology promoted by the project in targeted project areas	0	1,000	2,000	4,000	6,000	8,000	10,400	10,400
2.4 Total land area under cultivation for citrus and cardamom increased by 5%	0	1	2	3	4	4	5	5
3.1 Number of beneficiaries of project supported market infrastructure	0	5	10	15	20	25	30	30
3.2 Number of producers receiving market information	0	5	10	15	20	25	30	30
3.3 Number of farmer groups linked to schools under the project	0	1	3	5	7	9	10	10
3.4 Number of children receiving the recommended 5 servings of fruits/vegetables per day	0	100	250	500	1,000	1,500	2,100	2,100
4.1 At least 2 Learning Notes and 3 Case studies published and disseminated	n/a	0	0	1	2	3	5	5
4.2 Progress reports are prepared and submitted on biannual basis and are of satisfactory quality	n/a	yes	yes	yes	yes	yes	yes	yes
4.3 Procurement of goods and works under this project is completed according to schedule.	n/a	yes	yes	yes	yes	yes	yes	yes

[24] Services: Any intervention under the project.

4.4 Percentage of beneficiaries satisfied with access to services[25] provided by the project.	0	0	50	50	50	50	50	50

[25] Services: Any intervention under the project.

Annex 3. Detailed Project Description

Component 1: Strengthening Farmers and Producers Groups– (US$1.08 million)

1. The objective of this component is *to strengthen farmers' and producers' groups to better enable them to implement and sustain project interventions.* It is designed to address one of the key constraints to improved agricultural productivity and socio-economic conditions of farmers - weak farmers' groups that lack necessary and relevant skills, knowledge, practices, quality inputs and appropriate technologies.

1.1 Farmer Group Strengthening and Formation

2. The project will reach out to 10,400 farmer households and facilitate the formation and strengthening of 300 new and existing FGs in identifying and participating in project supported activities for increased productivity and enhanced market access. With the approach that every farm should be run as a profitable business (in which the cost of production is low and harvest losses are minimized), FGs will be re-oriented towards an enterprise and business planning model. Component 1 will build on and further strengthen the existing mechanism of FG formation and capacity development, relying on gewog RNR officials for the delivery of project interventions at the community level. It will include capacity building of FGs on various aspects of farm business management such as business orientation, financial literacy, book-keeping, and market assessment. The project will provide TOTs to RNR officials and community resource persons on this thematic area under the FAO TA (see FAO TA section).

1.2 Strengthening Producer Groups

3. The project will also support the formation of 30 PGs. Using a cluster-based approach, PGs will be organized into a business enterprise capitalizing on opportunities for product aggregation, value addition, and marketing in promising value chains. The project will build on DAMC's approach to cooperative and producer group strengthening and provide support to the PGs in areas such as organizational governance, value chain analysis, business development, quality control, access to finance, and marketing. The PMU's marketing/value chain expert will coordinate these capacity building activities in close collaboration with DAMC. Through the DAMC and FAO-TA, this component will also strengthen the capacity of project staff in group formation, governance, enterprise development, and commercial operations. The component will support the groups in: (a) consolidation of functional producer group clusters through effective constitutions, governance and operations; (b) strengthening of commercial farm management and business skills, especially production planning and supply to markets, schools and farm shops; and (c) developing marketing skills for effective engagement with upstream value chain actors and improving their bargaining power in getting better prices for their produce.

4. Raising awareness on nutrition will be addressed through capacity building of FGs in conjunction with other training activities. The project will actively promote nutrition awareness among the targeted population through a BCC approach using the FGs as an entry point. CRPs will be trained in BCC to facilitate households' understanding of improved nutrition and actions needed to improve diets, using communication materials developed through a participatory

diagnostic analysis of dietary behaviors. CRPs' role at the community level will be coordinated with other capacity building activities targeting the FGs, capturing all potential windows of opportunities throughout the project to address nutrition issues.

1.3 Contributing to Improved Nutrition

5. In an effort to ensure that production and income increases encouraged through the project also contribute to improved nutrition, activities will focus on raising awareness about the need for dietary diversity and nutrition among farming communities, especially women of reproductive age. The project will support a series of targeted, integrated interventions to encourage dietary diversification, by instigating demand and instilling value for a balanced diet that includes a variety of pulses, vegetables, cereals and animal-based foods. As such, the project will complement ongoing 'nutrition-specific' interventions that focus on activities to render the project 'nutrition-sensitive', taking a food-based approach. Project interventions also will take into account that food security and nutrition are contingent on people's practices, including choices at the market, food processing, and serving customs, and that food 'choices' are partly driven by knowledge, and partly by the habits and preferences rooted in cultural norms and values as well as the broader food system which makes certain foods more or less available and accessible. Beyond imparting messages however, the project will follow a BCC strategy that includes an in-depth diagnostic, development of materials, community mobilization, and participatory training[1].

6. Activities will be based on a thorough BCC analysis, which will help to determine what motivates people to change their dietary habits, the information to which they are receptive, and the skills needed to act on nutrition messages. This diagnostic will inform the design of materials and identification of effective media and complementary activities such as pictures, info-graphics, audio and text messaging, cooking demonstrations, discussion groups, and/or video. In-line with the Lead Farmer model, this material will be disseminated through a network of CRPs, particularly women of reproductive age together with community leaders. To ensure coverage and outreach to at least 60 percent of project households (6,000 individuals), 3 to 4 CRPs from each Gewog will be invited to a 4-day training session in an RDC on agriculture-nutrition linkages and the importance of dietary diversification. These CRPs will be given a set of materials and trained in the use of these materials and activities, which they will then screen or conduct on a regular basis in their respective communities. Refresher training will then be organized every 4 months to collect feedback and provide further materials to the CRPs. One key resource persons will be selected from each of the 5 Dzongkhags and invited to participate in an exposure visit abroad to learn from effective BCC interventions for nutrition. This kind of network of CRPs can help establish a platform for further nutrition interventions.

Component 2: Enhancing Farmer Productivity (US$ 5.21 million)

7. The objective of this component is to improve agricultural productivity vital for improving

[1] See Nutrition Toolkit- Using Communication to Improve Nutrition: http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTHEALTHNUTRITIONANDPOPULATION/EXTNUTRITION/0,,contentMDK:20205536~menuPK:282580~pagePK:148956~piPK:216618~theSitePK:282575,00.html

food security and nutrition. The component will promote climate smart agriculture through: (a) the productivity enhancement of rice, vegetables, pulses, and potatoes for improved food security and nutrition, (b) improving the productivity of key high value crops such as spices (specifically large cardamom and ginger), vegetables, and citrus for local and export markets, and (c) behavior change communication for production and consumption of nutrient rich food. Overall, the purpose is to expand the cultivated area, increase climate smart cropping intensity, improve nutrition awareness, and increase productivity and production for potential commercial surplus. The approach under this component is holistic and area-specific, providing an integrated package of interventions based on relevant farming systems and specific crops appropriate to the priorities of the farmers, farming systems, and overall production potential in selected area.

8. Paddy and maize are two most important dietary staples of Bhutan. However, domestic production (estimated at 77,038 metric tons in 2014) falls short of meeting the local food demand and therefore the country has to import almost an equal amount of rice, largely from India. Despite best efforts, production of major cereals in Bhutan remains low, an estimated 2.92 tons per ha (World Bank, 2015). Constraints to production include limited availability of cultivable land (only 2.7 percent of the total country area); lack of irrigation, use of low quality seeds and planting materials (for cardamom and citrus), pest and disease problems, inadequate extension services, and small and fragmented landholding. This is further compounded by a declining farming population, which is creating labor shortages (and high wages) and lack of post-harvest technologies.

9. The food crisis during the period 2008-2009 highlighted Bhutan's vulnerability in terms of its reliance on imported staple foods, particularly rice, maize and pulses. The RGoB is thus committed to increasing the production of staple foods to reduce the country's reliance on external resources and increase the production and quality of cardamom and citrus - two important cash crops.

10. Although yields of most cereal crops are low, there is proven potential to increase productivity with irrigation and improved production technologies, compared to rain-fed cultivation. For example, the rice paddy yield in Samtse (1,250 kg/acre) was only 54 percent of that of Paro (2,329 kg/acres) where farmers have adopted as an integrated package, irrigation, mechanization, and improved production technologies, including more productive and disease tolerant seed varieties, planting materials, integrated crop nutrition, and pest control. While cardamom and citrus enjoy good regional markets, the producer farmers have not been able to exploit their full potential due to the lack of value addition opportunities. Thus, one of the critical areas of intervention for cardamom and citrus would be to provide technology and required skills for adding value.

11. Component 2 will also address one of the main constraints to agricultural production and productivity in Bhutan, the inadequate supply of water for irrigation and deficient irrigation facilities, and other factors that impede rural farmers such as labor shortages, mountainous topography, and human wildlife conflicts. To increase farm production and productivity, the project will provide FGs with key farm infrastructure, productive assets (farm machinery, greenhouses, protective electric fencing, and planting materials), training, and extension services.

12. The project will provide these services and assets in a coordinated and integrated package with other project interventions. Some of the services and assets will be provided on a cost-sharing basis in accordance with MoAF norms. Based on this approach the component will focus on three key areas of intervention: water use efficiency, improved farm management and technical and institutional capacity building, and improved agri-inputs and technologies–all aimed at enhancing productivity.

2.1 Water Use Efficiency

13. Irrigation in Bhutan has been characterized as a traditional farmer-built open channel flow system using locally available materials. These irrigation channels are solely designed for paddy cultivation. Farmers carry out the operation and periodic maintenance of the irrigation channels themselves, although they may receive some government funds for maintenance and emergency repairs. Traditionally, water is diverted into the canals by raising the water level in the streams using the tree branches, bamboos, stones, etc. which get washed away during the flood events. The planned irrigation development using engineering design started from the first five-year plan in 1960. Most irrigation systems are made of earthen channels without lining and therefore suffer from high conveyance losses due to excessive seepage. Such irrigation infrastructure currently covers about 50 percent of paddy land and the rest depends upon monsoon rains. The number of control structures is low and most of them are traditional structures, which lead to poor control and low efficiency. All of these factors culminate in inadequate water supply and low agricultural productivity.

14. The National Irrigation Policy (1992), emphasizing community irrigation, tried to lay a foundation for a sustainable approach to irrigation development through the effective participation of the water users. The policy was revised (National Irrigation Policy of Bhutan, Revised 2012) to address the earlier policy, which focused solely on paddy cultivation and did not provide clear directions for a holistic irrigation development. The 1992 policy also ignored the importance of irrigating perennial and cash crops that would help farmers improve their livelihood and income. Irrigation technology and on-farm water management has not improved over the years and remain rudimentary. The new policy, among others, emphasize: (a) diversification of irrigation for crops grown on both Chuzhing and Kamzhing; (b) assured irrigation water supply for Chuzhing cultivation and protection of prime agricultural land; (c) enhanced water management and productivity; and (d) revitalized institutional arrangements for improved irrigation services delivery.

15. More than 1,800 acres of land were provided with an irrigation facility under DRDP in the past decade mostly in the gewogs of Chukha and Dagana Dzongkhags. Under the current RRCDP, the project has a plan to provide irrigation facility in Samtse (65 km, 987 acre), Chukha (38.5 km, 345 acre), Dagana (53 km, 705 acre), and Haa (18.7 km, 138 acre), which are also the selected Dzongkhags of the proposed FSAPP project.

16. The project design of FSAPP thus takes into account: (a) new construction using pipe conveyance system; (b) greater returns on irrigation investment by raising other crops after the paddy season focusing on crop diversification, and (c) supporting WUAs on improved agronomic practices and providing them training on operation and maintenance of irrigation systems.

17. The project intervention on irrigation and water management therefore consist of construction of irrigation facilities in selected project gewogs of the project Dzongkhags. The interventions will include:

(a) Infrastructure development – intake structures, pipe systems, and distribution systems;
(b) Pilot micro-irrigation systems with linkages to cluster sites with other commodity-focused interventions

18. Under this project, irrigation and water management facilities will be developed on 1,346.33 acres (545 ha) of land for increasing the production and productivity of cereals, potato, vegetables, and oilseeds as well as encouraging planting of secondary and cash crops in the irrigated command area. In addition, about 250 acres (100 ha) of land will be provided with a micro-irrigation system for horticulture and cash crops. Four irrigation schemes have been identified in four project gewogs in two Dzongkhags for providing irrigation water. The gewogs include: Dekiling and Gakidling gewogs in Sarpang dzongkhag as well as Norbhugang and Dophuchen gewogs in Samtse dzongkhag. The schemes identified are: (a) Ratey khola, 338 acres (Dekiling); (b) Laring khola, 310 acres (Gakidling); (c) Tarey khola, 648 acres (Norbhugang); and (d) Birkulo-Somlachen, 50 acres, (Dophuchen). Micro-irrigation systems will be piloted in appropriate gewogs in all project dzongkhags. As part of capacity building and institutional support, 4 water users' associations (WUAs) in the command area of 4 irrigation schemes and 20 water users' groups in the high efficiency irrigation area will be strengthened in the operation and maintenance of irrigation systems. Accordingly, the project will provide project staff with appropriate technical and capacity development opportunities.

19. In addition, certain high value crops and crops in the dryland and water-stressed areas are proposed to be irrigated using high efficiency irrigation system such as drip, sprinkler or other easily adaptable flow control systems (Gated pipe, e.g.). These micro-irrigation systems will cover 250 acres in the project gewogs as per the demand of the farmers.

20. Detailed surveys of the proposed schemes have been carried out, and the design of the schemes are in progress. Detailed design and cost estimates for all four schemes are have been completed and the bidding process for these schemes will start after the signing of the project grant agreement.

21. The pool of knowledgeable irrigation engineers that existed in the MoAF/DoA during the 1990s no longer exists. This fact is recognized and amply stated in the revised Irrigation Policy (2012). The earlier Irrigation Policy (1992) and the Procedural Manual with eight different modules provided the knowledge base and training to the engineers and the WUAs on community irrigation. Because irrigation is again the priority agenda of RGoB, as fully reflected in the 11th FYP, building the capacity of the DoA engineers in irrigation will be an important activity. Thus, the DoA/ED includes a proposal on capacity building.

2.2 Improved Farm Management and Technical and Institutional Capacity Building

22. As part of this sub-component, the project will provide FGs with training and extension services and necessary technical assistance to respond to priority farming and production needs. As described below, the project will also provide institutional strengthening support provided to selected agricultural institutions (that is, the Engineering Department, NSC,, NPHC of the MoAF) to sustain the project investments and to ensure that the farmers' increasing demand for quality agri-inputs is adequately addressed. This sub-component will also provide the necessary technical assistance for the introduction of new farming technologies in response to priority farming and production needs of the farmers.

23. *Support to Agricultural Institutions*. The NSC will be supported to produce and supply disease free large cardamom and citrus saplings to the farmers. For quicker multiplication, the project will also support FGs in the production of large cardamom, citrus, and vegetable seedlings. The project will also secure germplasm from Sikkim for developing healthy high yielding cardamom varieties, which will be made available to farmers after they are being tested for suitability and adaptability. The RRCDP-supported National Propagation Center (NPC) at Bhur is also expected to supply healthy planting materials of large cardamom to farmers. The NPC has the capacity to produce 60,000 and 103,000 saplings of citrus and cardamom respectively per year. Due to increasing demand for citrus, the project will finance strengthening of the National Citrus Repository at Tsirang. Along with the provision of healthy saplings, this Repository will provide technical and outreach services to farmers.

24. *Capacity Building for the DoA.* Building the capacity of the DoA engineers on irrigation scheme design, costing, civil works and contract management will be an important activity. The DoA/ED will be given the opportunity to update knowledge and skills through the provision of short training courses on irrigation (including high efficiency micro-irrigation) and exposure/institutional visits for the central and RDC-based engineers.

2.3 Improved Agriculture Inputs and Technologies

25. The need for the use of farm machinery (suitable for small farmers, especially women in the mountainous terrain of Bhutan) is becoming especially important with the declining farming population, rising cost of farm labor, and diminishing returns from farming. Due to the small and fragmented landholdings, the project will promote smaller farm machineries and equipment such as mini power tillers, mini threshers, reapers, ridgers, weeders, rice transplanters, seed/fertilizer dibblers, mulchers, and balers. Business functions (renting of farm machineries and services) of the Agriculture Mechanization Center (AMC) have been transferred to a newly established state owned enterprise Farm Machinery Corporation Limited (FMCL). The AMC will now concentrate on: (a) training, (b) research and development, and (c) recommendation of standards for importing machineries and implements. The establishment of FMCL is expected to provide services for maintenance of equipment and machineries at the grassroots level. The project will, on a cost-sharing basis, provide farm machineries and equipment to eligible farmers groups who will be selected based on an established criteria and will be required to provide either a monetary contribution towards the cost of farm machineries/equipment or an in-kind contribution consisting of the labor required for the installation of equipment in accordance with criteria set forth in the Project Operations Manual.

26. Other farm infrastructure and assets such as electric fencing, low-cost greenhouses, and planting material will also be supported on a demand basis in consultation with the district agriculture extension officer. Low-cost greenhouse demonstration will be organized in order to promote high value and off-season vegetables, which will fetch both cash income and household nutrition needs.

27. Technical support and training will include: (a) support for quality seed production and distribution; (b) improved climate-smart farming practices such as soil fertility management, integrated pest management, nursery management, improved cultural operations; (c) promotion of improved cropping pattern based on availability of water; (d) aligning production with market demand; (e) basic maintenance and operation of farm equipment; and (f) business planning and nutrition awareness. The project will also build the technical capacity of agriculture extension agents and district officials on required skills.

Component 3: Enhancing Access to Markets – (US$1 million)

28. The component aims *to promote value chains for select high value nutrient-rich crops and enhanced linkages to domestic and export markets.* The primary focus will be to: (a) reduce post-harvest losses, (b) strengthen nutrition sensitive value chains of selected crops; and (c) enhance producers' knowledge, bargaining power, and access to agri-markets. It will include strengthening local producer-consumer linkages, and establishing productive relationships with public and private market players, school meal programs, and exporters. The overall commodity selection strategy will follow the OGTP approach of the MoAF that focuses on the top three commodities as per the current production scale. Component 3 include two sub-components, described below.

3.1 Post-harvest and Market Infrastructure Support

29. Part (a) of this component will provide guidance, inputs, and support to farmers to minimize post-harvest losses; improve shelf life; and enhance product quality, storage and packaging, and transportation to ensure higher market value. It will include training, exposure visits, and provision of appropriate technologies and tools in line with the cost sharing policy of DoA (monetary contribution towards the cost of technology/equipment or in-kind contribution consisting of the labor required for the installation in accordance with criteria set forth in the Project Operations Manual). The trained lead farmers and CRPs will provide technology services, training and back up to the farmers against a fee, following sound business principles. PGs will be provided training in entrepreneurship, business planning, book keeping, accounting, and capacity building support for commercial operation and equipment operation and maintenance for post-project sustainability.

30. Part (b) will provide support to five food-processing groups for preparation, packaging, and marketing of hygienically safe nutritious food to domestic markets. It will include market research, training, exposure visits, and skills enhancement in hygienically safe food preparation, packaging, labeling, pricing, and marketing; lab testing for food composition and food safety; and provision of appropriate technology, equipment, and tools in line with DoA's cost sharing policy.

31. Part (c) will support the construction and rehabilitation of five farm shops as a pilot for commercially viable model enterprises. The shops will increase timely availability of quality agri-inputs to farmers, link small producers to agri markets, and provide a buy back facility for selected crops. The component will work closely with the DAMC and FCBL and provide the necessary inputs and technical support to develop and operationalize these shops as commercially viable enterprises and to incorporate lessons learnt from this pilot in other farm shops being rolled out.

3.2 Linkage to Domestic and Export Markets

32. Small farmers are constrained by limited information, knowledge, and access to domestic and export agri-markets. The existing DAMC-managed market information system (the AgMarket website and IVR system) remains sub-optimally developed and under-utilized, especially by the small producers. In order for local farmers and producers to have regular information and updates about the demands and prices of agri-produce in local and distant markets, and to help them make informed decisions to adequately reap market benefits, this sub-component will provide support to DAMC to assess and upgrade the current system into a user-friendly agri-market information system which producers and other stakeholders are able to easily access through computer and mobile technology. The purpose is to: (a) improve the flow of market information from local auction yards and distant markets to producers; and (b) systematically improve production planning and management of commodities. This platform can also be used to facilitate regular dissemination of information on agriculture-nutrition linkages, as supported in Component 1. In addition to supporting the DAMC portal, the use of mobile technology will strengthen producer linkages, knowledge sharing, and enhanced interactions among local producers, middle men, traders, and agri markets, thus allowing producers to have regular knowledge of local market dynamics and prevailing prices.

33. This sub-component also addresses high value export commodities, which are constrained by limited access to international markets and inadequate backward linkages with producers. The component will: (a) facilitate knowledge and information exchange between producer groups, traders, exporters, and key stakeholders for maximizing foreign exchange returns – by arranging regular buyer-seller meetings and dissemination of critical information on production, market, policies, etc.; (b) inform exporters about international trade practices, trade negotiation, and other issues, and link them with producers and intermediaries for efficient value chain functioning.

34. Lack of access roads and inadequate transport facilities is a major barrier for small farmers in getting agri-inputs and taking their produce to the market. The project will promote an entrepreneurial approach to enhance small producers' collective bargaining power as a business unit and engage in collective transportation, selling, and buying. Where appropriate, the project will support producers/individual members/youth to set up transport enterprises for back and forth transportation of agriculture inputs and produce from farm to market.

35. As part of sub-component 3, the project will link PGs to the school meal program. In the wake of limited availability of local agri-produce primarily due to high prices, local preferences, limited seasonal availability and weak supply chain, the school meal programs - an entitlement of every boarding student in Bhutan - find it hard to provide a balanced and nutritious diet to students. Integrated homegrown school meal programs can help increase farmers' incomes leading to a higher propensity to invest in food expenditures and help drive changes in consumption practices

of future buyers by exposing children at a young age to a balanced diet and concurrently engage the community. The project will facilitate productive linkages between the producer groups and schools so that the schools can purchase seasonal vegetables, fruits, and pulses from these groups. The project will develop the capacity of: (a) PGs, in establishing partnerships with schools and accessing local markets to sell their produce, as needed; (b) schools, to improve their menus based on the crop calendar to help the PGs plan supplies accordingly; and (c) school cooks, to make use of seasonal foods and increase nutrient retention, The project also will support exposure visits to successful home-grown school feeding programs

36. The following table identifies some of the possible schools in the selected Dzongkhag's that could link with local farmers. These schools can serve as a pathway to connecting with other local institutions, improve livelihoods of individuals in farmer's group, and contribute to the improvement of diets among school children and the local community if complemented by effective capacity development and BCC.

Table 1: Prospective Schools Linked to Local Farmers

Dzongkhag	Gewog	Name of School	No. full board	No. of HH	Estimated Population
Dagana	Drujeygang	Drujeygang HSs (RGoB)	352	397	1,985
	Lhamoizingkha	Lhamoizingkha MSs (RGoB)	267	314	1,570
Haa	Gakiling	Rangtse PS (WFP)	154	200	1,000
	Uesu	Tshaphel LSS (WFP)	185	255	1,275
	Samar	Gyenkhana PS (WFP)	212	325	1,625
Chukha	Bongo	Pakshikha Central School (RGoB)	457	663	3,315
		Bongo PS (WFP)	50	n/a	n/a
		Chungkha Ps (Both WFP (RGoB)	78	n/a	n/a
	Dungna	Dungna LSS (WFP)	205	167	835
	Getana	Getana Ps (WFP)	104	152	760
Samtse (nutrition officer is also present in this area)	Dophuchen	Dorokha Central School (RGoB)	503	1045	5,225
		Sengdhen LSS (RGoB)	400	788	3,940
		Denchukha LSS (RGoB)	140	550	2,750
		Mindruling PS (RGoB)	72	924	4,620
	Tading	Tabadramtoe PS (RGoB)	160	n/a	n/a
	Tendruk	Tendruk HSS (RGoB) & Soeltapsa PS (WFP)	268	n/a	n/a

37. Activities on linking producer organizations with school meal programs to improve dietary diversity will mainly include: (a) strengthening contractual arrangements between POs and schools, and (b) linking production calendars with seasonal school meal requirements, and (iii) training of school cooks. The acceptability of the meals in schools will be regularly examined, and regular cooking demonstrations will be conducted together with associated appropriate BCC materials. Contractual arrangements will also need to be monitored.

Annex 4: Technical Assessment

Rapid Analysis of the Citrus Value Chain

1. **Citrus is a promising commodity for the country as well as for the small farmers.** Mandarin is one of the top 10 forex revenue earning commodity of Bhutan and hence its importance cannot be undermined at the national level. For smallholders in remote areas mandarin remains a major cash crop option. The farmers visited in this mission reported that they used to earn Nu 70,000-80,000 per orchard per annum in the 1990's. However, since 2004-05 they started losing the orchards due to the heavy outbreak of diseases thus constraining their income levels. It is therefore essential to critically analyze this sector and plan immediate measures to stabilize the Mandarin production and productivity in the country.

2. **There has been a rapid decline in citrus area, production and productivity.** The Mandarin production in Bhutan, across most of the dzongkhags is declining very rapidly since 2004-05 as recalled by farmers met during the mission (refer to table 2 below). The MoAF has initiated a very comprehensive strategy to revive citrus production (reference: Citrus Master Plan, MoAF, 2007) and has taken timely steps to address spreading disease through initiation of a project with ACIRO, Australia (in operation since 2007 and is now in its second phase), establishing a citrus repository center and developing a system for providing 'disease free saplings' to the farmers. Orange export business involves three parties besides growers. Financial institutions provide seasonal loans to exporters from across the country and these exporters distribute the same capital to mandarin suppliers or middlemen. With a record low production, the country exported 4,959 metric tons of mandarin to Bangladesh and India in the 2015-16 season. This is a slump of more than 500 percent from the last season. Without business exporters have now started to default with the banks.

3. **Gaps in farmer knowledge/capacity remain**. There remains a huge gap in transferring the technologies and good practices (as recorded in Citrus manual, 2008) to the farmers' field. Few farmers visited during the mission were found to be continuing with senile orchards (~47 years) and practicing inadequate orchard management practices. The knowledge and capacity gaps include orchard sanitation and management and soil/water management, limited knowledge of farm based input development and usage etc. Further widespread decline of orchards in the adjoining areas, continued poor crop performance (possibly due to changes in winter precipitation and weather variability under climate change impact) and systemic bottlenecks in the marketing system (thereby impacting orchard profitability) demotivates the growers to plan orchard care and investment. This issue requires a strategic plan and efforts to strengthen production systems (planned under Component 1)

4. **The supply of healthy disease free saplings and other critical inputs is limited and labor costs are increasing.** Rejuvenating the old orchards and plantation in new upcoming areas will require the accelerated supply of disease free healthy saplings of improved cultivars. The current capacity of disease free sapling production is very limited (200,000 saplings per annum ~1,800 acres). Limited and timely availability/access of saplings and other critical inputs, and the increasing costs of farm labor are further constraints the production system and thereby restricts the market competitiveness of Bhutanese mandarin. The supply of nursery saplings possibly

through promoting 'certified nursery entrepreneurs', accelerating farm mechanization etc. (being planned under Component 1) and increasing the availability through potential "Model Farm Shops" where appropriate will address these key production bottlenecks.

5. **Inefficiencies in the current marketing structure exist, though it is systematically organized.** Currently the export is largely market dependent (~90 percent to Bangladesh) and restricts market opportunities for high price realization. It is reported that there is high demand of mandarin from Bangladesh but the supply is limited. This is reportedly due to a buyers' cartel as informed by industry sources. Lack of strategic marketing support, complications in export system, limited knowledge/capacity at different stakeholder levels also act as key bottlenecks in the value chain. The farm gate pricing mechanism is not yet transparent (based on the estimation of the traders), though now the pre-harvest orchard purchase system has moved from the flowering stage to maturity stage. This also indicates diminishing market competitiveness. There is limited infrastructure for produce handling, transportation/logistics, produce and price information system. Availability of institutional finance to the aggregators and exporters was reported to be of good quality though limited, (~13 percent). Small producers are likely to get more affected as a result of these gaps in the marketing system. Identification and opening up of new export markets (e.g., capitalizing organized retail growth in the metro cities in India) will increase market competition and thereby result in higher price realization. Even a small swing in export prices will impact the farm gate prices and thereby motivate the growers to renew their interest in better production practices.

6. **The grading and packing is currently done by the exporters at their facility causing wastage**. The damage and wastage of fruits at farm gate, during transit and handling at auction yard/exporters facility has been reported to be very high (MoAF-SNV value chain analysis report, 2007). Currently, value addition through grading and sorting, packaging etc. is done at the exporter level. There is also considerable wastage of fruits at the farm gate level (92 percent of the growers reported fruit drops). These losses if arrested through strategic measures can not only generate more returns for the country and the value chain actors but also, contribute towards nutrition security through possible processing. The market value of the produce can be further enhanced through improved post-harvest technology (viz., waxing) & storage (to improve shelf life and thereby increasing the export period), packaging and through strategic product differentiation/branding. Limited processing was reported in Dagana area by small private players (more information needed to plan intervention areas). Processing of the rejected commodities (currently exported to India ~ @Nu7.8/kg) could also increase total value realization of this commodity.

Table 1. Production, productivity trend of Mandarin in select Dzongkhags

Dzongkhag	2011	2012	2013	2011	2012	2013	2011	2012	2013	2011	2012	2013
	Trees			Trees (B)			Production (MT)			Yield (Kg/BT)		
Chhukha	200,894	132,152	166,154	159,113	78,817	114,112	2,089	1,968.56	2510	13	25	22
Dagana	418,303	361,192	333,308	283,106	189,897	188,543	7,542	5,367.88	4,154	27	28	22
Haa	522	464	802	434	400	796	16	11.8	20	37	30	25
Samtse	157,347	105,691	98,722	112,035	83,022	62,498	2,877	2,430.38	1,215	26	29	19
Sarpang	414,200	173,197	210,802	280,870	125,291	153,879	15,389	7668.397	5,291	55	61	34
National	3,122,356	2,076,369	2,087,352	1,719,637	1,104,891	1,046,880	60,993	49,501	33,469	35	45	32

Rapid Analysis of the Spices Value Chain

7. Among spices, ginger and large cardamom are major commodities where Bhutan can leverage significant competitive advantage and accelerate export earnings. Though in these commodities, Nepal and India are the major competitors, Bhutan can systematically plan to develop and strengthen the current production systems (component 1) and adopt a value chain driven strategic marketing approach to capitalize on the promising export market. Current marketing systems inform that these products are largely being exported to India. Value addition through processing and strategically differentiating the product in markets (branded as Bhutan Origin) will increase the competitiveness of these products in the existing markets. Further opening up of new markets (Bangladesh, Thailand, and China) particularly for large cardamom could open new avenues for Bhutan and its smallholders. In Sikkim, for example, (adjacent to South West Bhutan), which is the single largest large cardamom producing state from India, there has been a recent widespread outbreak of bacterial blight disease and due to this about 50 percent area under cardamom has been lost. This is an excellent opportunity for Bhutan to capitalize the import demands from major markets.[1]

8. Key issues for large cardamom cultivation and export in Bhutan are as follows:
   a. Area of cultivation is increasing but the farmers and other major stakeholders lack clear insight on market situation/prices.
   b. Saplings distributed under RRCDP (~50K per dzongkhag which is equivalent to ~20 acres) are too low in number.
   c. Lack of knowledge and capacity of small producers acts as a major barrier towards inclusion of marginal producers.
   d. Processing, handling infrastructure is limited and traditional.
   e. There is a lack of organized marketing infrastructure – MIS, storage, packaging, auction yard.

[1] Major global importers of Large cardamom: Pakistan, UK, Major global producers of large cardamom: Nepal (~7,000 MT), India (~3,000 MT), Bhutan (~1,100 MT)

Table 2. Analysis of major spice categories

Dzongkhag	Ginger								
	Cultivated Area(Acres)			Production (MT)			Yield (kg/acre)		
	2,013	2,012	2,011	2,013	2,012	2,011	2,013	2,012	2,011
Chhukha	373	385	525	558	1,336	757	1,495	ER	1,465
Dagana	57	67	93	39	33	79	672	497	991
Ha	5	2	5	2	1	1	370	417	675
Samtse	718	NA	1,395	1,560	2,090	2,214	2,173	NA	1,500
Sarpang	283	350	530	407	652	765	1,437	1,865	1,437
Sub total (targeted area)	**1,436**	**804**	**2,548**	**2,566**	**4,112**	**3,816**	**1,229**	**926**	**1,214**
National share (percent)	**58**	**40**	**76**	**68**	**82**	**84**	**81**	**37**	**90**
BHUTAN	2,489	1,985	3,363	3,756	5,014	4,533	1,509	2,526	1,348
Dzongkhag	**Large Cardamom**								
	Cultivated Area(Acres)			Production(MT)			Yield (kg/acre)		
	2,013	2,012	2,011	2,013	2,012	2,011	2,013	2,012	2,011
Chhukha	1,427	1,191	748	178	183	88	125	154	118
Dagana	515	340	490	26	29	47	50	85	95
Ha	648	517	503	127	30	22	197	58	44
Samtse	3,400	2,460	2,086	743	305	449	219	124	215
Sarpang	595	497	213	71	62	33	120	124	153
Sub total (targeted area)	**6,585**	**5,006**	**4,040**	**1,145**	**609**	**639**	**142**	**109**	**125**
National share (percent)	**95**	**98**	**97**	**99**	**95**	**98**	**85**	**87**	**80**
BHUTAN	6,904	5,084	4,144	1,162	643	650	168	126	157

Table 3. Commodity Analysis by Dzongkhags

Priority commodity (tentative list – to be further analyzed after value chain analysis)	Major Dzongkhags (based on production and area trend) Dzongkhags ranked in descending order	Total production in major identified Dzongkhags (MT)_2013	Average commodity price (Nu/Kg)	Total commodity valuation (per annum) Nu Million (Million US$)
Mandarin	Sarpang, Dagana, Chukha, Samtse, Haa	13,190	31.87	420.36 (7)
Large Cardamom	Samtse, Chukha, Ha, Sarpang, Dagana	1,145 (99 % of national share)	1,800	2,061.00 (34.35)
Ginger	Samtse, Chukha, Sarpang	2,525	50	126.20 (2.10)
Potato	Chukha, Ha	7,869	10	78.69 (1.31)
Vegetables (green)	Chukha, Ha, Dagana, Samtse, Sarpang	9,480	10	94.80 (1.58)

Table 4. Scenario analysis of cumulative valuation of targeted commodities

Commodities	Total Value in US$ million (avg. annual growth due to value chain activities)					Cumulative total (US$)	Growth over year1 (%)
	Y1	Y2 (5%)	Y3 (5%)	Y4 (8%)	Y5 (10%)		
Mandarin	7	7	7	8	9	38	**26**
L Cardamom	34	36	38	41	45	194	**31**
Ginger	2	2	2	3	3	12	**31**
Potato	1	1	1	2	2	7	**31**
Vegetables	2	2	2	2	2	9	**31**
Total	**46**	**48**	**51**	**55**	**60**	**261**	**30**

Table 5. Analysis of Vegetables and Potato

Dzonkhas	Total Area (acres)	Total Production (MT)
Chhukha	1107	2589
Dagana	815	1528
Ha	637	3065
Samtse	888	1286
Sarpang	691	1012
Sub total (targeted area)	**4138**	**9480**
National share (percent)	21	21
Bhutan	19,480	45,095

Table 6. Analysis of potato (2011-2013)

Dzongkhag	Potato								
	Cultivated Area(Acres)			Production (MT)			Yield(kg/acre)		
	2,013	2,012	2,011	2,013	2,012	2,011	2,013	2,012	2,011
Chhukha	817	1,235	1,286	5,378	4,162	4,483	6,581	3,370	3,486
Dagana	161	218	470	171	217	1,511	1,060	992	3,215
Ha	555	672	406	2,491	2,639	1,604	4,485	3,929	3,949
Samtse	81	93	302	108	119	978	1,340	1,290	3,242
Sarpang	148	97	314	93	77	1,005	630	800	3,199
Sub total (targeted area)	**1,762**	**2,315**	**2,778**	**8,241**	**7,214**	**9,581**	**2,819**	**2,076**	**3,418**
National share (percent)	**13**	**18**	**18**	**16**	**17**	**18**	**75**	**62**	**100**
BHUTAN	13,391	12,548	15,609	50,390	43,000	52,116	3,763	3,339	3,427

Note: The reasons for more than 95percent growth in yield at Chukkha (2013 over 2012) needs to be ascertained.

Annex 5: Nutrition in FSAPP

1. **Any project that promotes small-scale agriculture and market linkages, whether for domestic consumption or export, can consider the nutrition status of the population and food security**. Investments in agriculture can have both positive and negative effects on making certain foods more or less available and accessible for household consumption. The FSAPP focuses on spices, cash crops, and food crops; each of which can contribute to the food and nutrition security of households through various 'impact pathways' either by increasing purchasing power or by increasing local production of nutrient-rich foods for diverse food choices. However, increases in income alone do not automatically render a better diet as diets depend on what kinds of foods are available at the market, affordable, convenient, and desirable, on who controls the income, is in charge of feeding household members, how food is prepared, and how food is distributed among family members. A nutrition 'lens' has been adopted in order to maximize the positive impacts of this project on household food security and nutrition. By aiming to (a) increase the availability of nutrient-rich foods (particularly vegetables, citrus, and pulses), (b) complement this with nutrition awareness and behavior change communication to diversify the diet, and (c) enhance accessibility and the healthy utilization of food products for improved diets throughout the year by linking farmers to school meal programs to diversify school meals for young children, the FSAPP aims to enhance its contribution to food security and nutrition.

2. **This approach is in line with and reinforces the implementation of Government policies.** The 'Food and Nutrition Security Policy of the Kingdom of Bhutan, 2013' sets a framework for 'ensuring that food and nutrition security is adequately prioritized and mainstreamed in all development plans'. The increasing recognition of nutrition as fundamentally linked with agriculture is evidenced in the National Nutrition and Food Security Strategy (2016-2025) and Action Plan (2016-2018), which is currently being finalized by the Ministry of Health in close collaboration with the Ministry of Education and MoAF. While nutrition has not been the responsibility of any of the Ministries in the past decades, the role of food production, diversification, and food safety for improving the nutrition status of the population have rapidly gained recognition across Bhutan. The National Nutrition and Food Security Strategy has several gaps to fill to engender responsibility by respective Ministries. For example, the 11th FYP has a target to attain 'self-sufficiency' in agriculture production, to meet 100 percent of demand for fruits and vegetables. While production targets have nearly been met (except for cereals), it is unclear whether this has translated into dietary intake. Additionally, it is unclear whether "demand" for these products is close to the daily recommended intake of at least 200 grams of vegetables and fruits per person per day.

Quick Overview of the Food Security and Nutrition Situation in Bhutan

3. Meals are generally kept simple and prepared fresh in Bhutan, typically composed of a mix of red or polished white rice accompanied by chilies cooked in a white cheese sauce (*emadatsi*) or curry (*tshoem*) made with a mix of meat, tomato, potatoes, and pulses. Chilies are consumed like a vegetable, not a condiment, rendering dishes markedly spicy, a unique feature of Bhutanese cuisine. Salted or sweet tea with butter (*suja*) or milk, beer, or home-brew often accompany these

meals and are completed by chewing areca nut with betel leaf and lime, called *Doma.*[12] While meals do not greatly vary throughout the day or season, dishes vary across regions, especially between rural and urban areas. This offers opportunities to exchange goods as well as recipes between regions. It appears that there is an increasing trend towards vegetarianism especially among middle school-aged children, however, it does not seem that eating habits, school meals, nor dietary guidelines have been adjusted to substitute animal-products.

4. **While food security indicators have marginally improved, inadequate access to sufficient and varied foods remains a challenge across Bhutan.** According to the 2015 National Nutrition Survey, only 2.2 percent of HH reported to be food insecure. It is unclear what the actual figures are as in 2010, it was suggested that despite economic growth, nearly 27 percent of Bhutanese households consume less than the daily minimum calorific requirement of 2,124 kcal per day, 35 percent of households face yearly food shortages (over 50 percent for more than 4 months each year). However, if only 2.2 percent reported feeling 'food insecure', this significant difference may solicit a stronger focus on improving and diversifying the food basket of populations rather than ensuring the availability and access only to staples.

5. **The nutrition status of the population is improving, although not evenly.** According to the most recent National Nutrition Survey (2015), Bhutan has achieved a considerable reduction in stunting among children under 5 years of age from 33.5 percent in 2010 to 21.2 percent in 2015 with the highest numbers still in rural areas, in the East, among families with poor education, and in the lowest quintile. Stunting impairs cognitive and physical growth and predisposes the child to metabolic diseases later in life, incurring a high cost for the social and economic vitality of the country[3]. Inequality seems to be one of the strongest differentiating factors for care, health and education, access and dietary habits. This decline in the prevalence of stunting has significantly reduced since 1988 when 61 percent of Bhutanese children were deemed stunted[4] to 48 percent in 1999.[5] While the drivers of this reduction are far from clear, it appears that income, education, and rural-urban divide play a significant role.

6. **Vitamin and mineral deficiencies remain high** among certain groups and areas but information as to the causes of these deficiencies is missing. Figures from 2010 suggest:

- Vitamin A: according to the Ministry of Health, this is no longer a national concern[6] since the 2000 National Vitamin A Deficiency Study concluded a 2.6 percent prevalence. Vitamin A capsules have been distributed across Bhutan with uncertain coverage.
- Iodine: according to the FNS 2008, there is 98.4 percent coverage of iodized salt, nearly eliminating iodine deficiency across the country.

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[1] Lhamo, Dawa. "The Bhutanese Menu." *Bhutan: Ways of Knowing*. Ed. Frank Rennie and Robin Mason. USA: Information Age Publishing, 2008. 105-109.
[2] Like coffee and tea, betel nut impairs the body's ability to absorb nutrients.
[3] Ministry of Health (2009) National Nutrition, Infant & Young Child Feeding Survey.
[4] Zangmo U., De Onis M. & Dorji T (2002). Infant and young child feeding practices and child undernutrition in Bangladesh: insights from nationally representative data. Public Health Nutrition 15, 1697-1704
[5] Ministry of Health (2012). 'Annual Report 2012: Featuring 10th Five Year Plan status', (Thimphu, Bhutan: Ministry of Health, Royal Government of Bhutan).
[6] Ministry of Health (2012). 'Annual Report 2012: Featuring 10th Five Year Plan status', (Thimphu, Bhutan: Ministry of Health, Royal Government of Bhutan).

- Vitamin B Complex: in 2012 and again in 2013, over a dozen students were hospitalized with neuropathy; studies concluded this was due to a diet lacking in vitamins. These students were relying on the school meal program, which offered mostly carbohydrates with a bit of dhal and milk. Meat was only served once a month.
- Iron: as a result of iron deficiency, anemia rates remain high, especially among women and children. While some programs promoting fortification have proven rather successful in curbing high rates or iodine deficiencies, it is still unclear regarding the effectiveness of iron supplementation (during antenatal visits). This project aims to complement such nutrition-specific interventions with nutrition-sensitive interventions to support the increased intake of a more balanced diet.

Table 1. Prevalence of Anemia

Zone	Prevalence of Anemia (percentage of population)			
	Children (6-59 months)	Adolescent girls (10-19 years)	Women (non-pregnant 15-49 years)	Pregnant women
West	49.6	35.2	39.8	25.6
Central	38.9	35.3	35.3	19.1
East	40.6	32.6	29.0	33.1
Urban	44.4	32.4	35.9	29.3
Rural	43.4	30.2	33.8	24.7

(National Nutrition Survey, 2015)

7. **Dietary diversity remains a concern**. Sixty-seven percent of Bhutanese people consume less than the recommended five servings (or 200 grams) of fruits and/or vegetables per person per day. Furthermore, when vegetables are consumed, they are largely restricted to potatoes (considered a vegetable) and chilies, both of which represent essential staples across the country but scarcely help to meet the range of vitamin and mineral requirements. While production of vegetables has increased exponentially in Bhutan, the consumption of this produce does not seem to match this trend. Imbalances between production and local consumption can be partially explained by the exportation of micronutrient-rich foods through the growing Bhutanese trade balance. Indeed, exports in Bhutan have increased by 62 percent from 1994 to 2014, with 22 percent of vegetables and 32 percent of animal based-foods in 2013[1]. To reduce micronutrient deficiencies, discussions are underway to fortify rice and other staples, following the success of iodine and Vitamin A supplementation. However, emphasis needs to be placed on diversifying the food plate to complement such interventions for sustainable dietary habits. While the FSAPP does not aim to ensure the availability and consumption of all nine food groups[2], it seeks to contribute to the diversification and increased availability of certain food groups on the food plate (through increased production and improved access), particularly of a variety of legumes, vegetables, and fruits. BCC interventions will seek to instigate demand and instill value for an overall balanced diet including also a variety of pulses, vegetables, cereals and animal-based foods. As such,

[1] http://atlas.media.mit.edu/en/profile/country/btn/#Exports and http://www.tradingeconomics.com/bhutan/exports

[2] Minimum Dietary Diversity Score includes nine food groups: (i) all starchy staples; (ii) All legumes and nuts; (iii) All dairy; (iv) Organ meat; (v) Eggs; (vi) Flesh foods and other miscellaneous small animal protein; (vii) Vitamin A-rich dark green leafy vegetables; (viii)Other vitamin A-rich vegetables and fruits; and (ix) Other fruits and vegetables.

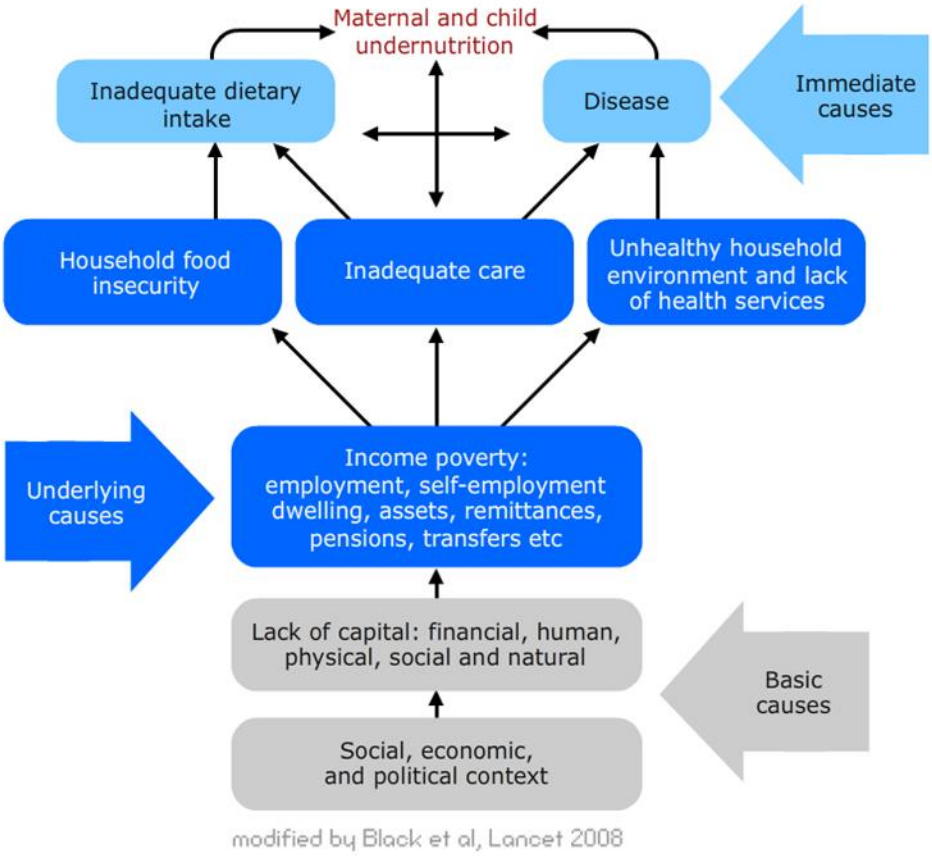
activities have been included to render the project 'nutrition-sensitive' to complement ongoing 'nutrition-specific' interventions.

8. **Dietary diversity for school children.** A healthy balanced diet for children, also after the first 1,000 day window of opportunity, is essential to ensure cognitive and physical growth. All Bhutanese children are eligible for free school meals – at lunch for day students and three meal per day for boarding students. With the introduction of Central Schools in Bhutan, the number of boarding students is likely to significantly increase, placing students even more reliant on school meal programs to provide their necessary dietary requirements. Since 2013, each boarding student is given the equivalent of a monthly stipend of 1,000 Nu, of which 60 percent goes to the Food Corporation of Bhutan to procure and deliver 9 perishables quarterly for school feeding and the remaining 40 percent to the school board to procure fresh foods directly. However, due to procurement, utilization (favoring grain-based meals), and funding shortages, the food plate in schools remains rather unbalanced where rice makes up the largest part of the food plate, 450 grams per day per child, only accompanied by a cup of watery dhal and a curry (composed mostly of potato) or *emadatsi* (green chilies with white cheese). No fruit is served. This imbalance was made evident by the outbreak of *baribari* (neuropathy) in 2012/13, which is caused by both the lack of a balanced diet and the overconsumption of simple carbohydrates, in this case rice. WFP together with the Government of Bhutan developed a national meal guideline and as the UN agency withdraws from the country (early 2015), it is also supporting the development of the School Food and Nutrition Policy.

9. **Under-nutrition figures in Bhutan are increasingly compounded by over-nutrition and non-communicable diseases** (especially hypertension and diabetes) and growing rates of obesity, increasing the risk of chronic disease and thereby generating significant health costs. FAO estimates that nearly 24 percent of women over the age of 15 are overweight. As is common in many regions of the world, as income increases, the purchase of processed foods also increases. As such, under and over-nutrition are often found in the same household. While stunting figures have reduced in the past, the food plate in Bhutan remains heavily based on carbohydrates and fats, with insufficient micro-nutrient rich vegetables, fruits, and protein-rich foods. Behavior change communication is imperative to accompany such a nutrition transition and mitigate its consequences. Many students in Bhutan study abroad and are already exposed to such messages, but those in rural areas are rarely privy to such education.

10. **The underlying causes of malnutrition** in Bhutan are multiple and compounded by the topography, market price fluctuations, social taboos and beliefs related to child feeding practices, , and consumer knowledge, tradition, and social trends. The UNICEF Framework, developed in 1990, is widely acknowledged as the guiding structure for understanding the multi sectoral drivers of malnutrition, determined by basic, underlying, and three broad immediate causes as further illustrated below.

Figure 1. UNICEF Malnutrition Framework



11. While solid data on these underlying causes is at times missing in Bhutan, findings from the preparation and design mission support conclusions captured in the World Bank Group's discussion paper[1]. Throughout the mission, all three immediate causes were recognized, however, aspects directly related to food and dietary diversity were most emphasized to ensure the coherence and effectiveness of project's activities and investments on nutrition. Many of the following statistics are derived from the above-mentioned World Bank Discussion Paper as well as the National Nutrition Survey, 2015.

- **Immediate causes of malnutrition in Bhutan**
  - Dietary diversity: low intake of iron-rich foods and dietary diversity due to the high cost and availability of animal based products[2] and the density of dhal.
  - Diarrheal diseases affect 25percent of children under 5[3] and anemia-causing H. pylori infections affect around 70 percent[4];

[1] Atwood, S., Nagpal, S., Mbuya, N., Laviolette, L. (Dec, 2014). 'Nutrition in Bhutan: Situational Analysis and Policy Recommendations). World Bank Group Health, Nutrition and Population. Discussion Paper: 94029.
[2] Atwood, S., Nagpal, S., Mbuya, N., Laviolette, L. (Dec, 2014). 'Nutrition in Bhutan: Situational Analysis and Policy Recommendations). World Bank Group Health, Nutrition and Population. Discussion Paper: 94029.
[3] BMIS (2011). 'Bhutan Multiple Indicator Survey 2010.' In National Statistic Bureau (ed.), Thimphu, Bhutan.
[4] Mahachai, V., L. Tshering, T. Ratanachu-ek, Y. Yamaoka, T. Uchida, T. Fujioka, R. Vilaichone (2012). 'A Population-based Endoscopic Survey of Helicobacter Pylori Infection and Its Clinical Consequences in Bhutan'.

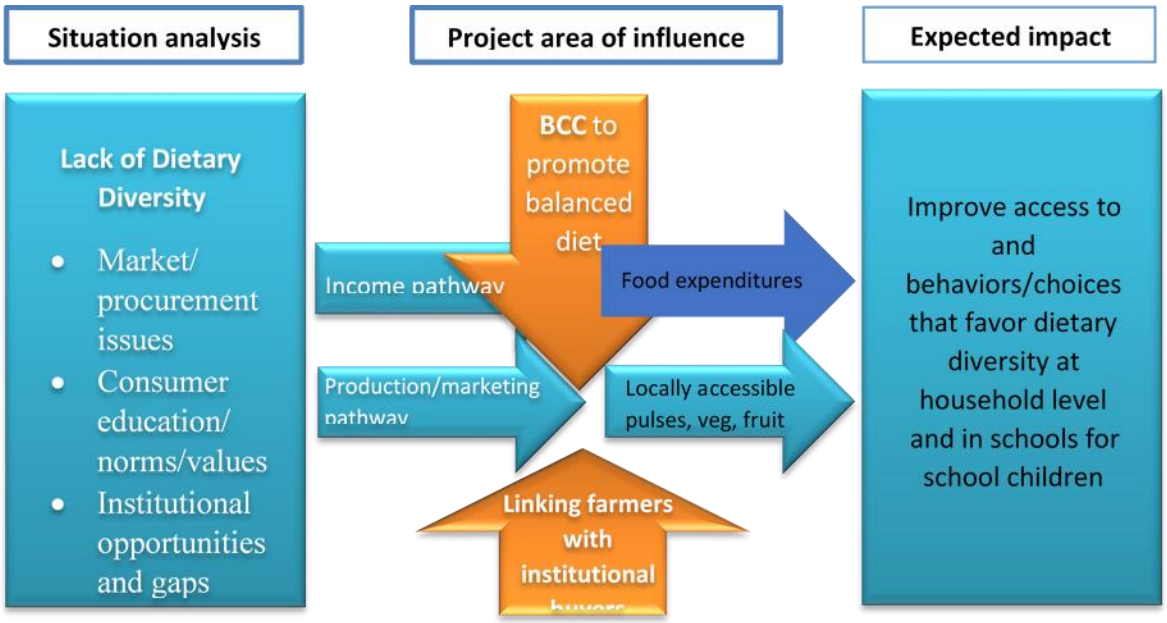
- Care: In 2015, the coverage of exclusive breastfeeding remained 51 percent and complementary feeding remained insufficient. Nearly all households have access to toilets (although most of these are pit latrines) and 88 percent report having access to an improved water source (though often not near the toilets)

- **Underlying and basic causes of malnutrition in Bhutan**
  - Poverty: wealth inequalities shed light on the importance of poverty for reducing stunting; the proportion of stunted children has decreased 73 percent since 2010 among the richest quintile compared with a 15 percent among lowest quintiles. In sum, children from the poorest quintile are 6.2 times more likely to be stunted (compared to 1.9 times in 2010), 7 times more likely to lack dietary diversity, 2.3 iron-rich foods, and 2.3 less likely to have access to sanitation;
  - Education: stunting among children with mothers with secondary and higher education have seen a reduction in stunting two times as fast as compared with those with mothers who have no formal education;
  - Urban-rural divide: children living in rural areas are 1.6 times more likely to be stunted than in urban areas;
  - In the East, rates of stunting are much higher (29.1 percent) whereas the West has seen an almost 50 percent reduction in stunting to 16.2 percent;
  - Affordability of food basket: general rates of inflation in Bhutan have decreased by 47.15percent from 2014 to 2016, but food inflation is forecasted to remain high and increase by 26percent from the last 2015 quintile to the second 2016 quintile, limiting purchasing power and food expenditures[1];
  - Health: In 2010, 77.3 percent of women attended four or more antenatal care visits compared with 84.8 percent today. Alcohol beverages are widely consumed among Bhutanese adults, in fact, Bhutan has the highest percentage of women in South Asia who consume alcohol (25.5 percent). This high intake of alcoholic beverages (also during pregnancy) is linked with low birth weight, liver diseases (the highest cause of deaths in hospitals in Bhutan[2].

12. **Following a thorough situation analysis, the project aims to work through several key impact pathways.** Key nutrition-related challenges were highlighted as linked with the project's overall objective and components: lack of dietary diversity at household level and in schools, which are increasingly responsible for providing students with their entire dietary needs. This issue of course has multiple underlying causes as described above. As such, in line with the project's objective, income and production/marketing have been identified as the key impact pathways through which the project will work. In order for these pathways to positively impact nutrition, dietary behaviors, shaped in part by the 'enabling environment' were considered of greatest importance. Activities have been identified to improve the effectiveness of the project on nutrition by working through two mechanisms/institutions: linkages between producers and sellers and schools.

[1] http://www.tradingeconomics.com/bhutan/food-inflation/forecast and the Consumer Price Index of Bhutan
[2] WHO-SEARO (2011). 'Epidemiological Profile of Non-Communicable Diseases in WHO South-Est Asian Region', Working Paper 1.

Figure 2. Activities to enhance the effectiveness of FSAPP on nutrition and theory of change



13. **A clear thread has been woven through the project to enhance the potential effectiveness of the identified activities on nutrition and activities in the project will principally work through two impact pathways** to improve dietary diversity (a supply and demand failure). The project will primarily aim to improve dietary diversity by adding vegetables and pulses to school meals and support behaviour change to diversify meals at household level. This would be through improving market linkages of farmers with schools and increasing income (both of which are the principle impact pathways of the overall project), and these two will be complemented by capacity building and behaviour change communication in order to maximize the impact on nutrition. The project will principally work through two impact pathways with the objective of improving dietary diversity (a supply and demand failure).

- **Income Pathway-** As described above, inequalities in income and depth of poverty have a significant differentiating impact on nutrition. In 2007, the cost of 2,124 kcal cost Nu 689 (US$12.50) per month. However, the cost of a balanced food basket is most likely higher (Poverty Analysis Report NSB 2007a). With increases in income, households are more likely to afford a more balanced food basket. However, in order to instil healthy dietary choices and values for a diverse diet. As such, behaviour change communication activities are imperative, based on an understanding of foods that are socially and economically valued.
- **Production and Market Pathway-** While most families in Bhutan claim to be food secure, often ensured by both on-farm production and purchases, they do not have regular access to a balanced food basket throughout the year. This may be due to physical access, lack of market information and infrastructure, and insufficient disposable income, among other drivers. Furthermore, even when such products are available, they could be utilized in a

manner to better make use of their nutrient value. The project will seek to improve the production/availability of diverse nutrient-dense crops, improve processing, storage and preservation of these crops, expand market opportunities for these products (by starting with schools, which can be a secure buyer and ensure accessibility of these products).

14. **In order for these two pathways to have a positive impact on nutrition, four entry-points have been identified** including: (a) increasing the availability of diverse vegetables, fruits, and legumes (as a cover crop/to intercrop), (b) improving access of farmers to sustained markets and the access of school children to diverse produce by retaining some of this production in the local market for school meal programmes (c) ensuring the sustainability of these linkages by developing diverse locally and culturally adapted menus to coincide with the seasonal calendar and (d) creating behaviour change communication (BCC) materials including the use of ICT based on a thorough behaviour change analysis, to instigate demand and instil value for nutrient-rich foods and improve cooking practices. These entry-points have been packaged into two comprehensive activities (a) diversifying the school meal plate and (b) improving awareness of food-based nutrition issues based on the BCC theory of change.

Behaviour Change Communication to improve dietary diversity and food preparation/consumption practices

15. **The availability of fruits and vegetables appears to be improving** in Bhutan as well as income levels. However, demand for a diverse food plate remains low in rural areas, a concern for farmers encouraged by past interventions to cultivate vegetables as well as for the nutritional status of the population. For FSAPP, BCC is critical to enhance market demand for seasonal produce but also to enhance the food and nutrition security situation of targeted populations. FSN is contingent on people's practices including choices at the market, processing techniques, and serving habits. There have been efforts to raise awareness of a balanced food plate and several health-related interventions have been carried out, using antenatal visits and child immunizations as opportunities for hospitals to convey messages. However, most food based nutrition guidelines and information are in English and remain in written form, excluding less educated and illiterate people. There is a risk of conflicting information and advice from grandparents, folklore, hospitals, and media and so there is need to develop materials that build on the local social context and translate dietary guidelines to instigate socially-cognizant behaviour change for improved FSN, using not just the written English word.

16. **For the FSAPP, BCC is critical to enhance market demand for seasonal produce but also to enhance the food and nutrition security situation of targeted populations**. FSN is contingent on people's practices including choices at the market, processing techniques, and serving habits. BCC activities will focus on diversifying the food plate and, as such, target pregnant women (to consume larger quantities of nutrient-rich foods), young mothers to prepare complementary foods including locally-available fruits and vegetables, children, and adolescent girls (encouraging the consumption of iron-rich foods, considering plant-based alternatives to animal products as many girls are said to be vegetarian). As it is imperative to expose children at a young age to a varied diet so that their taste-buds will not hamper them from trying new foods later on in life, complementary feeding practices and school meals can offer a good entry-point if complemented by appropriate BCC interventions.

17. **In order to effectively design BCC, it is important to understand what motivates people to change their practices,** impart information on the benefits and risks of changing practices, and teach the skills needed to implement these suggestions. Based on a thorough BCC analysis conducted by two BCC/nutrition consultants in the selected Gewogs, it will be possible to identify the bottlenecks and catalysts for diversifying the food plate and to get a sense of what kind of messages and social channels to which people respond. It is important to introduce new concepts but also to anchor BCC in existing traditional habits even from the past that might have been lost. For example, in the past, it is said that the Bhutanese cuisine was rather varied, based largely on wild seasonal foods and that people were tall; but now people with income consume junk foods and have a diet with limited variety and colour.

18. **There are multiple means of relaying agriculture-nutrition messages and engaging target populations;** tapping on auditory and visual senses can be effective by using pictures, infographics, audio messages, and videos, which allow access to a wider audience. As Bhutan embarks on drafting its e-agriculture strategy, the FSAPP can pilot the use of videos to bring weight to the existing dietary guidelines as well as develop simple, ready to apply messages on the importance of eating a varied diet, how to store food to retain its freshness, and especially on cooking practices (building on for example Tarayana Foundation's work with SAFANSI on developing a one-dish nutritious meal). Peer-to-peer learning videos as championed by Digital Green[1] may offer such a means of communication as these locally-pertinent videos can then be screened and complemented with village-level discussions and dissemination of related materials as well as cooking classes using for example schools, farmer's groups, community meetings, non-formal education centres as meeting points.

19. **The project will support a series of targeted integrated interventions** to encourage dietary diversification, by instigating demand and instilling value for an overall balanced diet including a variety of pulses, vegetables, cereals and animal-based foods. As such, the project will complement ongoing 'nutrition-specific' interventions focus on activities to render the project 'nutrition-sensitive', taking a food-based approach. Activities will be based on a thorough BCC analysis, which will help to understand what motivates people to change their dietary habits, the information to which they are receptive, and the skills needed to act on nutrition messages. This diagnostic will inform the design of materials and identification of effective mediums and complementary activities such as pictures, infographics, audio and text messaging, cooking demonstrations, discussion groups, and/or video. In-line with the Lead Farmer model, this material will be disseminated through a network of Community Resource Persons (CRPs), particularly women of reproductive age together with community leaders. Three to four CRPs will be called on from each Gewog and will be invited to a 4 days training in an RDC on agriculture-nutrition linkages and the importance of dietary diversification. These CRPs will be given a set of materials and trained in the use of these materials and activities, which they will then screen or conduct on a regular basis in their respective communities. A refresher training will then be organized every 4 months to collect feedback and provide further materials to the CRPs. One key resource persons

[1] Digital Green - offer such a means of communication as locally-pertinent videos can then be screened and complemented with village-level discussions, cooking demonstrations, and dissemination of related materials

will be selected from each of the 5 dzongkhags and will be invited on an exposure visit abroad to learn from effective BCC interventions for nutrition. This kind of network of CRPs can help establish a platform for further nutrition interventions.

20. **Given that BCC for food security and nutrition is a responsibility across line Ministries, the FSAPP can help lead the implementation of the FSN Strategy and Action Plan**
The FSAPP can pilot the use of videos to bring weight to the existing dietary guidelines as well as develop simple, ready to apply messages on the importance of eating a varied diet, how to store food to retain its freshness, and especially on cooking practices (building on for example Tarayana Foundation's work with SAFANSI on developing a one-dish nutritious meal). Peer-to-peer learning videos as championed by Digital Green[1] may offer such a means of communication as these locally-pertinent videos can then be screened and complemented with village-level discussions and dissemination of related materials as well as cooking classes using for example schools, farmer's groups, community meetings, non-formal education centres as meeting points.

21. **Activities to instigate Behaviour Change Communication to improve dietary diversity and food preparation practices and consumer habits**

- FAO technical assistance to design BCC strategy for FSAPP in addition to technical backstopping and quality review;
- Recruit one BCC consultant for two years full time and then part-time to prepare and manage BCC activities. This specialist would be based in Thimphu in order to regularly liaise with WFP, FAO, Ministry of Health and Education as well as Agriculture;
- Conduct BCC analysis/study to inform development of BCC activities/materials and to identify bottlenecks and catalysers for dietary diversification among various population groups;
- Develop BCC materials such as customized chart of diversified food plate, promotional campaigns, seasonal recipe booklet, including use of ICT e.g. development of BCC videos in collaboration with Digital Green;
- Organize call for CRPs and coordinate and lead training workshops for CRPs;
- Pilot materials through CRP network including recipes through cooking demonstrations, awareness raising materials and campaigns, as well as video screenings;
- Partake and organize training and exposure visits for BCC 'champion' CRPs. Exposure visits may include to Vietnam to study how they use behavioural theory to guide a social marketing campaign or to an Alive and Thrive project in e.g. Bangladesh;
- Collect lessons learned on uptake and dissemination of BCC materials/messages to design more materials.

[1] Digital Green - offer such a means of communication as locally-pertinent videos can then be screened and complemented with village-level discussions, cooking demonstrations, and dissemination of related materials

Linking producer groups to institutional buyers: ensuring a market and diversifying the food plate

22. **The project seeks to build on previous experiences and the ongoing work of partner agencies including IFAD, WFP, among others.** To overcome market challenges, the Vegetable Value Chain Programme in the East (VVCP-E) under the Market Access and Growth Intensification Project (MAGIP), funded by the International Fund for Agricultural Development (IFAD) and implemented by the Ministry of Agriculture and Forests (MoAF) in six Eastern Districts in Bhutan successfully linked vegetable farmer's groups with schools. This linkage was motivated by the need to ensure a steady market for a nascent market and has provided a secure market for groups and ensured constant prices and therefore also returns. To build on this experience and expand its coverage to the select Western Districts, the FSAPP will seek to build on these experience and complement the supply-side with demand-side activities. Activities will aim to increase farmers' incomes leading to higher propensity to invest in food expenditures, and to diversify school meals throughout the year by supporting farmers to plan their production calendar, reduce post-harvest losses, and improve utilization of this food.

23. **Currently, the food plate served to boarding students in schools is often incomplete;** it is largely composed of rice, 450 grams per day per child, accompanied by a cup of watery dhal and a curry (made of potato and chili or green chilies with white cheese and small quantities of available vegetables). No fruit is served. The FSAPP can support farmers to establish groups and link with schools to supply seasonal vegetables, fruits, and pulses especially those rich in iron and Vitamin A as required by the school through the year. As such, school menus will have to be revised in order to make use of seasonal foods, which can help improve the diversity of school meals. This will require the expertise of a nutritionist/behavioral scientist to develop locally-appropriate seasonal dishes that can be easily prepared and meet the full dietary requirements of school children. Furthermore, cooking techniques will require adjusting to better incorporate this produce as well to increase nutrient retention and maximize nutrient absorption.

24. **The current school meal system is in transition.** The Lancet Commission has defined the promotion of "healthy eating in schools" to tackle unhealthy diets as one of a core set of "best buys that are highly cost effective, inexpensive and feasible." The purpose of school meal programs is to provide students with food to promote physical growth and cognitive development. In addition, it can also help to drive changes in consumption practices by exposing children at a young age to a balanced diet. Schools are often the first area of socialization for children and have a strong influence in instilling positive habits (especially at boarding schools). Secondly, school meals as well as other institutions such as hospitals can offer a market incentive for producers to sell their products locally, to have a secure buyer (and therefore stable source of income) and reduce transaction costs and time. Since 2013, each boarding student is given a monthly stipend of Nu 1,000, of which 60 percent goes to the Food Corporation of Bhutan Limited (FCBL) to procure and deliver nine non-perishable items quarterly to school feeding programs (including rice, oil, milk powder etc.) and the remaining 40 percent to procure fresh foods directly by the school management. However, schools are not able to procure all the perishables (due to a lack of availability and affordability) and so the inclusion of vegetables, protein-rich foods, and fruits is compromised on a weekly basis. As a result, the School Agriculture Program (SAP), originally meant to serve as an education program, has primarily become a means of production rather than

an educational tool. FSAPP will first work to identify farmers and schools interested in linking and can then consider linking with other institutions such as hospitals and monastic schools.

25. **This intervention comes at a critical time** when an increasing number of students will rely on schools as their sole supplier of meals with the establishment of Central boarding schools. Several institutional changes are expected in the coming years, which will demand considerable capacities and resources of farmer's groups to deliver sufficient produce throughout the year as well as among school staff to deliver healthy foods for school children. Due to a range of complaints raised by schools reporting a lack of funds to sufficiently purchase these goods, the budgetary allocation (40-60 percent) is likely to be revised in 2016 in favor of (locally supplied) perishable and nutritious items, which may work to the advantage of local farmer's groups. With the establishment of Central Schools to aggregate resources and improve the education delivered, there is likely to be a surge in the number of boarding students by 2017 (some schools will double in size). Schools that are now only serving one meal a day (with some exceptions where WFP is still providing breakfast until grade 6), and so will be expected to meet the dietary requirements of students throughout the year.

26. **Activities to diversify and increase quantity of vegetables, fruits, and pulses served in school meals.** Activities on linking producer organizations with school meal programs to improve dietary diversity will mainly include: (a) strengthening of contractual arrangements between POs and schools, (b) linking production calendars with seasonal school meal requirements, and (c) training of school cooks.

- A home-grown school feeding expert, supported by FAO, will be based in Samtse RDC (where a nutrition officer is also located) and will flexibly move between the three RDCs;
- Preliminary scoping will take place to capture (a) number of existing producer organizations near schools (b) dietary gaps (c) potential seasonal foods, (d) recipes, and (e) an analysis on how dietary gaps may be improved through production and PO linkages;
- Contractual arrangements. In line with other trainings as outlined in Components 1 and 2, train interested farmers on group formation and governance to support linkage with institutions. In contract, define menu as preliminarily prepared by consultant. Agree on margin for farmer, seasonal calendar, quantities supplied/needed by institutions. In some situations, a representative from the PO may take responsibility for the procurement of all perishable goods, irrespective of local cultivation to ensure strong linkage with school;
- Cooks will be trained on uses of seasonal foods and value of diverse food plate, food storage, procurement, recipes, safety etc., building on WFP's yearly training, which will be phased out in 2016. BAFRA, SAP coordinators, and hotel cooks can be invited for cooking demonstrations;
- Exposure visit will be organized for home grown school feeding 'champions' such as school principal, non-formal education instructors, teachers, community leader or religious head. Exposure visit may include to Thailand or Bangladesh;

- Acceptability of meals in schools will be regularly examined, as well as regular cooking demonstrations conducted together with associated appropriate BCC materials. Contractual arrangements need to be monitored and refined regularly.

The following table identifies some of the possible schools in the selected Dzongkhag's that could link with local farmers. Identified schools can serve as a pathway to connecting with other local institutions, improve livelihoods of individuals in farmer's group, and contribute to the improvement of diets among school children and the local community if complemented by effective capacity development and BCC.

Table 2. Prospective Schools linked to local Farmers

Dzongkhag	Gewog	Name of School	No. full board	No. of HH	Estimated Population
Dagana	Drujeygang	Drujeygang HSs (RGoB)	352	397	1,985
	Lhamoi Dzingkha	Lhamoizingkha MSs (RGoB)	267	314	1,570
Haa	Gakiling	Rangtse PS (WFP)	154	200	1,000
	Usue	Tshaphel LSS (WFP)	185	255	1,275
	Samar	Gyenkhana PS (WFP)	212	325	1,625
Chhukha	Bongo	Pakshikha Central School (RGoB)	457	663	3,315
		Bongo PS (WFP)	50	n/a	n/a
		Chungkha Ps (Both WFP (RGoB)	78	n/a	n/a
	Dungna	Dungna LSS (WFP)	205	167	835
	Getana	Getana Ps (WFP)	104	152	760
Samtse	Dophuchen	Dorokha Central School (RGoB)	503	1,045	5,225
		Sengdhen LSS (RGoB)	400	788	3,940
		Denchukha LSS (RGoB)	140	550	2.750
		Mindruling PS (RGoB)	72	924	4,620
	Tading	Tabadramtoe PS (RGoB)	160	n/a	n/a
	Tendruk	Tendruk HSS (RGoB) & Soeltapsa PS (WFP)	268	n/a	n/a

Annex 6: Implementation Arrangements

Project Institutional and Implementation Arrangements

1. The MoAF will coordinate overall implementation of the project. **A** PSC will provide policy guidance, direction, and oversight. The PSC will be chaired by the Director, DoA with representation of MoF, GNHC, DAMC, PMU, RDCs, five dzongkhag Dashos (Governors), and five beneficiary representatives (one from each dzongkhag). The biannual PSC meetings will be held in project dzongkhags on a rotation basis.

2. In consideration of the transformative nature of this project and the implementation challenges faced by the recently completed DRDP and ongoing implementation of RRCDP operations, it was agreed that implementation arrangements will be put in place to ensure that: (a) project implementation does not run into the problems, bottlenecks, and delays faced by the above mentioned projects; (b) adequate management and technical expertise are available to provide timely guidance, support, and inputs to meet project implementation schedules, targets, outcomes, and impacts; (c) properly functioning financial management and procurement systems and dedicated expertise are available to ensure timely disbursement and judicious use of approximately Nu 650 million in total and, on average, Nu 11 million every month, well-timed procurement of large volumes of goods and services, regular reporting of project expenditures, and avoidance of any conflict of interest for fiduciary compliance.

3. It was agreed that a PMU will be set up in the DoA. The PMU will report to the Director, DoA. The PMU will: (a) ensure that the project is aligned with the respective national sectoral policies and plans; (b) coordinate with relevant divisions and departments of MoAF, GNHC, ministries, partners, the private sector, and other stakeholders to seek necessary support and assistance for the project; and (c) steer successful implementation of the project, that is, achieving the PDO, results, and outcomes with due consideration to fiduciary and environmental and social management framework compliance.

Table 1. Project Management Unit Staff

PMU Position	Type of Appointment
• Project Director, M&E Expert, FM Expert, Driver, and Administrative Staff	• Existing DoA Staff on full-time basis
• Procurement Expert	• Full-time for 2 years (FAO-TA)
• Safeguards/Gender Expert	• Full-time for 2 years, (FAO-TA)
• Behavior Change Communication for Nutrition Expert	• Full-time for 2 years (FAO-TA)
• Value Chain Development/Marketing Expert	• Full-time for 3 years (FAO-TA)[1]

[1] 3 years under FAO TA, to be renewed after that with government resources for the remaining period

4. The DAMC will work closely with the project team for formation, orientation, and strengthening of both FGs and PGs. The project team, in close coordination of DAMC, will provide capacity building, training, and support to help FGs and PGs become proactive and well-functioning enterprises with business plans to reduce their production costs, minimize pre and post-harvest losses, improve information and understanding of agriculture markets, and establish effective backward and forward linkages with the local and export agriculture markets. DAMC will provide an easy to use and regularly updated market information system (the AgMarket website and IVR system) and mobile interface for local farmers and producers to have regular information and updates about the demands and prices of agri-produce in local and export markets.

5. With due consideration of the ongoing organizational development exercise and wide ranging organizational reforms, which include assigning a greater coordination and technical backstopping role to the four RDCs in MoAF, it was agreed that three RDCs situated in Bajo, Bhur, and Yusipang will play a key role in project implementation. In each RDC, a PST will be set up to work closely with project staff in the dzongkhags and gewogs for successful project implementation. The PST will report to the RDC-Program Director, who will have the overall responsibility to guide, manage, coordinate, facilitate, provide technical inputs and back up, and ensure successful project implementation in the designated gewogs and dzongkhags. The dzongkhags' annual work plan and budget will be collated as a RDC-wide annual work plan and budget, and PST will be responsible for implementation of the annual work plan and budget and achievement of annual outcomes and outputs. In total, three PSTs will be established, comprising the following staff.

Table 2. Project Support Team

Program Support Team (PST) Positions	Type of Appointment
• M&E Expert, Irrigation Engineer	• Existing RDC and Engineering Division staff on full time basis
• Infrastructure Engineer, Accountant, Procurement expert, Safeguards/Gender Expert	• Existing RDC staff 50 percent time share basis
• School Agriculture and Nutrition Coordinator	• Full-time for two years, and will divide his/her time between the three RDCs on needs basis (FAO-TA)
• Marketing Officer	• Existing DAMC Staff on full-time basis

6. **Dzongkhag and Gewog Administrations**. Five dzongkhags' (Chhukha, Dagana, Haa, Samstse, and Sarpang) and 24 gewogs' administrations will be the implementation entities at the field level. Dzongkhags and gewog specific project annual work plans and budgets will be prepared and implemented with active participation and involvement of the PST-RDC; district officials, especially DAO and DE; Gewog Tshogde; Gup; GAO, EAs and Tshogpas. The District Agriculture Officer will be responsible for implementing the respective dzongkhag's annual work plans and budgets. In line with the project beneficiaries' priority needs, gewog and dzongkhag agriculture staff, along with the support of District Agriculture Officer and PST-RDC, will: (a) identify and prioritize project sites and interventions; (b) prepare district annual work plans and budgets (AWPB); (c) identify and fulfill training and skills enhancement needs of project beneficiaries; (d) provide relevant inputs, support, and back up to project beneficiaries; (e) guide and facilitate farmers'/producers' groups to have greater backward and forward linkages to access

quality inputs, improve farm management practices, minimize pre and post-harvest losses, enhance quality of produce/product through value addition, and for greater knowledge/info of and access to markets; (f) promote nutrition awareness and behavior change for availability and consumption of nutrient-rich foods; (g) ensure implementation of AWPB at the field level; (h) carry out data collection and validation, progress monitoring, and reporting; and (i) coordinate with the relevant government departments, private sector, markets, development partners, and ongoing programs and projects.

7. **Grievance Redressal Management**. A simple and effective GRM system will be set up that will enable the project to promote openness and transparency at the local level, increase project ownership, enable beneficiaries and stakeholders to share any concerns and suggestions, and for the project to adequately respond to them.

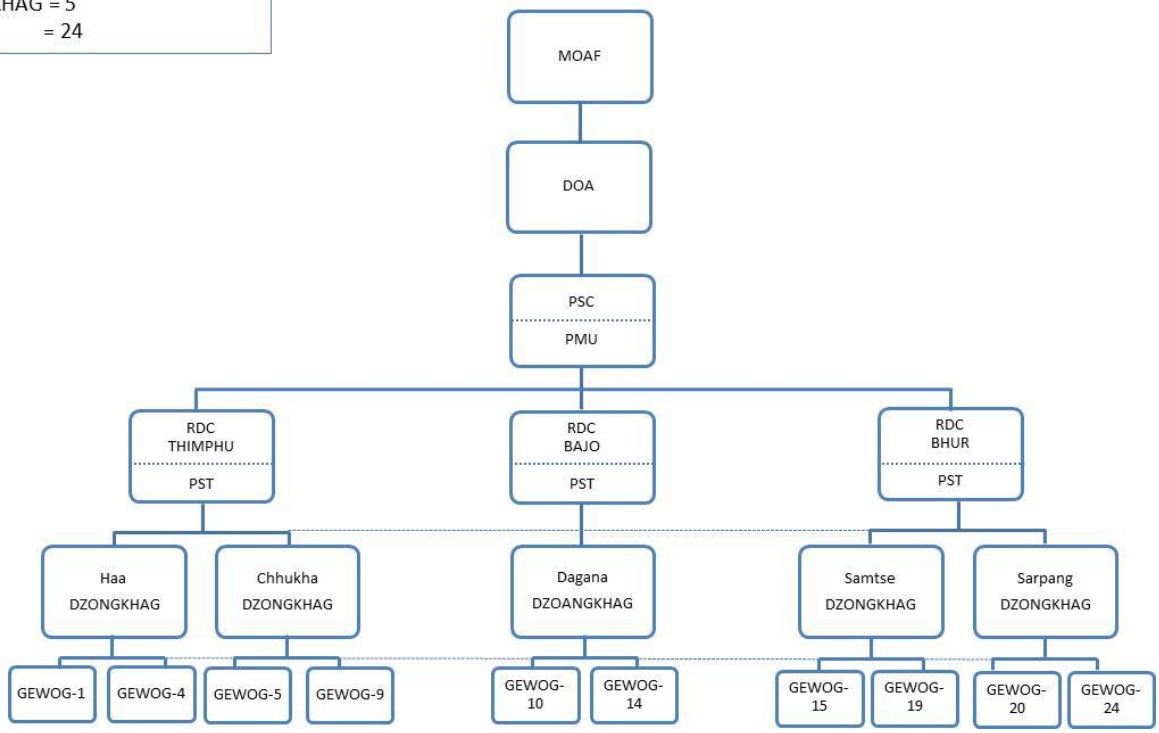
8. **Technical Assistance.** FAO will provide the required technical assistance and institutional strengthening support, in the estimated amount of US$ 1.15 million, as required by the PMU for successful implementation and sustainability of the project. This TA is designed to synergize with FSAPP's investment activities and will be integrated into its four project components to serve as a catalyst for achieving project-specific results on ground. Nutrition is the key technical area of focus for the TA. In addition, this TA will be used to support agriculture production and marketing, as well as capacity building for FGs to complement MoAF's current efforts in those areas.

9. The following activities will be supported by FAO TA: (a) Component 1 will include (i) training material development and training of trainers (TOTs) on farm business management; and (ii) nutrition awareness and capacity building for improved diet, including BCC strategy formation and material development; (b) Component 2 will provide (i) training on the designing of micro-irrigation systems; (ii) capacity building on WUA strengthening; (iii) technical training on citrus propagation and disease control; (iv) technical training on cardamom propagation, disease control, and orchard management; (iv) training on new emerging technical areas of strategic importance and relevance to the project (such as adaptation to climate changes); (c) Component 3 will include (i) training on post-harvest technologies, packaging, food processing and safety, targeting five PGs engaged in food processing businesses; (ii) upgrading of the market information system; and (iii) support for improving linkages between PGs and schools for improved school feeding. It was also agreed that all contracted positions in the PMU and RDCs will be supported under the FAO TA.

Figure 1. Project Organogram

PST = Project Support Team
PMU = Project Management Unit
PSC = Project Steering Committee

DZONGKHAG = 5
GEWOG = 24



Financial Management, Disbursements and Procurement

Fiduciary Capacity

10. Based on the assessment of MoAF, DoA, MoF, and RDCs fiduciary capacities, the fiduciary risk of the project is Moderate. Like other government institutions in Bhutan, these agencies are not immune to systemic issues affecting procurement efficiency and performance. MoAF and RDCs will require adequately skilled staff to manage procurement as well as additional training on Bank's Procurement Guidelines. Internal control, documentation, information dissemination, and contract administration, including delivery, follow up, payments, and complaints handling also need to be strengthened. In addition, several measures will need to be introduced to minimize procurement risks during project implementation. Given the past experience of MoAF in handling the Bank-financed projects and the Bank's prior understanding of the PFM systems in Bhutan, an update has been undertaken to assess the FM arrangements for this project. The project will be implemented using the existing systems of RGoB for budgeting, accounting, internal control, and audit. The project will be implemented by DoA, DAMC, and RDCs of MoAF in 5 Dzongkhags and 24 Gewogs. Adequate staffing at the PMU and all other levels; a well prepared and implemented Operations Manual; and regular supervision, support, and training are some of the measures that will be required to minimize the financial management risks during project implementation.

Planning and Budgeting

11. *Planning.* MoAF has finalized a Procurement Plan for the entire project; this was approved in STEP on October 20, 2016. MAF/PMU will update the procurement plan in agreement with the World Bank annually or as required to reflect project implementation needs and improvements in institutional capacity.

12. *Budgeting.* The project will be budgeted at 5 Dzongkhags, 3 RDCs, the DoA, and DAMC under separate Project Letter of Credit/s (PLC/s) and a separate Financing Item Code (FIC). Funds to the other agencies such as Gewogs, AMC could be passed on by the above agencies. The activity/sub-activity codes will allow for all project-related expenditures to be separately identified, accounted, and reported in the PEMS reports as well as in the IUFRs. Clearly identifying the project components/sub-components within the PEMS system will simplify the project financial reporting.

Internal Control

13. *Filing and Record-Keeping*. All implementing agencies will preserve all procurement records and documents in accordance with provisions of the Bhutan Procurement Rules and Regulations 2009 (Revised July 2015). These agencies must make these records readily available on request for audit/investigation/review by the Government and the Bank. The PMU will retain copies of supporting documents for all project transactions; originals will be maintained by the respective implementing agencies. All project-related documents must be filed separately to facilitate internal and external audits, as well as reviews by the Bank.

14. *Controls.* RGOB's Financial Rules & Regulations 2016 (FRR) provides the required control framework for procedural transaction control over individual items of expenditure and receipts. The FRR provides detailed guidance on internal controls, including safeguarding of cash, control over inventories, segregation of duties, and delegation of authority for approvals and operating the bank accounts. The FRR specifies the segregation of duties and defines the responsibilities and steps required to process financial transactions. Project specific procedures will be further detailed in the OM.

15. *Internal Audit:* The internal auditor of MoAF will review the project activities of each spending unit at least once every financial year, but the internal audit reports will be issued on a biannual basis. These reports should be shared with the External Auditors on a regular basis, and shared with the Bank during project review/supervision.

Governance and Oversight Arrangements

16. *External Audit.*[1] Annual Project Financial Statements (PFS) will be audited each year by the RAA as per the standard Terms of Reference agreed for Bank-financed projects by MoF's letter dated November 24, 2011. PFS will include financial statements for the project along with a statement reconciling Grant disbursements against claims submitted to the Bank and balances available in the Designated Account as reported in the IUFRs, as well as a Management Letter. MoAF will be responsible for submitting the project financial statements to RAA by September 30th of each financial year. The financial statements submitted by the MoAF for the purposes of the audit will include an assurance from Management on the correctness, completeness, and confirmation of the use of project funds for intended purposes. The following table indicates the audit reports to be submitted to the Bank and their due dates:

Table 3: Audit Reports

Coordinating Agency	Audit Type	Auditor	Deadline
PMU, MoAF	Annual Project financial statements	Royal Audit Authority	December 31 of each year

17. *Procurement Complaints.* The PMU must establish a system to manage complaints, including a database for recording, monitoring, and following up on all procurement activities. The Bank must be notified of any complaints to ensure transparency in the resolution process.

Procurement Considerations in the Fiduciary Assessment

18. Procurement would be carried out in accordance with the "World Bank Procurement Regulations for Borrowers under Investment Project Financing" dated July 1, 2016. As per requirement of the Procurement Regulations, a comprehensive Project Procurement Strategy for Development (PPSD) has been prepared with support of the Bank.

[1] There are no overdue audit reports under any of the Bank funded projects

19. *Project Procurement Development Objectives (PPDO)* is to increase procurement efficiency and ensure value for money that contributes to agricultural productivity and enhanced market linkages in selected rural districts in south-west Bhutan.

20. *Project Procurement Results Indicators*. The achievement of the PPDO will be measured by the following indicators: (a) increase completion by 50 percent for works contract compared with other agriculture projects, (b) reduce instances of rebidding by 50 percent compared to other agriculture projects, (c) timely completion of 75 percent of major contracts, and (d) ensure value for money through implementation of 75 percent contract management KPIs.

21. *Key Procurement under the Project*. The project's total value is US$ 8 million of which approximately US$3 million contributes to the procurement of works contracts for the construction of irrigation channels. Others are mostly low value consultancies and goods procurement under national competitive selection and direct selection method. The PMU will conduct the procurement process for high value contracts.

22. *Civil Works*. There are civil works anticipated for implementation of Component 2: Enhancing Farmer Productivity.

23. *Procurement of Goods and Non-Consultant Services.* Goods and non-consulting services required under the project would include office supplies, community awareness supplies, consumables, and community center rentals. As per PPSD, appropriate procurement methods have been selected and mentioned in the procurement plan.

24. *Selection of Consultants*. There are few low-value firm and individual consultants. As per the PPSD, the appropriate procurement method have been selected and mentioned in the procurement plan.

Client Capability and PMU Assessment

25. MoAF has moderate capability at the PMU level because the staff proposed for the PMU have all worked under similar projects in the past. MoAF is now implementing another similar Bank-funded project, RRCDP. The engineers involved in the design and implementation of the infrastructure works have already carried out similar works under RRCDP and are familiar with the World Bank Procurement Procedures. However, the MoAF / PMU lacks capacity in market analysis/survey. Thus, the ongoing project is suffering frequent rebid, less competition, and high-priced bids. To mitigate such risk in this project, MoAF is using the Bank's New Procurement Framework (NPF) with contains some new features, such as sustainable procurement, rated criteria, and contract management with key performance indicators (KPIs).

26. *Contract Management*. The PSTs will implement works contracts at the field level. The engineers at the field level have contract management experience using the RGoB system, which will meet the basic requirement. However, the team members of PST would require extensive contract management training especially for monitoring KPIs. The MoAF/PMU will also need training to develop effective KPIs for contract management.

27. *Complaints management and dispute resolution systems*. The Ministry of Finance has established an Independent Review Body to address grievances related to Procurement. They system is robust and fully functioning. The bidders will follow this system for complaints and grievances and dispute resolution. In addition to this, arbitration will follow the process set up by the Construction Development Board. However, the PMU should also maintain a complaints register for record keeping.

Market Analysis

28. *Procurement of works under irrigation activities*. Works contract will be carried out in two dzongkhags, Sarpang and Samtse. A detail market survey and analysis has been carried out. Based on the outcome of the market analysis, the irrigation works have been grouped into four packages. To ensure value for money and perfect completion as per the market analysis, the following specific arrangements will be used for this project: (a) rated criteria, (b) sustainable procurement, (c) negotiation, (d) KPIs in contract management, and (e) prospective bidders' awareness and readiness though consultation and training.

29. *Low value activities.* For seedlings and saplings, NSC would be the only option because there is no national bidder for this type of assignment.

Table 4. Key Risks and Proposed Mitigation

Procurement Core Principle	Possible Risk	Proposed Mitigation Measures.
Value for Money (VFM)	(a) High priced bid (b) High maintenance cost (c) Less life time of the product (d) Less quality of the finished product (e) High cost of ownership over the life of the product. (f) Negative impact in terms of social and environment (g) Lack of knowledge of FoAF/ PMU to ensure value for money (h) Inadequate understanding of the bidders related to value for money	(a) Incorporate rated criteria considering contractor's performance, capacity, social and environment aspect. (b) Introduce KPI for green procurement (social and environment) part in contract management. (c) Comprehensive training for Borrower on VFM. (d) Awareness and hands on training program for the prospective bidders on VFM customized for specific bidding opportunities.
Economy	(a) High bid price (b) High cost of ownership (c) Contract will not be completed on time; cost over run	(a) Conduct bidder's awareness to ensure better completion which may ensure reasonable price (b) Conduct negotiation for significantly high priced bid with prior approval from bank as per negotiation toolkit.
Integrity	(a) Possibility of wrong doing by the bidder.	(a) Bhutan has developed a standard integrity pact, which is a mandatory part of bidding documents for all government-funded contracts. MoAF / PMU will use the integrity pact and bid will be rejected if a bidder fails to sign the integrity pact.
Fit-for-Purpose	(a) limited local market and contract size will not attract international bidders (b) Remote access to the site place discouraging national bidders to participate.	(a) Introduction of rated criteria will encourage the good national bidder to participate at this is not the lowest cost bid rather best priced bid.

Procurement Core Principle	Possible Risk	Proposed Mitigation Measures.
	(c) As per market analysis, for some specific type of works/ service there is no bidders.	(b) PMU will follow direct contracting with local community instead of initiating competitive bidding.
Efficiency	(a) Frequent rebid (b) More time will berequired to prepare bidding document and complete evaluation and change of faulty bidding document and evaluation. (c) Contract will not be completed on time.	(a) Set appropriate packing and qualification requirement based on market analysis. (b) Introduce performance-based penalty based on set milestones. (c) KPIs will be linked with payment. (d) Use of project management tool like MS Project and closely monitor the critical path.
Transparency	(a) All bidding information may not be public.	(a) All advertisement will be published in MoAF's website. (b) Contract award information will be published in MoAF's website.
Fairness	(a) Local bidders may get advantage over national bidders in terms of bidders' awareness (b) Change of incorrect bid evaluation	(a) MoAF / MPU will issue notification in its website to invite all national bidders for awareness program and training. (b) In additional to website publication, individual invitation will be sent to all large contractors. Construction Development Board (CBD) has comprehensive database for all large contracts in Bhutan.

Financial Management Considerations in the Fiduciary Assessment

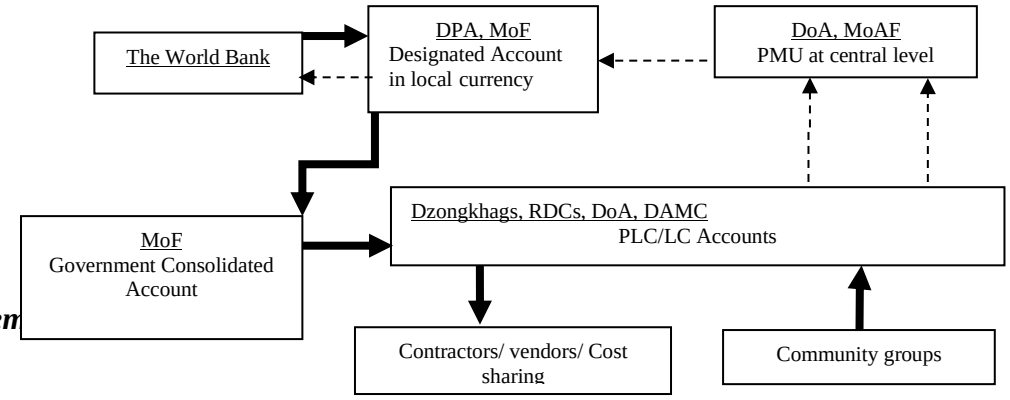
30. *FM Staffing:* In Bhutan, the Ministries and departments have Administration and Finance Divisions (AFD) and Dzongkhags and Autonomous bodies have Administration and Finance Sections (AFS) to manage their financial affairs. Finance personnel (budget officials, accounts officials, revenue and customs officials, procurement officials and internal auditors) are placed in all the budgetary bodies across the country. Accounts personnel are also placed at the lowest level of the administration i.e. Gewog Administration. The project accounting and financial reporting functions will be managed by the existing accounting staff of MoAF at the central level, at the Dzongkhag level, and at the Gewog level. Given the regional nature of the project and the number of agencies involved in project execution, an experienced, well trained, and senior level accountant from the existing staff, has been assigned to the PMU by MoAF/DPA. The accountant will be provided training in Bank FM procedures and shall not be transferred during the life of the Project. Requests for all releases to PLC/LCs under the project will be routed through the Accounts Officer in the PMU. For ease of reporting, it is proposed that the Accounts Officer shall obtain read-only access to PEMS systems to access expenditure incurred at various project locations. The above accountant through AFD, MoAF will have the primary responsibility for (a) routing all fund requests to the Department of Public Accounts (DPA) and tracking the fund releases; (b) reconciling the Designated Account (DA); (c) coordinating with accountants at RDC, Dzongkhag, and Gewog levels to advise them on the project financial management arrangements; (d) obtaining expenditure details from accountants at the RDC, Dzongkhags, and Gewogs; (e) preparing and submitting half-yearly consolidated interim financial reports to IDA, and (f) ensuring timely submission of internal and external audit reports and follow-up on resolution of any audit para /observations.

31. *Accounting and Reporting.* Accounting for project expenditures will be maintained on a cash basis in PEMS itself and no separate project level accounting will be required. The prevailing rules of RGOB, that is, Financial Rules and Regulations (2016), will apply to all project expenditures. Key aspects of the project FM arrangements are as follows:

- All payments to contractors, consultants, and suppliers against invoices and running bills are considered expenditures.
- Other transfers such as inter-department transfers, transfers to the spending units, and the advances provided to the community organizations will be considered as advances.
- All sources of funds, all expenditures, and advances will be reflected in the project's financial statements.
- There is a provision of beneficiary contribution and cost sharing under the project. The modalities of the release and reporting requirements for the said items shall be provided in the Operations Manual.
- No funds are expected to flow to communities. All procurement and expenditure would be carried out by the implementing agencies identified under the project.

32. *Designated Account, Fund flow, and Reporting.* Project funds will be deposited in advance into the DA denominated in Ngultrum to be opened at the Bank of Bhutan. The DA will be segregated and used only to deposit advances for the project. The DA will be operated by the DPA in the MOF. Funds will be withdrawn from the DA on an "as required" basis and transferred to the government budget fund account (GBFA) by the DPA as an advance. The transfers from DA to GBFA are based on requests from MoAF at the central ministry level. Based on the requests, the DPA in the MOF will release funds to the Project Letter of Credit (PLC)/Letter of Credits (LCs) of the participating agencies. The project agencies will issue checks against the PLC/LC to meet the project expenditures and account for the same in PEMS. On a monthly basis, all participating agencies will submit a copy of the financial report generated from the PEMS to MoAF. The project accountant will consolidate the information and prepare IUFRs in form and contents agreed with IDA. The IUFRs will provide information on expenditures made in the previous two quarters, beneficiary contributions, and forecast for three subsequent quarters. The project management should compare the financial information provided in the IUFRs with the project's physical progress reports. Half yearly disbursements would be made based on these financial reports, providing funds for three subsequent quarters after adjustment for past disbursements. The figure below describes the funds flow arrangements for the project.

Figure 2. Flow of Funds and Information



Disbursem

33. The project duration is five years. Project funding will consist of a Grant of US$ 8 million. The Grant will finance 100 percent of the costs (excluding beneficiary cash contributions for goods purchased under the cost sharing arrangements in parts 2.3 and 3.1(b) of the Project), including taxes, for each expenditure category. The project will disburse on the basis of half yearly IUFRs providing expenditure for the last two quarters and forecast for the next three quarters. The table below shows grant financing under the various expenditure categories.

Table 5. Allocation of Grant Proceeds

Description	Project Cost (In US$)	Financing (In % including taxes)
(a) Goods, works, non-consulting services, consulting services, training, and incremental operating costs under the Project (other than Parts 2.3 and 3.1(b) of the Project)	7,250,000	100%
(b) Goods under Parts 2.3 and 3.1(b) of the Project	750,000	100% (excluding any beneficiary cash contribution)
Total	8,000,000	

Environmental and Social Safeguards

Social Safeguards

34. The social issues relating to the project include acquisition of land for small rural irrigation infrastructure, ensuring broad-based support for the sub-project activities through consultations, enhancing citizen engagement in project activities, and making agriculture focused rural livelihoods inclusive for vulnerable groups, including women. The project is expected to directly benefit approximately 10,400 household beneficiaries in 24 gewogs in 5 dzongkhags through integrated interventions in agriculture sector that include: strengthening of farmers groups, crop diversification, support with irrigation, climate smart technologies and farming practices, improved agricultural inputs and mechanization, and adoption of a value chain approach for high value crops to enable farmers to better access markets. Additionally, through improved homegrown school feeding programs, the project will target 3,000 school children in 16 schools located in 11 gewogs in 4 dzongkhags.

35. Overall, the negative impacts associated with the project are expected to be minimal. No involuntary resettlement is envisaged under the project. Land acquisition, if any, will be small-scale and to the extent possible, land will be acquired through voluntary land donation or will make use of public lands or those already under the ownership of project beneficiaries. Likewise, the project interventions are expected to be pro-poor and have a substantial focus on the capacity building of farmers and producer groups through technical skills development, group formation and operations, business development trainings, and market orientation. Specific interventions to support women and other vulnerable groups involve: ensuring their participation in stakeholder consultations, planning, and implementation; targeting women and other vulnerable groups during the establishment and mobilization of all types of farmer groups; support for mechanization at the

farm level to reduce the burden of labor on women; awareness raising for dietary diversity and nutrition, carried out through a network of community resource persons, particularly women of reproductive age who require additional nutrition awareness for their own health and to care for their children; and training and capacity building activities on gender for CRPs and other project personnel at the central, Dzongkhag, and Gewog levels. To ensure that that the overall project benefits accrue to women, the project will also track and report on gender-disaggregated information for all key indicators, and will also ensure that approximately 30 percent of the project beneficiaries are women.

36. While the benefits of the project, including those affecting vulnerable groups such as the poor and women, are considerable. However, there is a risk of them not being adequately consulted, informed about the project, or excluded from project benefits. Hence, to maximize project benefits and mitigate any negative impacts, an ESMF has been developed under the project that draws on lessons learned from environmental and social compliance and management in the RRCDP. The ESMF is also consistent with World Bank's OP/BP 4.12 on Involuntary Resettlement, and RGoB's policy and legislative framework. To provide guidance in project planning and implementation to deal with the issue of land taking and possible impacts on structures and livelihood sources, a 'Land Acquisition and Rehabilitation Framework' satisfactory to the World Bank setting forth the guidelines, principles, and procedures for mitigating any adverse impact that may arise from resettlement under the project, has been prepared and is incorporated in the section of the ESMF entitled "Land Acquisition". The ESMF also includes: (a) sub-project screening guidelines, (b) guidelines for preparing management plans, especially Environmental and Social Code of Practices, Gender Development Plan, Vulnerable Community Development Plan, and Resettlement Action Plan (if applicable) for all proposed interventions; (c) monitoring and evaluation indicators and criteria for social assessment and performance, and (d) public consultation guidelines.

Environmental Safeguards

37. *Applicable Environmental Category and Safeguard Polices.* Considering the nature and magnitude of potential environmental impacts from relatively limited scale irrigation and market access interventions, the FSAPP is classified as category 'B' project. The key environmental issues that will need to be addressed by the project are: (a) land slide/soil erosion; (b) over-extraction or misuse of irrigation water; (c) soil degradation; (d) pesticide-related health and safety issues; (e) water pollution; and (f) workers and community health, safety and sanitation. The environmental safeguard policies triggered are Environmental Assessment (OP 4.01), Forest (OP 4.36), Pesticide management, OP 4.09, and International Waterways (OP 7.50). These policies have been triggered to ensure that the project design and implementation will be focused on reducing adverse impacts and enhancing positive impacts.

38. OP 4.36 on forests is triggered although the project will not include any activities inside the forest or protected forests, and no forestry activities are envisaged in the project. However, some activities such as irrigation schemes and market infrastructure development may involve

some clearing of vegetation. Hence, the policy is triggered. The ESMF has incorporated negative list of activities that prevent conversion or destruction of natural forests in the country.

39. Although the FSAPP will not finance procurement and distribution of pesticides, in anticipation of higher yields, farmers could expand the use of chemical fertilizers, and pesticides more than what is recommended. Therefore, OP 4.09 (Pest Management) is triggered as a precaution. The proposed FSAPP is expected to promote sustainable production practices as a part of project design and will discourage agrochemicals and promote bio-fertilizers. The National Plant Protection Center controls the procurement, distribution, and use of pesticides. As a result, control over pesticide use has remained very effective. However, the ESMF will provide guidelines on safe use of agrochemicals and promotion of green agriculture technologies such as: (a) Integrated Pest Management (IPM); (b) balanced fertilizer use to reduce the dependence on fertilizers; and (c) composting.

40. OP 7.50 (International Waterways) is triggered because raw water for irrigation from the existing streams will be withdrawn, stored, and distributed to the agricultural field, and the project includes development of new micro-irrigation schemes. The DoA in the MoAF has determined that 1,450 liters per second of water, less than 0.3percent of the total flow during the monsoon season and 500 liters per second of water during the dry season will be extracted from four streams, the Ratey Khola, the Laring Khola, the Taray Khola, and the Bir Khola, all of which are tributaries of the Brahmaputra River. The RGoB has provided notification letters to the Governments of India and Bangladesh, as riparians to the Brahmaputra River, on March 23, 2016 through their respective diplomatic embassies in Thimphu. Comments were received from India on July 25, 2016, requesting information on the latitude and longitude of diversion sites and the daily discharge series. The RGoB provided a response on August 4, 2016. On November 18, 2016, the Bank received a response from Bangladesh, indicating no objection to the implementation of the Project.

41. *Approach to Address Environmental and Social Safeguard Issues.* The proposed project will be implemented over a period of five years. DoA intends to ensure that the proposed interventions take environmental concerns into account. Details of the sub-projects to be implemented under the FSAPP will be finalized during the project implementation phase and therefore, the exact locations, size, and extent of the sub-projects remain unknown at the project appraisal stage. As such, an ESMF was prepared by the borrower describing the typical environmental impacts from different types of sub-projects and provided guidelines to reduce or mitigate the negative impacts and enhance positive impacts.

42. The ESMF provides guidelines to comply with national legislation and World Bank safeguards policies, and defines the environmental requirements needed for processing the financing of each sub-project. In the implementation stage, the project team will systematically undertake the following procedure to ensure overall environmental management of proposed sub-projects: (a) review of interventions and negative list of activities, (b) EA categorization for exemptions or detailed assessments, (c) environmental screening and preparation of EMP, (d) implementation of EMP, and (e) compliance monitoring. The sub-project activities have been

grouped into three categories according to their magnitude of impacts and requirement of EA: (a) activities excluded from EA requirement, (b) activities needed to prepare ECoPs through an ESS, and (c) activities needed to prepare ESMP through an IESE. The ESMF presented in this report provides detail guidelines for carrying out ESS/IESE (including preparation of ESMP). The environmental assessment will be carried out following the ESMF presented in this report.

43. The Project will not fund any physical activity without prior environmental and social screening, analysis, and submission of an acceptable environmental and social management plan. All Environmental and Social Screenings (ESs) or Environmental and Social Management Plans (ESMPs) will be reviewed and cleared by the Environmental Specialist and Social Specialist at the PMU prior to fund disbursements. No activity will be funded on an ad hoc basis. The Project Environmental Specialist and Social Specialist are responsible for the design and preparation of sub-projects environmental and social monitoring plan at the PMU. The DoA will also be responsible for getting necessary environmental clearance from the Competent Authority.

44. *Borrower's capacity on environmental and social safeguards.* The DoA has limited institutional capacity for environmental safeguards and management of FSAPP. Thus, the DoA will hire an Environmental Specialist and a Social Specialist to ensure the environmental and social sustainability of project interventions by integrating social and environmental issues and concerns into the overall project implementation process.

45. *Consultation and Disclosure.* The ESMF was prepared in consultation with the key stakeholders including MoAF officials, local farmers, and communities. The ESMF along with translation of the Executive Summary was disclosed by the DoA on their website on April 14, 2016 and hardcopies were made available at Dzongkhag offices. The ESMF was disclosed in the Bank's Infoshop on November 2, 2016.

Monitoring and Evaluation

46. The GAFSP Framework Document stipulates that the selected Supervising Entities (SEs) will prepare and supervise projects using their own policies, guidelines, and procedures. Therefore, the project will follow the World Bank guidelines on project M&E during all phases of the project cycle.

47. The M&E implementation plan for the project includes: (a) organizational arrangements, (b) monitoring of progress in the implementation of activities, (c) M&E staffing and cost estimates, and (d) M&E of outcome/results. The M&E function is envisioned as part of the overall institutional development and capacity building of the project implementation units at PMU, PST, dzongkhag and gewog levels. The FSAPP PMU will have the overall responsibility for M&E operations and dissemination of results for the project and will receive required support from the Bank. The PMU will be supported by the PST at the RDC level. Both structures will have designated persons for M&E. Formal M&E mechanisms and structures will be established at all levels of project implementation, including the dzongkhags and gewogs. The PMU will be

responsible for monitoring implementation progress (physical and financial), and verifying and consolidating data. It will also be responsible for monitoring overall project implementation progress, outcome/results, and evaluations as well as commissioning and supervising baseline, satisfaction, impact evaluation, and other surveys. Monitoring activities and providing regular feedback is an important part of the transformational agenda and key to the success of the project. The PMU will report on a biannual basis.

48. Key features of project M&E include baseline data, bi annual progress reports, regular reporting of progress to the Steering Committee (SC), an independent evaluation of implementation at project completion, and Impact Evaluation (IE) upon completion as well as any other assessments, surveys, and evaluations required to better analyze the impact of the project. The results framework is attached in Annex 1. It includes five GAFSP Core indicators.

49. The PMU will have the overall responsibility of collecting and housing all project data and reporting to the Bank. The PSTs will gather project data through the dzongkhag staff and gewog staff, and the PMU will obtain this data from the PST and manage them at a central level. Monitoring activities and providing regular feedback are important parts of the transformational agenda and key to the success of the project. The Bank team will closely support the PMU over the course of the project to ensure adequate data collection and management.

50. *Baseline, mid-term, and program evaluation*. An independent firm will be hired to conduct the surveys required for project evaluation, including establishing a baseline at project start-up and designing the end-of-project evaluation. At mid-term, an independent firm will carry out a technical audit and a beneficiary assessment. A household food and nutrition survey will be carried out in year five of the project, and a rapid (non-experimental) impact evaluation will be conducted to measure the project impact on various aspects of household income, food security, and nutrition.

Annex 7: Economic and Financial Analysis

1. **Project benefits**. The menu of interventions to be selected by farmer and producer groups/cooperatives are anticipated to result in a wide range of tangible and intangible benefits. Key quantifiable benefits include: (a) increases in overall agricultural productivity as a result of the dissemination and adoption improved production technologies; (b) higher cropping intensities for paddy, maize and pulses in areas where irrigation schemes are constructed/rehabilitated; (c) improved labor efficiency and reduced production costs due to mechanization of labor-intensive farm activities; (d) reduced production losses caused by human-wildlife conflict through installation of electric fencing; (e) prevention of post-harvest losses with the establishment of farm-level and large storage facilities; (f) increased incomes from the commercialization traditional cash crops for export markets (ginger, cardamom and citrus) through training in IPM, provision of good quality planting materials and group strengthening for collective marketing; (g) increase in market prospects for vegetable farmers through off-season production and linkages with institutional buyers; (h) nutritional benefits derived from increased availability of fresh produce in the local markets and better preservation of their nutrient contents thought adequate storage and value addition; (i) creation of employment opportunities, in particular around the farm machinery supporting services. Furthermore, benefits for the country as a whole include *increased self-sufficiency of staples and vegetables* that would in turn translate into a more positive trade balance and a reduction of foreign exchange costs on account of a decrease in volume of imported foods from India and other countries and an increase in export quantities of high-value crops.

2. **Beneficiaries.** The project will be implemented in 24 selected gewogs of the 5 target Dzongkaghs (Dagana, Haa, Samste, Chukka and Sarpang) and will attempt to cover their entire rural population (roughly 10,400 households). Farmers and rural households may benefit directly from one or more project activities, and/or indirectly through increased demand for agricultural labour, value chain forward-backward linkages and nutrition-related outcomes. The demand-driven nature of the project makes it difficult to anticipate how many farmers will benefit from each activity and which crops or enterprise activities will be selected.

3. After being formed and strengthened (Component 1), farmer groups will be able to choose up to three different technical trainings per year, including commodity-based trainings from a pre-defined menu comprising cereals, pulses and high value crops (fruits, spices and vegetables) and/or other innovative and climate-smart production technologies (Component 2). In order to ensure a blanket approach, the project has made budget provisions to train about 12 groups of 35 members in each gewog every year over the life of the project. Furthermore, four Water Users Associations will be formed with the 563 households in the command areas of the newly constructed Pressurized Irrigation Schemes and trained in efficient water management. In addition to technical trainings, other farm services and equipment will be made available on demand, such as a farm machinery, micro-irrigation and protective structures (greenhouses and electric fencing). The 30 most successful farmer groups will qualify for additional training in group governance, business management, post-harvest handling and food processing, and receive post-harvest and processing infrastructure and equipment on a cost-sharing basis (Component 3). Pre-existing producer groups may also be invited to participate. Lastly, the project aims to target 3,000 school children in 16 schools located in the project area by linking producer organizations with school meal programs for improved nutrition (Component 3). MoAF staff based in Thimphu and RDCS would also

benefit from intensive training and continuous technical assistance provided by FAO and independent experts.

4. **Key assumptions**. This economic and financial analysis includes all potential benefits related to increases in agricultural output that as well as reductions in production and post-harvest losses. It also includes benefits from collective marketing and value addition, including sorting, grading and processing. The analysis in based on crop models for the key commodities to be supported by the project, namely cereal crops, vegetables, fruit crops and spices, and on representative infrastructure and enterprise models, such as pressurized irrigation schemes and storage and processing facilities. Incremental benefits have been estimated as the difference between a 'without project (WoP)' and a 'with project (WP)' scenario. Financial prices have been converted to economic by applying a standard conversion factor to labor and domestically traded goods and materials. Import parity prices have been calculated for chemical inputs and export parity prices for exported commodities. All models are expressed in 2015 constant prices. The analysis builds on primary data collected by the design team during the first and second design missions in June and September 2015, information provided by MoAF, secondary sources, and a comprehensive review of relevant publications and case studies. Conservative assumptions and parameters have been applied, to avoid over-estimation of benefits and provide realistic results.

5. **Crop production models.** Several 1 acre production models have been prepared to assess the effect of project-supported activities in farm productivity, gross margins and returns to labor for the main four commodity groups prioritized by FSAPP, i.e. cereal crops (rice and maize), vegetables (winter crop promotion and spring crop intensification), spices (cardamom and ginger) and fruit crops (apples and mandarin). A summary description of each model, alignment to project objectives and main benefit is presented in Table 1 below. Detailed financial results can be consulted in tables 2 to 6.

Table 1: Summary description of 16 illustrative production models

Model	Objective/Outputs	Proposed Activities	Potential Benefits
Cereal crops: 1. Summer paddy intensification 2. Winter maize production 3.Summer maize intensification	Increase productivity of rice and maize. Double cropping: winter maize and summer paddy. Reduction of post-harvest losses (maize). Increase rice and maize self-sufficiency and reduce imports. Increase farmers 'incomes.	Construction of pressurized irrigation schemes. Provision of improved seed varieties. Mechanization of land preparation and post-harvest activities (power tiller and threshing machines). Training in IPM and new technologies. Provision of low-cost farm-level maize storage structures.	Yield increases between 70-100 percent and additional 800 kg per acre for summer rice and maize. Maize post-harvest losses reduced from 20 percent to 5-10 percent. Reduced land tilling and rice threshing costs. Increase in farmers' incomes (about additional US$ 300 per crop per acre) and self-sufficiency on cereals.
Vegetables - Winter crop production: 1.Broccoli 2.Cauliflower 3.Cabbage 4.Chilli	Increase availability of local vegetables during the winter months and reduce dependence on imports from India. Enhance food security and nutrition. Increase farmers 'incomes by selling of surpluses. Increase supply of vegetables to School Feeding Programs.	Provision of protective structures (polytunnels for nursery production and low-cost greenhouses). Provision of hybrid seed varieties, more resistant to winter climatic conditions. Provision of micro-irrigation on a cost-sharing basis (sprinkler and drip). Demonstrations in Dzongkhaghs and Gewogs centers. Training in soil fertility management, IPM and new technologies.	Additional domestic produce between 1.6 and 2.8 tons per acre (increased availability for home consumption and School Feeding Programs). Premium price for off-season local produce and additional gross incomes ranging between US$ 720-927 per acre.
Vegetables - Spring crop intensification: 1.Tomato 2.Onion	Increase productivity of spring vegetable crops. Improve post-harvest handling practices to reduce losses (crates).	Provision of higher yielding hybrid seed varieties. Provision of micro-irrigation on a cost-sharing basis (sprinkler and drip).	Yield increases between 80-100 percent and additional kg per acre ranging between 0.6-1.2 tons.

Model	Objective/Outputs	Proposed Activities	Potential Benefits
3.Bitter gourd	Increase availability of local vegetables for domestic consumption and export.	Demonstrations in Dzongkhags and Gewogs centers. Training in soil fertility management, IPM and new technologies. Strengthening and creation of farmers groups.	Post-harvest losses reduced from 20 percent to 5-10 percent (tomato). Labor costs relative to output value reduced by more than 20 percent.
Root crops and spices: 1.Potato 2.Large Cardamom (re-planting) 3. Ginger	Promote the use of disease-free and high-yielding certified varieties. Improve farmers' market access and bargaining power through collective marketing and use of market information systems. Improve storage and value addition (sorting and grading).	Support to NSC Bhur and to private cardamom nurseries. Provision of farm-level low-cost storage on a cost-sharing basis (potato and ginger). Provision of improved drying and curing facilities for cardamom (improved "bhatti"). Support FCBL/DAMC in improving MIS systems (auction yards). Training in orchard management and improved practices, including organic production (ginger). Training in post-harvest handling and value addition, including processing, sorting and grading. (see ginger processing facility model).	Yield increases between 30-42percent (potato and ginger). Post-harvest losses reduced from 25percentpercent to 5-10 percent (potato and ginger). Premium price for graded ginger and potato produce and supply of larger quantities Premium price for better quality of cardamom capsules (color and moisture content). Returns to labor nearly doubled for all three commodities.
Fruit production: 1.Apple intensification 2.Mandarin intensification (plantation rehabilitation) 3.Mandarin production expansion (new plantation)	Revitalize apple and mandarin orchards, suffering from micro-nutrient deficiencies, pest and diseases. Improve post-harvest storage (apples) to increase off-season availability and reduce imports from India. Increase production for export markets (citrus).	Promote orchard re-planting and rehabilitation with improved and/or grafted good quality planting materials. Provision of micro-irrigation on a cost-sharing basis. Training in orchard management, including HLB management for citrus. Strengthening and creation of farmers groups. Training in post-harvest handling and value addition, including processing, sorting and grading. (see zero energy cooling chamber model).	Increase in number of bearing trees and productivity per tree. Incremental fruit production between 2.2-2.5 tons per acre. Premium price (+10 percent). for graded produce and collective marketing (apples and mandarin) and off-season sales (apples). Gross margins per increased up to 200 percent.

6. Overall productivity of paddy and maize is expected to increase on account of the construction of new irrigation schemes. In addition to increased productivity and cropping intensities, farmers would benefit from the introduction of improved seed varieties (hybrid for maize and shorter-term varieties for paddy) and from higher labor efficiency, bringing about incremental incomes of about US$ 300 per acre and nearly doubling returns to labor/day, rendering paddy and maize production a viable and more attractive economic activity (see table 3).

7. It is anticipated that the provision of low-cost greenhouses and a ready access to productive inputs from the project-supported Farm Shops would encourage the production of off-season vegetables, resulting not only in new income opportunities for smallholders but also increasing the availability of nutritious foods in the local markets and reducing the Bhutan's dependence on imports from India during the winter months. Average gross margins per acre are estimated at Nu. 54,750 or about US$ 840. This activity is intended for subsistence and small-scale commercial farmers that typically cultivate less than one acre, and is linked to the school meal programs supported by FSAPP in selected gewogs. Similarly, the intensification and expansion of areas under spring vegetables will be strongly encouraged for its potential as an income generating activity and importance in improving local diets. Gross margins and returns to labor vary across different crops but remain very satisfactory despite a relative increase of production costs over output values (see table 3-4).

8. Efforts to deal with pests and diseases through provision of good quality planting materials and training in IPM practices are expected to revitalize the production and commercialization of traditional cash crops for export markets, mainly cardamom and citrus, providing a secure source

of livelihoods for smallholders across the target area. These are by far the most profitable commodities supported by FSAPP, with gross margins per acre potentially between US$ 2,600 and 2,850 annually, followed closely by apple production (see tables 5-6).

9. Ginger and potato production would benefit from similar project interventions, such as provision of disease-free certified rhizomes and seeds, low-cost storage to prevent post-harvest losses and promotion of sorting and grading to tap on premium market prices. Incremental margins after valuing family labor average Nu. 33,500 or US$516 per acre (table 5).

Table 2. Financial results, one acre production models for cereal crops (Nu.)

Cereal crops	Unit	Summer rice intensification			Summer maize intensification			Winter maize production	
		WoP	**Wp**	**Increment**	**WoP**	**Wp**	**Increment**	**WoP**	**WP = Increment**
Yield	kg	1,033	1,780	747	840	1,679	840	-	1,450
Gross margin (including hired labor)	Nu.	27,250	46,433	19,183	13,396	32,956	19,560	-	27,473
Net margin (including family labor)	Nu.	11,162	34,547	23,386	329	19,236	18,906	-	12,936
Input and service costs/output value	percent	14 %	15 %	1 %	14 %	17 %	0	-	16 %
Labor cots/output value	percent	54 %	28 %	-26 %	84 %	37 %	0	-	47 %
Returns to labor	Nu./day	468	895	427	298	701	403	-	528
Returns to family labor	Nu./day	553	1,276	723	335	785	450	-	617
NPV@10percent	Nu.	16,255			12,613			12,936	
FIRR	percent	124 %			81 %			115 %	

Source: Author's calculations

Table 3. Financial results, one acre production models for winter vegetables (Nu.)

		WoP	**WP = Increment**	**WoP**	**WP = Increment**	**WoP**	**WP = Increment**	**WoP**	**WP = Increment**
Yield	kg	-	2,089	-	1,663	-	2,865	-	2,170
Gross margin (including hired labor)	Nu.	-	56,144	-	60,279	-	46,834	-	55,741
Net margin (including family labor)	Nu.	-	34,718	-	37,471	-	25,231	-	25,279
Input and service costs/output value	percent	-	24 %	-	19 %	-	27 %	-	16 %
Labor cots/output value	percent	-	32 %	-	34 %	-	36 %	-	49 %
Returns to labor	Nu./day	-	724	-	736	-	612	-	516
Returns to family labor	Nu./day	-	856	-	863	-	708	-	598
NPV@10percent	Nu.		18,444		24,669		11,428		14,437
FIRR	percent		68 %		97 %		54 %		77 %

Source: Author's calculations

Table 4. Financial results, one acre production models for spring vegetables (Nu.)

Vegetables - Spring crop intensification	Unit	Tomato			Onion			Bitter gourd		
		WoP	Wp	Increment	WoP	Wp	Increment	WoP	Wp	Increment
Yield	kg	1,129	2,258	1,129	710	1,290	581	746	1,491	746
Gross margin (including hired labor)	Nu.	19,698	40,339	20,642	12,972	25,718	12,746	5,049	13,425	8,376
Net margin (including family labor)	Nu.	4,351	20,471	16,120	242	8,078	7,836	-3,265	2,138	5,403
Input and service costs/output value	percent	17 %	31 %	14 %	27 %	27 %	0 %	51 %	44 %	-7 %
Labor cots/output value	percent	67 %	37 %	-30 %	72 %	51 %	-21 %	76 %	48 %	-29 %
Returns to labor	Nu./day	346	535	190	309	451	142	180	361	181
Returns to family labor	Nu./day	419	663	244	333	476	143	198	389	190
NPV@10percent	Nu.	8,427			2,180			2,770		
FIRR	percent	62 %			35 %			76 %		

Source: Author's calculations

Table 5. Financial results, one acre production models for roots and spices (Nu.)

Root crops and spices	Unit	Potato			Cardamom			Ginger		
		WoP	Wp	Increment	WoP	Wp	Incremental	WoP	Wp	Increment
Yield	kg	3,322	4,745	1,424	60	165	105	1,700	2,200	500
Gross margin (including hired labor)	Nu.	25,499	48,674	23,175	66,179	198,007	131,828	29,382	68,572	39,190
Net margin (including family labor)	Nu.	10,041	40,933	30,892	57,686	185,022	127,337	14,355	50,605	36,250
Input and service costs/output value	percent	46 %	35 %	-10 %	8 %	6 %	-2 %	48 %	30 %	-18 %
Labor cots/output value	percent	37 %	25 %	-12 %	12 %	6 %	-6 %	27 %	29 %	2 %
Returns to labor	Nu./ day	397	625	229	2,545	4,981	2,436	639	1,247	608
Returns to family labor	Nu./ day	539	867	329	2,545	4,981	2,436	639	1,247	608
NPV@10percent	Nu.	11,843			271,994			16,450		
FIRR	percent	42 %			36 %			45 %		

Source: Author's calculations

Table 6. Financial results, one acre production models for fruits (Nu.)

Fruit crops	Unit	Apple			Mandarin (rehabilitation)			Mandarin (new plantation)	
		WoP	Wp	Increment	WoP	Wp	Increment	WoP	WP = Increment
Bearing trees	percent	70 %	95 %	25 %	70 %	100 %	30 %		100 %
Productivity per tree	kg	15	35	20	25	40	15		40
Yield	kg	1,155	3,658	2,503	2,188	4,400	2,213	-	4,400
Gross margin (including hired labor)	Nu.	36,345	106,688	70,343	60,423	178,855	118,432	-	178,855
Net margin (including family labor)	Nu.	29,305	88,958	59,654	53,084	169,545	116,462	-	169,545
Input and service costs/output value	percent	1 %	2 %	1 %	1 %	1 %	0 %	-	1 %
Labor cots/output value	percent	19 %	19 %	-1 %	13%	6 %	-6 %	-	6 %
Returns to labor	Nu./day	1,687	1,682	-4	2,575	5,260	2,686	-	5,260
Returns to family labor	Nu./day	1,687	1,966	279	2,689	6,276	3,586	-	6,276
NPV@10percent	Nu.		164,791			271,874			345,110
FIRR	percent		90 %			48 %			63 %

Source: Author's calculations

10. **Enterprise models.** Post-harvest value addition, storage and packaging infrastructure would be supported under subcomponent 3a. Postharvest and Market Infrastructure Support with the aim of minimizing post-harvest losses, prolonging shelf-life and ensuring higher market value in select commodities. All infrastructure investments will be undertaken on a cost-sharing basis with the beneficiary PO/cooperatives (in cash or kind) in order to build ownership and accountability. Two such potential investments for value addition have been analyzed: (i) processing facilities for ginger, and (ii) a zero-energy cooling chamber. The first model estimates the potential returns to investing in a processing facility for the production of ginger candy, pickles and squash. The second model illustrates the benefits of constructing a zero-energy cooling chamber where farmers would store potatoes (summer) and apples (winter) and thereby avoid market gluts in the high season, fetching better prices and granting longer periods of accessibility throughout the year.

11. The zero-energy cooling chamber yields the highest annual benefits, over Nu 561,000 or US$13,800) and can be run with minimum operating costs. However, the technology currently available is quite expensive (about Nu 2.5 million/US$ 38,000 for a 30-ton capacity chamber) and therefore requires a rather high initial investment. FIRR is estimated at 28 percent, well above the opportunity costs of capital assumed for this analysis (10percent). This investment would be justified considering the potential incremental profit for farmers, who may receive premiums between 70 percent-80 percent with a very low marginal cost. Nevertheless, further studies should be undertaken to assess households' financial capacity to withstand a three-month delay in cash inflows. The ginger processing facility, in turn, would require a considerably lower investment

and produce very satisfactory returns (1.34 annually for each nu. invested), showing a 30 percent FIRR.

Table 7. Financial results, community-managed enterprise models (Nu.)

Processing and storage models	Unit	Ginger processing facilities	Zero energy cooling chamber
Total investments	Nu.	264,645	2,250,000
Incremental benefits per year	Nu.	354,949	561,425
NPV of gross benefits @ 10percent	Nu.	3,034,113	4,992,571
Cost/benefit ratio		11.46	2.22
NPV@10percent	Nu.	251,582	1,220,079
FIRR	percent	30 %	28 %
Return per Nu. of investment	Nu.	1.34	0.25

Source: Author's calculations

12. **Infrastructure models.** A large share of project funds will be invested in four large pressurized irrigation schemes in Sarpang and Samste. Total costs of civil works amount to US$ 2.2 million or about 26percent of the total GAFSP funds, exclusive of capacity building for WUAs and technical assistance for MoAF. The proposed schemes would benefit 563 households providing irrigation to 1,346 acres, mainly under paddy, maize and vegetable crops. Average costs per household are high (over US$4,100/household) which is to be expected in a very sparsely populated country like Bhutan. Considering that lack of irrigation is the main constraint to the development of the agricultural sector, and that every other project intervention would be pointless without adequate access to the most important resource for agricultural production, these high costs per beneficiary would be acceptable. Results of the two irrigation infrastructure models prepared for this analysis[1] are presented below.

13. Assumptions and parameters in terms of area coverage and number of beneficiary households coincide with actual proposals for Sarpang and Samste. In "Irrigation scheme 1", benefits are derived from one additional crop (winter maize) and increased productivity (summer paddy).In "Irrigation scheme 2", double cropping of maize (summer and winter) is assumed. Increases in crop productivity have been adjusted to remove effects from other project interventions. The two schemes differ in size and number of beneficiaries, but yield very similar results in terms of cost/benefits ratios and returns per Nu. of investment, confirming the robustness of the analysis. IRRs are comfortably high, 36 percent and 38 percent respectively, and in line with MoAF estimations for similar investments (see Shyam's report). Switching values demonstrate a relatively low sensitivity to unexpected increases in investment and maintenance costs.

[1] These models have been prepared for illustrative purposes only. A detailed technical feasibility study of the schemes must be conducted to have full account of the potential, viability, total cost and benefits accruing to the farmers from each scheme.

14. Human-wildlife conflicts prevail in most of the country, and crop damage by wild animals is considered by farmers a major constraint and disincentive to farming[1] . Economic benefits of installing electric fences to protect paddy land as well as land under maize and vegetables have been assessed. This rather low-cost intervention would benefit a selected number of households that will vary according to demand but is assumed to be around 50. Incremental benefits of Nu 1.7 million would accrue per year.

Table 8. Economic results, pressurized irrigation schemes and electric fencing (Nu.)

Infrastructure models	Unit	Irrigation Scheme 1	Irrigation Scheme 2	Electric Fencing
Area coverage	acre	648	338	337
Beneficiary households	number	270	187	52
Total investments	Nu.	81,972,000	38,870,000	3,077,360
Incremental benefits per year	Nu.	34,355,794	14,486,491	1,723,095
NPV of gross benefits @ 10percent	Nu.	252,587,293	119,524,722	10,090,482
Cost/benefit ratio		3.08	3.07	3.28
NPV@10percent	Nu.	146,899,601	64,397,500	4,952,712
IRR	percent	36 %	38 %	24 %
Return per Nu. of Investment	Nu.	0.42	0.37	0.56
Switching Values				
Incremental Revenues	percent	-58 %	-54 %	-49 %
Incremental Recurrent Costs	percent	471 %	396 %	212 %
Incremental Investments	percent	197 %	166 %	177 %
Incremental Outflows	percent	139 %	117 %	96 %

Source: Author's calculations

15. **Economic analysis.** The period of analysis is 20 years to account for the phasing and gestation of the proposed interventions. Economic benefits have been estimated by converting financial prices into economic following the parameters outlined above under 'key assumptions.' Economic benefits from the adoption of improved technologies have been aggregated by using an average return per acre/year of key crops, namely spices, vegetables and fruit trees, and factoring-in conservative adoption rates. Provision planting materials and inputs, farm implements, small storage and micro-irrigation are included in the models and deducted from the project costs to avoid double counting. For maize and rice, only the areas with new access to irrigation have been considered, in order to remain conservative in the estimation of benefits from these commodities. Benefits from irrigation and PO-managed facilities have been aggregated by applying an annual return per US$ of investment ratio to the total investment sum. Benefits are phased-in progressively for all types of interventions. Economic costs[2], calculated by the removal of price contingencies and taxes/duties, have then been deducted from the overall benefit stream. The economic analysis shows satisfactory results, with a Net Present Value at US$6.7 million and a 22

[2] RNR statistics 2014

[3] O&M costs for infrastructure have been counted in the calculation of the net incremental benefits of individual infrastructure models.

percent EIRR. Results were tested for sensitivity to variations in benefits and costs and for various lags in the realization of benefits. A delay of 2 years in the generation of benefits or a decrease of 30 percent relative to the base scenario would reduce the EIRR to 15-16 percent, still comfortably above the discount rate. Cost overruns would have a similar impact, with EIRR falling to 17 percent with a 30 percent increase. All scenarios show acceptable results.

Table 9. Aggregation of economic benefits, assumptions and parameters.

Improved Technologies and Management Practices	Annual incremental net benefit (Nu. average)	Annual incremental net benefit (US$ average)	Adoption Rates
Cardamom	167,185	2,388	0.6
Ginger	58,048	829	0.6
Citrus	150,717	2,153	0.5
Apple	85,117	1,216	0.5
Vegetables			
winter production	33,060	472	0.4
spring intensification	9,822	140	0.7
Average Improved Technologies*	**83,992**	**1,200**	**0.55**
Irrigation and Electric Fencing	Total Investment (US$)	Return per US$ of Investment	Annual returns per US$ of investment
Total Pressurized Irrigation Schemes	2,100,000	0.40	831,397
Total Electric Fencing	51,816	0.56	29,013
Processing/Storage facilities	Total Investment (US$)	Return per US$ of Investment	Annual returns per US$ of investment
Processing facilities	190,000	1.34	254,833
Storage facilities	220,000	0.25	54,895

Table 10. Economic analysis (US$)

FSAPP Incremental Benefits	2017	2018	2019	2020	2021	2022	2023	2024-36
Improved Technologies and Management Practices								
realization of benefits	*0 %*	*0 %*	*15 %*	*25 %*	*50 %*	*70 %*	*70 %*	*70 %*
Total Incremental Benefits from Improved Technologies and Management Practices	**0**	**0**	**299,533**	**499,222**	**998,443**	**1,397,820**	**1,397,820**	**1,397,820**
Pressurized Irrigation and Electric Fencing								
realization of benefits	*0 %*	*0 %*	*0 %*	*10 %*	*40 %*	*60 %*	*90 %*	*90 %*
Pressurized Irrigation Schemes	0	0	0	83,140	332,559	498,838	748,258	748,258
realization of benefits	*0 %*	*0 %*	*15 %*	*40 %*	*80 %*	*100 %*	*100 %*	*100 %*
Total Electric Fencing	0	0	4,352	11,605	23,211	29,013	29,013	29,013
Total Incremental Benefits from Pressurized Irrigation and Electric Fencing	**0**	**0**	**4,352**	**94,745**	**355,769**	**527,852**	**777,271**	**777,271**
Processing/Storage facilities								
realization of benefits	*0 %*	*0 %*	*0 %*	*15 %*	*40 %*	*60 %*	*90 %*	*90 %*
Processing facilities	0	0	0	38,225	101,933	152,900	229,350	229,350
Storage facilities	0	0	0	8,234	21,958	32,937	49,405	49,405
Total Incremental Benefits from Processing and Storage Facilities	**0**	**0**	**0**	**46,459**	**123,891**	**185,837**	**278,755**	**278,755**
Total FSAPP Incremental Benefits	**0**	**0**	**303,885**	**640,426**	**1,478,104**	**2,111,509**	**2,453,846**	**2,453,846**
Economic project Costs	**1,369,460**	**2,089,507**	**1,922,937**	**1,690,399**	**1,104,399**			
Incremental net Benefits	**-1,369,460**	**-2,089,507**	**-1,619,053**	**-1,049,973**	**373,705**	**2,111,509**	**2,453,846**	**2,453,846**
NPV @ 10percent	6,722,377							
IRR	22 *%*							

Source: Author's calculations

Table 11. FSAPP Incremental Benefits

	2017	2018	2019	2020	2021	2022	2023	2024-36
Improved Technologies and Management Practices								
realization of benefits	*0 %*	*0 %*	*15 %*	*25 %*	*50 %*	*70 %*	*70 %*	*70 %*
Total Incremental Benefits from Improved Technologies and Management Practices	**0**	**0**	**299,533**	**499,222**	**998,443**	**1,397,820**	**1,397,820**	**1,397,820**
Pressurized Irrigation and Electric Fencing								
realization of benefits	*0 %*	*0 %*	*0 %*	*10 %*	*40 %*	*60 %*	*90 %*	*90 %*
Pressurized Irrigation Schemes	0	0	0	83,140	332,559	498,838	748,258	748,258
realization of benefits	*0 %*	*0 %*	*15 %*	*40 %*	*80 %*	*100 %*	*100 %*	*100 %*
Total Electric Fencing	0	0	4,352	11,605	23,211	29,013	29,013	29,013
Total Incremental Benefits from Pressurized Irrigation and Electric Fencing	**0**	**0**	**4,352**	**94,745**	**355,769**	**527,852**	**777,271**	**777,271**
Processing/Storage facilities								
realization of benefits	*0 %*	*0 %*	*0 %*	*15 %*	*40 %*	*60 %*	*90 %*	*90 %*
Processing facilities	0	0	0	38,225	101,933	152,900	229,350	229,350
Storage facilities	0	0	0	8,234	21,958	32,937	49,405	49,405
Total Incremental Benefits from Processing ans Storage Facilities	**0**	**0**	**0**	**46,459**	**123,891**	**185,837**	**278,755**	**278,755**
Total FSAPP Incremental Benefits	**0**	**0**	**303,885**	**640,426**	**1,478,104**	**2,111,509**	**2,453,846**	**2,453,846**
Economic project Costs	**1,369,460**	**2,089,507**	**1,922,937**	**1,690,399**	**1,104,399**			
Incremental net Benefits	**-1,369,460**	**-2,089,507**	**-1,619,053**	**-1,049,973**	**373,705**	**2,111,509**	**2,453,846**	**2,453,846**
NPV @ 10percent	6,722,377							
IRR	22 %							

Table 12. Sensitivity analysis (US$)

Sensitivity Analysis	Base case	Costs Increase			Increase of Benefits		Decrease of Benefits			Delay of Benefits	
		+10 %	+20 %	+30 %	+10 %	+20 %	-10 %	-20 %	- 30 %	1 year	2 years
IRR	22.3 %	20.4 %	18.8 %	17.3 %	24.2 %	26.1 %	20.2 %	18.0 %	15.7 %	18.7 %	16.1 %
NPV (US$)	6,722,377	6,096,689	5,471,002	4,845,315	8,020,301	9,318,226	5,424,452	4,126,527	2,828,602	5,210,855	3,836,745

Note: Discount rate 10percent
Source: Author's calculations

Annex 8: Assessment of the Net Carbon Balance with EX-ACT

1. The project supports activities which enhance climate change adaptation, resilience and risk management. Following analysis aims at assessing the greenhouse gas (GHG) mitigation and carbon sequestration potential of the project and selected project activities.

Bhutan's climate change policy context

2. In September 2015, Bhutan submitted its Intended Nationally Determined Contributions (INDC) to the UNFCCC and committed to remain carbon neutral in 2009. According to the second national carbon inventory, Bhutan constitutes a net sink for GHGs due to its extensive forest cover (70percent of land, including extensive primary forest), low levels of industrial activities, and electricity generation through hydropower. The estimated sequestration capacity of Bhutan's forests is 6.3 million tons of CO_2. At the same time, emission from the year 2000 were estimated at 1.6 million tons of CO_2 equivalent (tCO_2e). The highest emissions are from the agriculture sector. It is expected that these emissions remain more or less constant, while mission from industrial processes and transport are expected to rise. Thus the main three priority activities identified are sustainable forest management and conservation; introducing alternative modes of transport (rai, water and gravity ropes), and zero waste concept and sustainable waste management practices). Climate smart livestock farming practices and climate smart agriculture for food and nutrition security are mentioned as well, though not among the top three priorities.[49]

3. Bhutan prepared its National Adaptation Program of Action (NAPA) in 2006 and is now implementing a few of the then identified priority actions. Major existing laws and policies which identify priority actions and plans for mitigation are identified in the National Environment Protection Act 2007, which promotes clean energy sources and alternative technologies to reduce pressure on forest and fuelwood, National Forest Policy 2011, Economic Development Policy (EDP) 2010 and draft 2015 which promotes accelerated hydropower development and energy expansion as economic driver for the country, the National Strategy and Action Plan for Low Carbon Development (2012), or the Bhutan Transport 2040: Integrated Strategic Vision.[50]

World Bank's corporate mandate

4. In its 2012 Environment Strategy, the World Bank has adopted a corporate mandate to conduct greenhouse gas (GHG) emissions accounting for investment lending. The quantification of GHG emission is an important step in managing and ultimately reducing emission, and is becoming a common practice for many international financial institutions. The World Bank has adopted the Ex-Ante Carbon-balance Tool (EX-ACT), developed by FAO in 2010,[51] to assess a project's net carbon-balance, i.e. the net balance of tonnes of CO_2 equivalent (tCO_2-eq) GHGs that were emitted or carbon sequestered as a result of project implementation compared to a "without project" scenario.

[49] National Environment Commission, Royal Government of Bhutan (2015): Kingdom of Bhutan. Intended Nationally Determined Contributions (INDC). 30, September 2015.

[50] National Environment Commission, Royal Government of Bhutan (2015); Davis, M, Li, L. (2013.): Understanding the Policy Contexts for Mainstreaming Climate Change in Bhutan and Nepal: A Synthesis. Regional Climate Change Adaptation Knowledge Platform for Asia, Partner Report Series No. 10. Stockholm Environment Institute, Bangkok

[51] http://www.fao.org/tc/exact/ex-act-home/en/

Data inputs to EX-ACT

5. The basic assumptions for the GHG accounting are the following: On average, Bhutan, has a cool temperate climate regime, and moist moisture regime. About 60 percent of the project area are located in the humid sub-tropical areas (except Haa with 1,933 cultivated land; and Chukha with 1,800 ha cultivated land), and we assume tropical, moist climate regime. The dominant soil type is High activity Clay. We use Tier 1 coefficients for the analysis and the dynamics of change are assumed to be linear. Project implementation period is 5 years and 15 years capitalization period. We assume that the current scenario is equal to the without project scenario.

6. The project targets 10,000 ha land. The activities that can be captured by EX-ACT are mainly found in component 1 and 2. Component 1 aims to increase agricultural productivity, by introducing climate smart agricultural practices for a variety of crops such as rice, vegetables, pulses, potatoes, as well as high value commodities such as cardamom, ginger or citrus for the local and export market. Farmers and extension agents will receive training. Component 2 aims at enhancing farmer productivity and production by providing key farm infrastructure, productive assets, training, and extension services, and new irrigation facilities will be developed Irrigation infrastructure will take place to allow pressurized flood irrigation on 545 ha of land that will also allow crop rotation for maize and vegetables and two seasons of paddy rice production. In addition, 100 hectare, will be equipped with high-efficiency irrigation systems will be introduced for horticulture and cash crops. The project will promote small farm machinery and equipment and other agricultural infrastructure will be funded on a demand driven basis. In Component 3, farm shops as pilot for commercially viable model enterprise will be funded.

7. These activities can be captured in EX-Act as follows (also compare Table 1): In EX-ACT following activities are captured:

- **Improved management of crops and vegetables (rain-fed):** The project targets 6,758 ha rain-fed cropland, which will be improved with climate smart agriculture practices and improved crop management, including improved nutrient management, improved agronomic practices, improved manure management.
- **Introduction of improved irrigation systems**: Overall, 545 ha will fall under pressurized irrigation and 100 hectares under high-efficient micro irrigation systems such as drip or sprinkler irrigation. On 345 hectares, Farmers are expected to produce irrigated maize and vegetable, horticulture production. They are assumed to produce two seasons per year and are expected to adopt improved nutrient, manure, agronomic water management practices. The remaining 200 hectares are expected to be under flooded rice.
- **Improved rice management (irrigated and rain-fed)**: Of the 545 ha under irrigation, 200 hectares are expected to fall under intermittently flooded rice cultivation. Farmers will receive training and are expected to reduce cultivation period from 150 to 120 days per season and cultivate two seasons per year. The remaining 1,722 hectares which are currently under rain-fed rice production will remain under rain-fed rice production though farmers will be able to apply improved crop management practices.
- **Improved perennial management**: Currently, 1,320 hectares are under perennials, in particular cardamom and citrus, which will come under improved management practices with the project. In addition, an expansion of area under perennials of 5 percent is envisaged, leading to additional 66 ha in year 5. As a high share of land is unused, fallow land, it is assumed that fallow land will be converted to perennials.

- **Production inputs**. While facilitate access to productive assets. It is expected that farmers will increase their use of synthetic fertilizer, in particular for irrigated crops. While no concrete values are known, an average of 120 kg/ha is assumed.

Table 1. Data inputs for EX-ACT for the current/without project scenario and with project scenario

Activities	Current Situation/ Without project situation	With project scenario
Improved crop production for rain fed production (climate smart agriculture) [(a)]	6,758 ha rain-fed cropland,	6,313 ha remains rain-fed under improved, CSA practices
Introduction of pressurized irrigation systems – annual crops and vegetables [(a)]		345 ha pressurized irrigation system (irrigated maize; crop rotation with maize or vegetables)
		100 ha under micro-irrigation (horticulture)
Introduction of pressurized irrigation systems – rice; Improved management practices for rain-fed and irrigated rice.	1,922 ha rain-fed rice	200 ha pressurized irrigation system (intermittently flooded rice, two seasons, 120 cultivation days/season)
		1,722 ha rain-fed rice cultivation, improved practices
Improved management of perennials (Cardamom) [(a)]	1,320 ha	1,320 ha
Expansion of area under perennials by 5 percent	66 ha fallow land	66 ha perennials.
Fertilizer consumption, Urea (assumption) [(b)]	0	Average ca. 120kg/ha; 54 t/irrigated area/year.
Farm shops	0	5 agricultural buildings; 100m^2 each
Total project area	**10,000 ha**	**10,066 ha**

Notes: (a) improved crop management for rain-fed vegetable, annual crops and cardamom production includes: improved agronomic practices, and improved manure management; for irrigated production it included in addition: improved water management and improved nutrient management. (b) As no detailed information on type of fertilizer is available, urea is assumed.

Results

8. The project shows to be a carbon sink of -411,585 tCO_2e over 20 years, thus -20,579 tCO_2e emission per year and -41 tCO_2e emission per hectare over 20 years or -2 tCO_2e emission per hectare in one year. The activities aiming to improve management of rain-fed and irrigated crops and vegetables and rain-fed rice on ca. 8,700 ha land leads to a carbon sink of -414,036 tCO_2e, ca. -47 tCO_2e per hectare; the conversion of 66 ha fallow land into perennials leads to -11,505 tCO_2e, which is about -191 tCO_2e per hectare. Irrigated rice production on 200 ha land, in two seasons instead of one, leads to a carbon source of 10,681 tCO_2e emission. Introducing irrigation infrastructure and synthetic fertilizer on irrigated land leads to a carbon source of 4,806 tCO2e emission.

Table 2. Results of gross fluxes in the without and with project scenario and net balance per activity in tCO_2e emission.

Components	20 years			Per year		
	Gross Fluxes			Gross fluxes		
	Without project	With project	Net Balance	Without project	With project	Net Balance
Land use change	0	-1,897	-1,897	0	-95	-95
Perennials growth and management	-18,480	-29,985	-11,505	-924	-1,499	-575
Improvement of crop management practices	0	-414,036	-414,036	0	-20,702	-20,702
Rice production	5,265	15,946	10,681	263	797	534
Inputs and investments		5,171	5,171		259	259
Total	**-13,215**	**-424,800**	**-411,585**	**-661**	**-21,240**	**-20,579**
Per hectare	-1	-42	-41			
Per hectare per year	-0.1	-2.1	-2.0	-0.1	-2.1	-2.0

9. A sensitivity analysis shows that even with an adoption rate of 50 percent, the project would still constitute a net carbon sink of -205,780 tCO_2e. However, the overall results could be underestimated as several aspects such as increased transport to markets, processing facilities, electricity consumption of micro-irrigation schemes and processing facilities are not considered, due to a lack of information and the demand driven nature of several project activities.

Annex 9: Implementation Support Plan

Strategy and Approach for Implementation Support

1. The strategy for Project Implementation Support (IS) by the Bank builds on the experience and learning from implementation support the Bank has provided to the Royal Government of Bhutan over the years - especially to the MoAF through the recently completed DRDP and the ongoing RCCDP project. The implementation support strategy for FSAPP reflects the nature of the project and its risk profile in the context of ongoing government led reforms in MoAF and the emerging role of 3 RDCs in project implementation. The strategy and approach is flexible, reflective, and adaptive and will continue to evolve and be refined further in line with the opportunities, challenges and emerging needs of the project and the capacity of the MoAF project implementation team. Besides regular improvements through Implementation Support Missions (ISMs), and the Implementation Status and Results Report (ISR), a Mid-term Review (MTR) at the project's mid-point will review project progress and revise the strategy and approach of implementation support if required.

2. **Overall Implementation Support** will focus on: (a) strategic thinking, technical expertise, and leadership to support the Client's vision, motivation, and ability to understand and implement the project; b) overall operational planning and coordination across all implementation entities, stakeholders and development partners; (c) management systems, reporting lines and technical capacity aligned with project objectives; (d) regular monitoring and reporting of project implementation, including results framework, social accountability, and independent verification; and (e) periodic analysis, review, studies and assessments of project processes, outcomes and impacts.

3. **Fiduciary compliance**. Bank will provide: (a) guidance and inputs to set up effective and efficient fiduciary systems and procedures; (b) institutional strengthening and staff capacity building support as necessary; (b) review and streamline the project's financial management system including but not limited to, accounting, reporting and internal controls in line with the approved Operational Manual; (c) provide guidance on the Bank's New Procurement Framework to project staff; (b) review procurement documents and provide timely feedback and clearances; and (c) help monitor procurement progress against the Procurement Plan.

4. **Environmental and Social Safeguards**. The Bank will accord a high priority to social inclusion including gender, youth and marginalized groups, and the environmental sustainability of project interventions and impact. The Bank will guide, support and train project staff at PMU, PST, dzongkhags and gewogs for effective ESMF implementation and compliance. The Bank will facilitate and encourage project staff to sensitize project communities, and train community resource persons for social inclusion and environmentally friendly interventions at the community level. In the first 12 months of implementation, capacity development support will be provided by environmental and social specialists.

5. **Knowledge Management and Outreach.** The Bank will encourage and support the development and implementation of a knowledge management and outreach strategy to bring in best practices and learning to project areas and to analyze, collate and disseminate project experiences and lessons learnt to wider audiences in Bhutan and abroad. The strategy will also

seek to support implementation of consultative and accountability processes, including information on a grievance redress mechanism.

Implementation Support Plan

6. In order to effectively provide implementation support to the DoA, PMU, PSTs and district/gewog project staff, the Bank team will draw on the resources in the GFADR, other global practices and FAO-TA. International and national consultants will be hired to provide guidance and technical expertise for successful project implementation.

7. The operations manual will be finalized prior to effectiveness while the project procurement development strategy and procurement plan have been finalized. PMU at the central level and three PSTs will be made functional prior to effectiveness. The Bank's implementation support will start immediately after effectiveness and the project will be launched in all 5 dzongkhags. While frequency of formal implementation support missions is expected to be 2 per year, more frequent technical supervision is expected, especially in the first two years. Fiduciary, M&E, and safeguards will be key components of the initial workshops and task team members would mentor and provide guidance to project staff throughout the implementation period.

8. The implementation plan will be revised regularly on the basis of project progress and continuous risk assessment. A mid-term review will ascertain project performance and implementation status to determine the need for any restructuring and changes in the project design and/or implementation arrangements.

9. During ISMs, the task team will thoroughly review overall implementation progress, review the efficacy of institutional arrangements, implementation plans and staff capacity for effective project implementation. For this, the team will (i) undertake a detailed review of each project component; (ii) engage in detailed dialogue at the PMU, PST, dzongkhag, gewog, cluster, producer group and farmer group levels to get insight into strategic and implementation issues, identify key issues and make recommendations to the project management for strengthening and streamlining implementation arrangements and to achieve outputs and outcomes; (iii) conduct a review of fiduciary aspects including disbursements and procurement and; (iv) verify compliance of project activities with the Bank's environmental and social safeguard policies.

Table 1. What would be the main focus in terms of support to implementation during the project period

Time	Focus	Skills Needed	Resource Estimate	Partner Role
First twelve months	Establishment of implementation capacity	Procurement and FM	6 SWs	
	Planning and farmer group formation process	Rural Development Spec.	5 SWs	
	Planning and execution of irrigation schemes	Irrigation Engineer	4 SWs	FAO TA
	Nutrition change Behavior strategy	Nutrition Communication Expert	4 SWs	FAO TA
	Operationalization of M&E and reporting system	M&E Expert	4 SWs	
	ESM implementation and compliance	Environmental and social safeguards experts	6 SWs	

	Project Management and Communication	Task Team Leader Co-TTL Operations Analyst/Officer	8 SWs 8 SWs 8 SWs	
12-48 months	Procurement Implementation support	Procurement specialist	8 SWs	
	FM implementation support	FM specialist	8 SWs	
	Environmental sustainability and safeguards supervision	Environmental Specialist	8 SWs	
	Social inclusion and safeguards	Social Development Specialist/Gender Spec.	8 SWs	
	Nutrition change behavior strategy implementation	Nutrition communication expert	8 SWs	
	Commercialization of Agriculture	Agri business development specialist	10 SWs	
	Irrigation schemes, High efficiency irrigation schemes	Irrigation Engineer	8 SWs	FAO-TA
	Project Management, M&E	Task Team Leader Co-TTL Operations Analyst/Officer M&E Specialist	12 SWs 12 SWs 12 SWs 8 SWs	

Table 2: Skills Mix Required

Skills Needed	Number of Staff Weeks	Number of Trips
Project Management, TTL, CO-TTL, Project Analyst/Officer	 55 55 55	 15 15 15
Financial Management	20	12
Procurement	20	12
Environmental Safeguards	20	12
Social Safeguards	20	12
Agri Business Development	30	12
Irrigation Engineer	20	12
Farmer Group Formation and strengthening	20	12
Monitoring and Evaluation	20	12
Agriculture productivity enhancement	20	12
Gender	10	6

Table 3: Partners

Name	***Institution/Country***	***Role***
Department of Agriculture - Project Management Unit	MoAF/RGOB	Implementation Agency
Research and Development Centers	MoAF/RGOB	Implementation Unit
DAMC	MoAF/RGOB	Implementation Unit
Food Corporation of Bhutan Limited	MoAF/RGOB	Implementation Partner
National Seed Centre	MoAF/RGOB	Implementation Partner
National Post-Harvest Centre	MoAF/RGOB	Implementation Partner
Agriculture Machinery Centre	MoAF/RGOB	Implementation Partner
FAO	FAO Investment Centre	Technical Assistance to DoA

ANNEX 10: TERMS AND DEFINITIONS

Chiwog	Group of Villages for self-governance (sub-block)
Collection center	It is a temporary structure or facilities at strategic production location where the RNR produce are collected from the farmers/producers to bulk up to transport to the processing plant or markets.
Collection shed	It is a simple structure that comes in a wide range of sizes, rooflines and siding options basically to offer growers with a space to temporarily store their RNR produce to be further marketed / dispatched to the processing unit/ value addition room / farm shops.
Dry land	Generally agricultural land where crops are grown without irrigation or on rain-fed.
Dzongdag	Administrative Head of Dzongkhag
Dzongkhag	District (there are 20 Dzongkhags in the country
Dzongkhag Tshogdu (DT)	District Council
Farm shop	A Farm Shop is a business model that offers customers the convenience of having multiple needs met in one location. The presence of three distinct services best define the farm shop namely the buy back guarantee, farming inputs and groceries.
Farmers' groups	Farmers group means a group of not less than three (3) members deriving economic benefits from one or more economic enterprises related to Renewable Natural Resource Sector
Farmers' cooperatives	Cooperative is defined as one where a minimum of fifteen (15) natural persons who are Bhutanese citizens with common bond of interest in the area of operation of cooperative, join or organize to realize common economic needs of the members and communities by engaging in any of the business activities in production, processing, manufacturing, supply and marketing and financing.
Gewog	Block (sub-district) (there are 205 gewogs in the country; 70 gewogs in the 6 eastern Dzongkhags)
Gewog Tshogde (GT)	Block Council
Gup	Administrative Headed of a Gewog
Lyonchhoen	Prime Minister
Lyonpo	Minister
Thromde Tshogde (TT)	Municipal Council
Tshogpa	Village leader
Household	A person or group of persons operating as one economic unit, usually having a common arrangement for the preparation and consumption of food and share the same kitchen.
Household head	The most knowledgeable person of all the household members and one who takes decisions in the household.
Household size	Total number of person in the household.
RNR sector	Renewable Natural Resource (RNR) sector encompasses the administrative combination of the so-called sub-sector of agriculture-horticulture (including irrigation), livestock and forestry under one roof, and the farm and farmer level, many if not all aspects of the management of these sub-sectors are interlinked and inter-dependent.
RNR products	Any farm products of agriculture-horticulture, livestock including fishery, apiary and forestry.
Wetland	A terraced land and/or valley flat land having access to irrigation to grow paddy and other crops; there are also rain-fed wetlands that are terraced.e

Annex 11: Map of Bhutan