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Report No: ICR00448

IMPLEMENTATION COMPLETION AND RESULTS REPORT
TF-A4224 and TF-B6044

ON A

GRANT

IN THE AMOUNT OF US$12.64 MILLION EQUIVALENT

TO THE

ROYAL GOVERNMENT OF BHUTAN

FOR THE

FOOD SECURITY AND AGRICULTURE PRODUCTIVITY PROJECT

JUNE 24, 2025

Agriculture and Food
South Asia

CURRENCY EQUIVALENTS

(Exchange Rate Effective December 31, 2024)

Currency Unit =	Bhutanese Ngultrum (BTN)
BTN 85.61 =	US$1

FISCAL YEAR
July 1 – June 30

Regional Vice President:	Martin Raiser
Country Director:	Abdoulaye Seck
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Practice Manager:	Tomas Ricardo Rosada Villamar
Task Team Leader (s):	Sheu Salau, Joachim Vandercasteelen
ICR Main Contributor:	Sabina Khatri Karki

ABBREVIATIONS AND ACRONYMS

AF	Additional Financing
AFSS	Agrifood Sector Strategy
AOS	Annual Outcome Survey
ARDC	Agriculture Research Development Centre
BCC	Behaviour Change Communication
BSM	Buyer Seller Meet
CPF	Country Partnership Framework
CPS	Country Partnership Strategy
CRP	Community Resource Person
CSA	Climate-Smart Agriculture
DAMC	Department of Agricultural Marketing and Cooperatives
DoA	Department of Agriculture
DRDP	Decentralized Rural Development Project
E&S	Environmental and Social
EFA	Economic and Financial Analysis
ERR	Economic Rate of Return
EoP	End of Project
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
EX-ACT	Ex-Ante Carbon-balance Tool
FAO	Food and Agriculture Organization
FG	Farmer Group
FM	Financial Management
FRR	Financial Rate of Return
FSAPP	Food Security and Agriculture Productivity Project
FSO	Farmers Sales Outlet
FYP	Five-Year Plan
GAFSP	Global Agriculture and Food Security Program
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GRM	Grievance Redress Mechanism
HDDS	Household Dietary Diversity Score
ICR	Implementation Completion and Results Report
IE	Impact Evaluation
IFAD	International Fund for Agriculture Development
IRI	Intermediate Result Indicator
ISR	Implementation Status and Results Report
M&E	Monitoring and Evaluation

MOAL	Ministry of Agriculture and Livestock
MTR	Midterm Review
NCOA	National Centre for Organic Agriculture
NPV	Net Present Value
O&M	Operation and Maintenance
PAD	Project Appraisal Document
PDO	Project Development Objective
PG	Producer Group
PMIS	Project Management Information System
PMU	Project Management Unit
RGoB	Royal Government of Bhutan
STEP	Systematic Tracking of Exchanges in Procurement
ToC	Theory of Change
TTL	Task Team Leader

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DATA SHEET

BASIC DATA

Product Information

Operation ID	Operation Name
P155513	Food Security and Agriculture Productivity Project
Product	Operation Short Name
Investment Project Financing (IPF)	Food Security and Agriculture Productivi
Operation Status	Approval Fiscal Year
Closed	2017
Original EA Category	
Partial Assessment (B) (Approval package - 27 Apr 2017)	

CLIENTS

Borrower/Recipient	Implementing Agency
Ministry of Finance, Department of Public Accounts	Ministry of Agriculture and Livestock

DEVELOPMENT OBJECTIVE

Original Development Objective (Approved as part of Approval Package on 27-Apr-2017)

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

Current Development Objective (Approved as part of Additional Financing Package Seq No 1 on 15-Jul-2021)

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

FINANCING

Financing Source	Original Amount (US$)	Revised Amount (US$)	Actual Disbursed (US$)
World Bank Administered Financing	12,640,000.00	12,640,000.00	12,375,356.15
TF-A4224	8,000,000.00	8,000,000.00	7,737,434.92
TF-B6044	4,640,000.00	4,640,000.00	4,637,921.23
Non-World Bank Financing	1,330,000.00	0.00	0.00
Borrower/Recipient	1,100,000.00	0.00	0.00
Local Beneficiaries	230,000.00	0.00	0.00
Total	**13,970,000.00**	**12,640,000.00**	**12,375,356.15**

RESTRUCTURING AND/OR ADDITIONAL FINANCING

Date(s)	Type	Amount Disbursed (US$M)	Key Revisions
15-Jul-2021	Manual	7.41	• Additional Financing
05-Jun-2024	Manual	11.69	• Results

KEY DATES

Key Events	Planned Date	Actual Date
Concept Review		08-Jun-2015
Decision Review	22-Apr-2016	18-May-2016
Authorize Negotiations	28-Feb-2017	26-Jan-2017
Approval	28-Apr-2017	27-Apr-2017
Signing	18-May-2017	18-May-2017
Effectiveness	08-Aug-2017	08-Aug-2017
Additional Financing Sequence.01	Not Applicable	15-Jul-2021
Restructuring Sequence.01	Not Applicable	05-Jun-2024
Mid-Term Review No. 01	20-Oct-2020	30-Oct-2020
Operation Closing/Cancellation	30-Dec-2024	30-Dec-2024
ICR/NCO	30-Jun-2025	--

RATINGS SUMMARY

Outcome	Bank Performance	M&E Quality
Satisfactory	Satisfactory	Substantial

ISR RATINGS

No.	Date ISR Archived	DO Rating	IP Rating	Actual Disbursements (US$M)
01	09-Oct-2017	Satisfactory	Satisfactory	0.00
02	01-May-2018	Satisfactory	Satisfactory	2.10
03	19-Dec-2018	Satisfactory	Satisfactory	3.62
04	12-Apr-2019	Satisfactory	Satisfactory	4.02
05	23-Oct-2019	Satisfactory	Satisfactory	4.60
06	19-May-2020	Satisfactory	Satisfactory	6.75
07	06-Jan-2021	Satisfactory	Satisfactory	6.96
08	20-Sep-2021	Moderately Satisfactory	Moderately Satisfactory	7.41
09	27-Apr-2022	Moderately Satisfactory	Moderately Unsatisfactory	8.51
10	15-Nov-2022	Moderately Satisfactory	Moderately Unsatisfactory	8.51
11	06-Jun-2023	Moderately Satisfactory	Moderately Satisfactory	9.51
12	13-Nov-2023	Moderately Satisfactory	Moderately Satisfactory	9.51
13	27-Jun-2024	Satisfactory	Satisfactory	11.69
14	13-Mar-2025	Satisfactory	Satisfactory	12.38

SECTORS AND THEMES

Sectors

Major Sector	Sector	%	Adaptation Co-benefits (%)	Mitigation Co-benefits (%)

FY17 - Agriculture, Fishing and Forestry	FY17 - Agricultural Extension, Research, and Other Support Activities	22	79	0
	FY17 - Crops	16	0	0
	FY17 - Irrigation and Drainage	16	0	0
	FY17 - Public Administration - Agriculture, Fishing & Forestry	25	6	0
FY17 - Health	FY17 - Health	4	0	0
FY17 - Industry, Trade and Services	FY17 - Agricultural markets, commercialization and agri-business	17	0	0

Themes

Major Theme	Theme (Level 2)	Theme (Level 3)	%
FY17 - Environment and Natural Resource Management	FY17 - Climate change	FY17 - Adaptation	18
FY17 - Human Development and Gender	FY17 - Nutrition and Food Security	FY17 - Food Security	22
		FY17 - Nutrition	100
FY17 - Private Sector Development	FY17 - Enterprise Development	FY17 - Global value chains	21
FY17 - Urban and Rural Development	FY17 - Rural Development	FY17 - Rural Infrastructure and service delivery	100
		FY17 - Rural Markets	35

ADM STAFF		
Role	At Approval	At ICR
Practice Manager	Shobha Shetty	Tomas Ricardo Rosada Villamar
Regional Director	Juergen Voegele	Dina Umali-Deininger
Global Director	Martien Van NieuKopp	Shobha Shetty
Practice Group Vice President	Juergen Voegele	Juergen Voegele
Country Director	Qimiao Fan	Abdoulaye Seck
Regional Vice President	Annette Dixon	Martin Raiser
ADM Responsible Team Leader	Winston Dawes	Sheu Salau

I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES

A. CONTEXT AT APPRAISAL

Context

1. At the project's appraisal in 2017, Bhutan had attained a lower-middle-income country status and recorded rapid economic growth and significant poverty reduction. Fueled by the commercialization of agriculture, development of rural infrastructure, and spillovers from hydroelectric projects, economic growth averaged 7.5 percent over 2006–15, and poverty reduced from around 23 percent in 2007 to 12 percent in 2012 and 5.8 percent in 2017.[1] Despite this progress, food and nutritional challenges persist. Nearly 27 percent of households consumed less than the daily minimum caloric requirement, and 34 percent of children under five experienced stunting. Additionally, 35 percent of households faced yearly food shortages, and diets were largely based on carbohydrates and fats, lacking sufficient micronutrient-rich foods.

2. The development of the renewable natural resources sector, which comprised agriculture, livestock, and forestry, which are crucial to addressing these challenges, had been relatively slow in Bhutan because of 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, which increased trade deficits. The Royal Government of Bhutan (RGoB) therefore prioritized agricultural development in the 11th Five-Year Plan (FYP) because of its importance as one of the country's five jewels; its contribution to the national economy; and its significant role in addressing food and nutrition security, poverty reduction, and equitable and sustainable economic development goals.

3. As a predominantly agriculture-based society, the agriculture sector in Bhutan remained vital to the economy despite its declining gross domestic product (GDP) share. In 2022, the sector provided livelihoods to 58 percent of the total population and accounted for 16.8 percent of the total GDP in constant prices. Its contribution to GDP had declined since 2001, leading to its inability to adequately address poverty or contribute to food security. Consequently, Bhutan imported 34 percent of its cereal needs, and close to one-third of the population suffered from food insecurity, exacerbating malnutrition and the incidence of stunting (30 percent). A total of 51 gewogs[2] (25 percent) out of 205 gewogs (blocks), mainly in the east and south, were classified as 'vulnerable' to food insecurity.

4. The sector, predominantly subsistence based, was characterized by low productivity resulting from increasing vulnerability to climate change and natural disasters, exacerbated by its mountainous terrain. A shortage of irrigation water posed a serious challenge to increasing food production. Farmers lacked physical access to markets, credit, quality seeds and other inputs, machinery and equipment, as well as the skills necessary to adopt modern agricultural practices. Widespread outmigration to urban areas, particularly by youth and men, led to labor shortages and increasing feminization of agriculture. Crop damage by wildlife contributed to increased crop losses, and marketing infrastructure was limited. It is against this backdrop that the Food Security and Agriculture Productivity Project (FSAPP) was conceived to increase productivity and enhance market access in selected high-potential gewogs.

Rationale for Bank Support

5. The project was well-aligned with World Bank's Country Partnership Strategy (CPS) (FY15–19),[3] and contributed to the CPS emphasis on agricultural commercialization as a driver of poverty reduction, and the RGoB's 11th FYP commitment to address issues related to gender equity, food security and nutrition, environmental sustainability, and good governance. The project also supported the World Bank's twin goals of eradicating extreme poverty and promoting shared prosperity by (a) working with poor communities, especially targeting highly food-insecure areas and areas with

[1] https://ophi.org.uk/sites/default/files/2023-12/nsb_2017_bhutan_mpi.pdf; Bhutan Poverty Assessment 2014. https://www.worldbank.org/content/dam/Worldbank/document/SAR/bhutan-poverty-assessment.pdf.

[2] A gewog is a collection of villages, forming a local administrative area. Gewogs fall below the dzongkhag (district) level and above the thromde (municipalities) level.

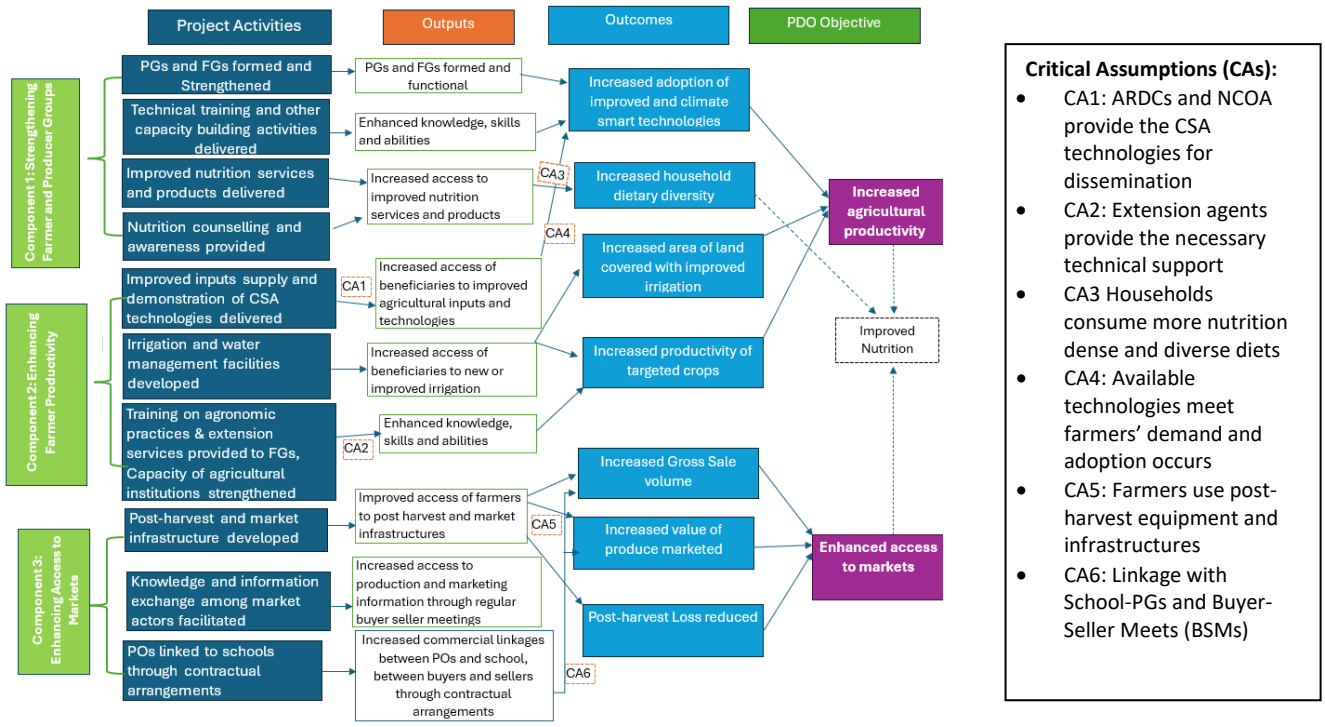
[3] https://documents1.worldbank.org/curated/en/612871468205491416/pdf/885970CPS0P148000Box385310B00OUO090.pdf. Report No. 88597-BT.

potential for increasing agriculture productivity, and (b) ensuring that project benefits contributed to shared prosperity in the target communities through citizen engagement and gender inclusion. FSAPP helped consolidate and expand on the achievements of other World Bank projects that supported agricultural productivity improvement, such as the Decentralized Rural Development Project (DRDP) and the Remote Rural Communities Development Project (RRCDP), by adopting a more integrated and focused approach to Bhutan's agriculture sector that encompassed nutrition outcomes while building the foundation for transition toward modernization, commercialization, and market development.

Theory of Change (Results Chain)

6. The Theory of Change (ToC) is prepared retrospectively based on the project's design at appraisal as it was not a requirement to do so then. The project aimed to enhance agricultural productivity through strategic interventions, including promoting climate-smart technologies; improving access to essential inputs, services, and irrigation infrastructure; and building the capacity and the skills necessary to adopt modern agricultural practices. Additionally, the project sought to increase market access by establishing post-harvest and market facilities, connecting producers with market actors, and reducing post-harvest losses. Collectively, these efforts were designed to improve nutritional outcomes for the targeted beneficiaries. The connections between the activities supported by the project's main components and the corresponding key outputs and desired outcomes are outlined in figure 1.

Figure 1. ToC for FSAPP



Note: ARDCs= Agriculture Research Development Centres; CSA= Climate-smart agriculture; NCOA = National Centre for Organic Agriculture; PGs = Producer groups.

Project Development Objectives (PDOs)

7. The PDO was to increase agricultural productivity and enhance access to markets for farmers in selected gewogs in south-west Bhutan.

Key Expected Outcomes and Outcome Indicators

8. At appraisal, PDO performance was to be measured against targets relating to the following: (a) increase productivity of targeted crops[4] by at least 20 percent in project areas,[5] (b) increase in value and volume of produce marketed by at least 20 percent, and (c) number of direct project beneficiaries of which 30 percent are women.

Components

9. The project was a US$12.64 million Investment Project Financing funded by the Global Agriculture and Food Security Program (GAFSP), comprising a US$8 million original grant original and US$4.64 million Additional Financing (AF), and included the following components.

10. **Component 1: Strengthening Farmer and Producer Groups** (Appraisal: US$1.08 million; Actual: US$0.740 million). The planned activities included (a) forming and strengthening farmer groups (FGs), (b) strengthening producer groups (PGs), and (c) nutrition behavioral change communication campaign.

11. **Component 2: Enhancing Farmer Productivity** (Appraisal: US$5.21 million; Actual: US$8.369 million). The planned activities included (a) construction and rehabilitation of community irrigation infrastructure along with efficient water management practices (b) farm management and technical and institutional capacity building, and (c) provision of improved agricultural inputs and technologies.

12. **Component 3: Enhancing Access to Markets** (Appraisal: US$1.0 million; Actual: US$2.168 million). The planned activities included (a) post-harvest and market infrastructure support and (b) links to domestic and export market.

13. **Component 4: Project Management** (Appraisal: US$0.71 million; Actual: US$1.091 million). This component supported (a) management and coordination, (b) monitoring and evaluation, (c) technical assistance, and (d) a grievance redress system for an effective and transparent project management system.

B. SIGNIFICANT CHANGES DURING IMPLEMENTATION

14. The project underwent two restructurings. The first in 2021, following the approval of US$4.64 million AF in October 2020, which extended the closing date by two years to December 30, 2024, added one gewog per district, reaching 2,106 additional households, and supported 150 beneficiaries displaced or laid off due to COVID-19. Through the second restructuring in 2024, the end-of-project (EoP) targets, initially established for three intermediate results indicators (IRIs), were revised (annex 7).

15. The overall project design, including the PDO, components, institutional arrangements, implementation strategies, fiduciary responsibilities, and environmental and social (E&S) safeguards arrangements, remained unchanged.

Revised PDOs and Outcome Targets

16. The PDO remained unchanged throughout the project period. However, the targets for outcome and output indicators were modified after the first and second restructurings.

Revised PDO Indicators

17. The targets for all the PDO indicators were scaled up. The revised targets are summarized in table 1.

[4] Rice, vegetables, potatoes, large cardamom, and citrus.
[5] Project areas = 24 gewogs in 5 dzongkhags in South-West Bhutan.

Table 1. Summary of Changes in PDO Target

Indicator	Original EoP Target	Revised EoP Target
PDO 1. Increased Productivity of targeted crops in project areas (Percentage)	20	25
PDO 2. Increase in volume of produce marketed (Percentage)	20	25
PDO 3. Increase in value of produce marketed (Percentage)	20	25
PDO 4. Number of direct project beneficiaries (Number)	10,400	11,938
Female Beneficiaries (Percentage)	30	34

Revised Components

18. The project components remained unchanged, with only adjustments made to the budget allocations.

Other Changes

Revised Intermediate Indicators

19. The modifications to the intermediate indicators are outlined in annex 7.

Rationale for Changes and Their Implication on the Original Theory of Change

20. While the rationale for the first restructuring was to support the COVID-19 recovery operations through the expansion of activities focused on enhancing preparedness and protecting the gains made to enhance food security, the rationale for the second restructuring was to revise the overly ambitious EoP targets. These changes did not affect the PDO or the underlying ToC because the modifications were mainly aimed at adjusting the targets and expanding activities without altering the fundamental nature of the project.

II. OUTCOME

A. RELEVANCE OF PDO

Assessment of Relevance of PDOs and Rating
Rating: High

21. The project's objectives remained relevant at its conclusion, aligning with Bhutan's Agrifood Sector Strategy 2034 (AFSS 2034) and the Food and Nutrition Security Policy 2023. AFSS 2034 emphasizes the affordability, availability, and accessibility of food while also aiming to scale the agrifood sector's potential for achieving the Sustainable Development Goals and building a climate-resilient and sustainable sector. Key outcomes included increased agricultural exports, higher farmer incomes, and improved food self-sufficiency. The project's efforts to enhance farmers' capacity to adopt improved CSA technologies, irrigation methods, and market participation were vital to achieving these three outcomes.

22. This project also aligns with the RGoB's 13th FYP, which aims to transform Bhutan into an upper-middle-income country by 2029 and a high-income country by 2034. FSAPP has cross-cutting nutrition activities to improve diets, including a behavioral change communication (BCC) campaign and efforts to enhance the production and availability of nutritious and diverse foods in rural areas.

23. Additionally, the project aligns with the World Bank's Country Partnership Framework (CPF)[6] for Bhutan for FY25–FY29, which focuses on (a) increasing private investment and jobs, (b) enhancing climate resilience, and (c) improving infrastructure. FSAPP supports the promotion of economic resilience (CPF Objective I and II) through the creation of jobs and livelihoods in the agriculture sector, which is crucial for improved economic growth. The project further aligns the

[6] https://www.worldbank.org/en/news/press-release/2025/05/01/bhutan-world-bank-group-s-new-country-partnership-framework-will-help-create-jobs-and-boost-growth.

promotion of climate resilience (CPF Objective II) by continuing to mainstream CSA practices and providing resilient market infrastructure.

B. ACHIEVEMENT OF PDOs (EFFICACY)

Assessment of Achievement of Each Objective/Outcome

24. The PDO can be unpacked into two outcomes: (a) increase agricultural productivity and (b) enhance access to markets. Achievement of the PDO was to be measured with the following outcome indicators, including: (i) increase in productivity of targeted crops by at least 25 percent in project areas; (ii) increase in value and volume of produce marketed by at least 25 percent; and (iii) number of direct project beneficiaries, of which 34 percent are women. The assessment of project outcomes was based on various sources, including Annual Outcome Survey (AOS) reports,[7] EoP impact evaluation (IE) assessments,[8] specific thematic reports,[9] Implementation Status and Results Reports (ISRs), and FSAPP's Project Management System (monitoring and evaluation [M&E] system) database and reports.

25. The project achieved remarkable success, surpassing the targets set for three of the four PDO indicators, with the remaining indicator nearly reaching its target. The achievements are summarized in table 2.

Table 2. Target and Achievements of PDO Indicators

Indicator	Baseline[10]	Appraisal Target	Revised Target	Actual [11]	Achievement (%)
PDO Indicator 1-----Increased productivity of targeted crops in project areas (%)	2,289 kg/acre	BL + 20% = 2,746 kg/acre	BL + 25% = 2,861 kg/acre	BL + 24% = 2,840 kg/acre	99
PDO Indicator 2(i)-----Increase in volume of produce marketed (%)	389 kg	BL + 20% = 466 kg	BL + 25% = 486 kg	BL + 28% = 499 kg	103
PDO Indicator 2(ii)---- Increase in value of produce marketed (%)	BTN 24,069	BL + 20% = BTN 28,882	BL + 25% = BTN 30,086	BL + 35% = BTN 32,592	108
PDO Indicator 3-- Number of direct project beneficiaries (Number)	0	10,400	11,938	12,916	108
Of which Female Beneficiaries (%)	0	30	34	59	173

PDO Outcome 1: Increase Agricultural Productivity

26. There was significant progress toward achieving this objective, as evidenced by the increase in the productivity of targeted crops.[12] This increase was evaluated by comparing the treatment group's data from the EoP IE assessment report with the baseline data. The average percentage increase in agricultural productivity among project beneficiaries was 24 percent, surpassing the appraisal target of 20 percent and approaching the revised target of 25 percent. Regarding crop productivity, the yields of the five targeted crops (except paddy and cardamom) showed substantial increases in the IE compared to baseline. The increases were 18.2 percent for vegetables, 26.02 percent for potatoes, 32.25 percent for mandarin, 38.46 percent for ginger, and 138.96 percent for quinoa.

[7] The project conducted successive AOSs from 2019 until 2023 which was used to update the RF.
[8] IE conducted by an independent survey firm at the end of the project.
[9] (a) Technology Adoption Report 2023, (b) IA Report on Sarpang Dzongkhag Irrigation Schemes, (c) the farmers sales outlets (FSOs), (d) the BCC report.
[10] The baseline value for productivity data is generated by averaging RSD data for 2014–2016 and the baseline value for average volume and value of produce marketed is used from AOS 2018. These baseline values were agreed upon by the project team and are documented in the Aide Memoire of the Implementation Support Mission held from July 19 to 26, 2021.
[11] Actual values for PDO I, II, and III are derived from the final project IE data provided by the project. These values are averaged across seven priority crops, with adjustments made to the vegetable data by excluding black pepper to align with the Project Appraisal Document (PAD).
[12] Priority crops include rice, vegetables, potatoes, large cardamom, mandarin, quinoa, and ginger. Among the vegetables, 10 specific crops have been identified: chili, cauliflower, cabbage, beans, tomato, onion, broccoli, carrot, pea, and leafy greens.

27. To achieve the project's first outcome of increasing agricultural productivity, several key interventions were implemented, as detailed in the following paragraphs.

28. **Adoption of improved agricultural technology.** Technology adoption under FSAPP was captured through (a) beneficiaries adopting established and known technologies such as seeds, fertilizers, and polyhouses and (b) beneficiaries adopting new and improved crop management practices that FSAPP promoted and demonstrated to farmers. The Agriculture Research and Development Centers (ARDCs) in Bajo, Samtenling, and Yusipang[13] and national soil and plant health centers were instrumental in promoting new and improved agricultural technologies aimed at enhancing CSA practices and boosting productivity among smallholder farmers in project areas. Key achievements include promotion and adoption of new technologies for the cultivation of crops such as quinoa, climate-resilient crop varieties for paddy (DQ-11 and Mahsuri), black pepper, and potatoes (Yusi Maap) and improved techniques such as citrus canopy management, direct seeding for paddy, soil fertility, and plant protection. A technology adoption survey conducted by the project in 2023 showed an overall technology adoption rate of 73.18 percent, with significant technology adoption rates observed across all ARDCs) (annex 8). Combining both categories of technologies, 10,794 households adopted improved technology, exceeding the EOP target of 8,300 households.

29. Some technologies promoted through on-farm demonstrations, such as improved potato and quinoa cultivation and electric fencing using HDPE poles, achieved full adoption in specific regions. The local government and the other donor-funded projects, such as the Green Climate Fund Project, promoted some of the technologies supported by the project in the country including the non-FSAPP-supported gewogs (control groups), resulting in the control group adopting these technologies as well. This indicates the broader influence of the project beyond its immediate beneficiaries. However, treatment households adopted technologies at higher rates than controls, for example, 31.9 percent versus 15.9 percent for protected cultivation (greenhouse/polyhouses) and 31.5 percent versus 11.5 percent for mulching plastics. Additionally, non-adoption rates were lower among the treatment group (36.8 percent versus 54.5 percent), demonstrating the effectiveness of the interventions in encouraging the adoption of technologies in the treatment groups.

30. **Land area covered with irrigation facilities.** The construction and rehabilitation of community irrigation infrastructure, along with efficient water management practices such as low-cost water harvesting technology and high water-use-efficient irrigation systems, boosted cropping intensity, water use efficiency, and resilience to climate change. Irrigation covered 2,275 acres (flood irrigation: 1,924 acres and micro-irrigation: 351 acres), surpassing the target of 2,244 acres, benefiting 2,395 water users. Treatment households increased dryland, orchard, and wetland cultivation by 0.30, 0.27, and 0.05 acres, respectively. The Impact Assessment Report on the Sarpang Dzongkhag Irrigation schemes highlighted increased cultivation areas, diversified cropping patterns, and improved irrigation frequency. About 90 percent of beneficiaries reported increased cultivation, 53 percent noted diversified cropping patterns, and 78 percent regularly irrigated their orchards during dry seasons. Additionally, 80 percent of beneficiaries reported increased household income, and 98.7 percent noted improved crop productivity, thereby enhancing food security.

Beneficiaries' Access to Improved Agricultural Inputs and Services

(a) Strengthening Farmer and Producer Groups:

31. A total of 335 FGs/cooperatives/producer organizations received technical trainings and other capacity-building support. Additionally, 10,076 farmers (44.56 percent female) became members of an association, including PGs and cooperatives. Through the project, 6,834 people (3,456 female) received improved nutrition services and products. Overall, training and capacity building increased beneficiaries' knowledge, skills, and abilities, leading to the increased adoption of improved and climate-smart technologies, ultimately enhancing productivity.

[13] National Centre for Organic Agriculture (NCOA-Yusipang), basically an ARDC for organic agriculture (1 of the 10 PIUs of FSAPP).

(b) Provision of Modern Equipment

32. The provision of equipment (on cost-sharing), including 929 women-friendly mini-tillers, 130 rice mills, 556 grasscutters, 2,434 polyhouses, 500 low-cost polyhouses, electric fencing, power sprayers, 2,911 shade nets, and 3,468 sets of plastic mulch, facilitated the commercialization and mechanization of farm operations. This initiative reduced drudgery, minimized crop depredation by wild animals, and conserved soil moisture, thereby contributing to improved crop productivity. Polyhouses enabled the succession of three crops per year (mostly vegetables) instead of one under open field conditions.

33. Similarly, electric fencing significantly reduced crop losses from wild animals, with households reporting no crop loss increasing from 5.0 percent to 23.0 percent and those experiencing negligible losses (< 10 percent) rising from 2.2 percent to 26.9 percent from the treatment groups.

PDO outcome 2: Enhance Market Access

34. There was substantial progress toward achieving this objective, as measured by its key outcome indicators, namely: (a) increase in value; and (b) volume of produce marketed by at least 25 percent. Farmers' access to post-harvest and market infrastructure was enhanced through the development of improved facilities. The project fostered market links among the beneficiaries by organizing two buyer seller meets (BSM) with producers (farmers and FGs) and the buyers (private sectors) and establishing connections with institutional buyers. Sales to institutional buyers integrated beneficiaries into domestic and export supply chains. These efforts resulted in higher gross sales volumes, increased value of marketed produce, and reduced post-harvest losses.

Outcome 2.1: Increased Volume of Produce Marketed

35. The increased volume of the product marketed was assessed by comparing the treatment group's data from the EoP IE assessment reports against the baseline data. The average percentage increase in the volume of the product marketed for priority crops among project beneficiaries was 28 percent, compared to the appraisal target of 20 percent and the revised target of 25 percent during the restructuring in 2020. The average volume of the product marketed was 24,069 kg at baseline and 32,592 kg at project completion. Although this was, in apart, a reflection of increased production (as discussed above), some enabling factors also played an important role, such as repairing critical road segments where physical connectivity was a major constraint and fostering business alliances with off-takers through BSMs.

Outcome 2.2: Increased Values of Produce Marketed

36. The average percentage increase in the mean value of products marketed for priority crops among project beneficiaries was 35 percent, surpassing the initial appraisal target of 20 percent and the adjusted target of 25 percent. Enhanced access to markets was achieved through several mutually reinforcing interventions that reduced transaction costs and increased the market volume and value of the produce marketed, as follows:

(a) **Improved access of farmers to post harvest and market infrastructures.** The project supported the construction and/or rehabilitation of 28 post-harvest facilities, including markets, agro-processing mills, storage quality control facilities, centralized pack houses, integrated cold storage units, food processing and packing equipment and materials, and farmer shops. This represents 88 percent of the EoP target. Additionally, the project supported 64 market infrastructure, and 78 PGs received market information.

(b) **Links to domestic and export markets.** The project facilitated commercial partnerships with multiple stakeholders, ensuring access to output markets and addressing constraints faced by individual beneficiaries in accessing these markets. The links were established through the following:

(i) **Increased commercial links between PGs and schools.** Project beneficiaries leveraged the FSOs to secure sales agreements with institutional clients, including the School Feeding Program (SPF), for supplying fresh vegetables. As a result, the SFP now has consistent sources of locally produced fresh

vegetables. By the end of the project, FSAPP had linked 23 schools with 45 PGs across the five project dzongkhags. As per the IE report, 379.681 MT of commodities were supplied to schools/institutions. The Farm to School Assessment Report 2022 indicated that PGs had the opportunity to earn an annual income of BTN 132,983,490 through the supply of renewable natural resource commodities to schools.

(ii) **BSMs.** The Department of Agricultural Marketing and Cooperatives (DAMC), one of FSAPP's Project Implementing Units, organized two BSMs during the project period. These events served as a pivotal platform for connecting stakeholders in the agricultural sector, promoting collaboration, enhancing market access, facilitating knowledge exchange, and addressing policy issues within Bhutan's agricultural ecosystem. The tangible result of this collaborative effort was the signing of 45 offtake agreements involving an impressive total volume of 5,398 MT of vegetables. Additionally, the BSM activities had a spillover effect, with participants who did not sign contracts during the events sourcing from PGs. Furthermore, the project supported the participation of farmers in food and regional trade fairs. These activities, along with improved access to market information and guaranteed output markets, encouraged PGs to sell more to the market.

(c) **Post harvest machinery and equipment.** The project also distributed several post-harvest machinery and equipment such as 130 rice mills, threshers, dryers, grinders, and graders on a cost-sharing basis.[14] This machinery and equipment contributed to increased value addition.

PDO 3: Direct Project Beneficiaries

37. The project directly benefitted 12,916 people, exceeding the EoP target of 11,938 by 8 percent. Female beneficiaries notably benefited, with 59.6 percent (7,689), surpassing the target of 34 percent. Furthermore, the project achieved an impressive satisfaction rate among its beneficiaries, with 99 percent expressing satisfaction with the services provided by the project.

38. **Improved nutrition.** Improved agricultural productivity and market access are essential for better nutrition, as they increase food availability and affordability for communities. A key strategy to enhance nutrition involves raising awareness about dietary diversity and the benefits of a balanced diet, which was achieved through BCC initiatives. As a result of the nutrition BCC counseling and awareness programs, more than 95 percent of the beneficiaries have established 'nutrition kitchen gardens on their farms. These gardens helped beneficiaries recognize the importance of locally produced vegetables and fruits. The project also significantly exceeded its targets in several areas. It reached 6,834 people (3,456 female) with improved nutrition services, surpassing the initial goal of 6,000 (2,400 female). Additionally, 4,856 individuals received nutrition counseling and education, and 1,978 received extension support, exceeding the targets of 4,000 on nutrition counseling and education and nearly reaching the target of 2,000 for extension support. A total of 163 community resource persons (CRPs) were trained on BCC themes and reached out to over 6,000 fellow farmers. Furthermore, the proportion of beneficiaries with a medium or high (>7) Household Dietary Diversity Score (HDDS) reached 88.7 percent, surpassing the target of 70 percent. These achievements highlight the project's success in improving nutrition outcomes and promoting dietary diversity among the FSAPP communities.

Justification of Overall Efficacy Rating

39. The scope of the project expanded through the AF, which made the project more ambitious. Rather than using a split rating, which is typically applied when a project's scope is reduced, the efficacy was assessed based on the revised, more ambitious targets. Out of the four parameters used to evaluate achievement of the project's objectives, only one was not fully met (table 2). Given that the project almost fully achieved its intended outcomes, the overall efficacy is rated Substantial.

[14] The cost-sharing guidelines of 2019 and 2021 issued by the Ministry of Agriculture and Livestock (MOAL) ensure that farmer-beneficiaries contribute either 20–50 percent of the costs or contribute labor valued at approximately 20–30 percent of the total cost of establishment.

C. EFFICIENCY

Assessment of Efficiency and Rating

40. **Economic and Financial Analysis (EFA).** An ex-post economic and financial efficiency analysis was undertaken to assess the financial and economic impact of FSAPP. Except for some modification, such as incorporation of nutrition benefits, the analysis followed the approach adopted in the PAD to ensure methodological consistency and comparability. The analysis draws on the EoP IE, successive AOSs, specific thematic reports, and the Implementation Completion and Results Report (ICR) team's field visits and interviews.

41. The project's quantifiable benefits mainly come from a net increase in productivity of targeted crops among participating farmers due to increased cropping intensity, adoption of CSA technology, reduced losses from wildlife crop damage, value addition, and reduction in post-harvest losses through the provision of cold storage and other market infrastructure. Net benefits were calculated on a 'with' and 'without' project basis. Conversion factors were used to derive economic prices from financial prices, including specific import parity prices for rice and urea, and export parity prices for citrus and potato. An investment horizon of 20 years and a discount rate of 10 percent were assumed for the economic analysis.

42. The project's economic internal rate of return was estimated at 18.0 percent, compared to estimate of 15.5 percent at AF and 22.8 percent at appraisal. The net present value (NPV) was estimated at US$3.9 million, compared to US$2.9 million at AF and US$4.9 million at appraisal. When greenhouse gas (GHG) and nutrition benefits are accounted for, the economic rate of return (ERR) increases to 23.1 percent, slightly higher than the projection at appraisal (22.8 percent) and higher than the updated projection at the AF stage (15.9 percent). At completion, the NPV is estimated at US$6.6 million, which is slightly higher than the appraisal figure (excluding GHG benefits and calculated on the original project budget of US$8.0 million) and significantly higher than the NPV calculated at the AF stage (US$3.1 million).

43. The sensitivity analysis indicates that (a) even without accounting for GHG and nutrition benefits, the project remains viable with an 18.0 percent ERR and a US$3.9 million NPV and (b) a reduction of the anticipated benefits by 20 percent would lower the ERR to 17.5 percent and the NPV to US$3.6 million, still indicating economic viability.

44. **Administrative efficiency.** Several factors contributed to project inefficiency. First, COVID-19 significantly affected project implementation progress and affected the needs and well-being of the targeted beneficiaries due to multiple lockdowns that restricted movement. Construction works were delayed due to labor constraints, and group-based capacity-building activities were postponed because of restrictions on large gatherings. Second, the high turnover of Task Team Leaders (TTLs) (four World Bank TTLs in seven years) during project implementation may have undermined continuity in dialogue and overall project support. Although great care was taken to ensure extended overlaps during transitions, team leadership was more stable in the latter years. Similarly, there was high turnover on the Government side, which eventually stabilized during the later years of project implementation. Additionally, challenges in bidder selection led to multiple re-advertisements and delays in completing market infrastructure, as well as delays in selecting competent operators for infrastructure management.

45. Conversely, several factors enhanced project efficiency. First, the project became effective four months after signing the Financing Agreement, contributing to significant achievements within the initial three years of implementation. By the midterm review (MTR) in October 2020, the project had disbursed US$7.41 million or 93 percent of the US$8.0 million grant. Second, co-TTL, based in the country provided sustained support to the project team for the final years of the project period, thereby improving project performance. The leadership stability of the Project Management Unit (PMU) at the Department of Agriculture, along with cooperation from District Agricultural Officers, Regional Agricultural Marketing and Cooperative Officers, and researchers from the ARDCs, as well as technical support from the FAO Bhutan office and oversight by the Project Steering Committee and the MOAL, contributed to the consistent implementation

progress. These collaborative efforts ensured that the project remained on track and achieved its objectives timely despite the challenges faced.

46. Considering both the efficiency of the economic analysis and the administrative efficiency, the overall efficiency is rated as Substantial.

D. JUSTIFICATION OF OVERALL OUTCOME RATING

47. The project remains highly relevant, with most of the PDO's key performance indicators meeting or exceeding the targets. The project's efficacy and efficiency are Substantial. Thus, the overall outcome is rated Satisfactory as shown in table 3.

Table 3. Project Outcome Rating

Rating Dimension	Rating
Relevance of Objectives	High
Efficacy	Substantial
Objective 1: Increase agricultural productivity	Substantial
Objective 2: enhanced market access	High
Efficiency	Substantial
Outcome Rating (Overall)	Satisfactory

E. OTHER OUTCOMES AND IMPACTS

48. **Gender.** The project integrated gender considerations into its design and implementation phases, ensuring that women are actively involved and benefit from project's activities. Approximately 60 percent of the direct beneficiaries were women, against the project target of 30 percent, indicating that women substantially benefited from all project interventions given its focus in contributing to reducing gender gap and addressing equity issues related to access to productive assets. The project's impact assessment determined that the share of female in FG membership ranges from 34.7 percent in Sarpang to 62.7 percent in Haa, indicating the gender-sensitive nature of the project and project deliberate efforts to strengthen collective action and social network to reduce the transaction costs of working with individual farmers and improve business readiness and links with agribusiness. In addition, while gender distribution was nearly equal, with 52.0 percent male and 51.1 percent female among sampled beneficiaries for the IE, women slightly outnumber men in the 15–64 age group (36.6 percent versus 35.0 percent), indicating greater female involvement in household-based farming. The project also supported 71 COVID-affected youths, of which 35 were female.

49. **Institutional strengthening.** The project enhanced the capacity of individual farmers, their organizations, national public institutions, and the national research system. Farmers were trained in good agronomic practices and farming-as-a-business, with those involved in irrigation organized into water users' associations and trained in the operation and maintenance (O&M) of irrigation infrastructure. Capacity building and equipment/input/machinery/technology support to ARDCs, the national soil services center, and the national plant protection center created a conducive policy environment for agricultural innovation, improved public service delivery and access to specific market segments like organic for which Bhutan has a reputation. This support enabled the promotion of new products and technologies such as quinoa; climate-resilient crop varieties for paddy, black pepper, and potatoes; and improved techniques like citrus canopy management, direct seeding for paddy, soil fertility, and plant protection, achieving a 73.18 percent technology adoption rate (IE report 2025). The strengthening of FG and PGs involved intensive capacity building to enhance coordination and institutional capacity for value chain functions and commercial partnerships with agribusinesses. Led by the DAMC, efforts will be made to scale up these FG strengthening activities and BSMs into national programs as an exit strategy. The BSM initiatives aim to connect buyers with individual and group sellers to foster market linkages. Such meetings are important to help the Government operationalize the market-led approach to agricultural development as envisioned in the 13 FYP. The pool of CRPs trained as part of the FSAPP program to introduce behavioral changes in nutrition practices is a significant resource and will continue to be an important vehicle for delivering development to communities. The five

FSAPP dzongkhag administrations have agreed to incorporate CRP activities into their budget and nutrition focal persons at the agricultural research and development centers, respectively, to ensure continuity in delivery and capacity building.

50. **Mobilizing private sector financing.** The project implemented a cost-sharing mechanism where beneficiaries contributed a portion of the total cost of interventions. This exceeded the target achievement contribution of US$0.68 million against the appraisal target of US$0.24 million (annex 9). An IE survey shows that financial inclusion improved among project beneficiaries, with 92.6 percent having bank accounts compared to 87.5 percent in the control group. Additionally, loan access improved, with 47.0 percent of beneficiaries availing loans versus 36.1 percent of non-beneficiaries. Financial inclusion varied across regions, with 75 percent of FGs in Samtse and 40 percent in Haa having bank accounts.

51. **Poverty reduction and shared prosperity.** About 13,000 farming households directly benefited from the project either as individual farmers or FG/PGs. They benefited from several interventions that addressed binding downstream and upstream constraints in the value chains supported by the project. They range from access to improved technologies such as improved and climate-resilient crop varieties, introduction of new varieties for high-value crops which promoted diversification, and access to irrigation and market infrastructure which facilitated links to domestic and export markets leading to improved farm incomes among beneficiaries. The improved income was supported by the findings of the IE. Average annual household incomes for beneficiary farming households are 24 percent higher than those of non-beneficiary ones. This is entirely due to a difference in on-farm incomes (crops plus livestock) that are 48 percent higher in beneficiary households while off-farm incomes and remittances remained unchanged between the beneficiary and non-beneficiary groups. The 27 percent increase in income from crop production can be attributed to the project.

52. **Other unintended outcomes and impacts.** The impact assessment report provides insights into the following unexpected or indirect results.

53. **Better access or utilization of financial services among project beneficiaries.** Specifically, 12.5 percent of non-beneficiaries did not have a bank account, whereas only 7.4 percent of project beneficiaries were without bank accounts. Around 10.9 percent of beneficiary households reported having no savings compared to 12.2 percent of non-beneficiary households. Furthermore, 47 percent of project beneficiaries were able to obtain loans, in contrast to only 36.1 percent of non-beneficiaries.

54. **Labor saving:** The number of nights spent guarding crops against wildlife incursion significantly decreased from 91.5 nights before the implementation of electric fencing to 24.5 nights after fencing. As a result of distributing women-friendly equipment, recipient households experienced a substantial reduction in the time spent on labor for field activities, with an average decrease of 65 percent, from 145 hours without machinery to 81 hours with machinery.

III. KEY FACTORS AFFECTED IMPLEMENTATION AND OUTCOME

A. KEY FACTORS DURING PREPARATION

55. The design of FSAPP integrated several lessons learned from previous World Bank projects, including the establishment of a designated PMU with a dedicated M&E officer, capacity building for FGs along with support for quality inputs and improved technologies, institutional strengthening, capacity enhancement of beneficiaries for ownership and asset management, connecting links to buyers, and building of an organized market infrastructure. The RGoB's involvement and support were also crucial during the project preparation phase. This commitment was further demonstrated through the establishment of dedicated institutional structures, including the PMU and the Project Steering Committee.

56. The Procurement Plan for the entire project was finalized and subsequently approved in the World Bank's Systematic Tracking of Exchanges in Procurement (STEP) tool before commencement of the project and the safeguard documents were prepared and disclosed. Having the Procurement Plan in STEP before the project commencement, along with the disclosed safeguard documents, facilitated the immediate kick-start of project activities as soon as the project

became effective. Several technical assessments on selected value chains, nutrition, and market links guided the design of interventions. Implementation arrangements were carefully designed to avoid past challenges, ensuring timely guidance and effective and efficient financial management and procurement. The project team consulted a wide range of stakeholders and leveraged the work of development agencies such as the International Fund for Agriculture Development (IFAD) and the FAO. The overall risk rating was Moderate, with risks relating to, for example, private sector crowding out, institutional capacity and donor coordination, and inclusion of vulnerable beneficiaries appropriately identified. The project had adequate mitigation strategies to minimize them.

B. KEY FACTORS DURING IMPLEMENTATION

57. **Factors subject to the control of government and/or implementing entities.** The project's strong commitment and leadership during the implementation period led to the successful achievement of its targets. Despite initial setbacks caused by frequent vacant positions, the project managed to meet almost all its goals. The retirement of the previous Project Director in October 2021 affected the project. The then M&E specialist took over as Project Director in December 2021 and recruited two successive M&E specialists. Toward the end, the Project Director also assumed the role of Chief Agriculture Officer of the Agricultural Research and Innovation Division, serving dual roles. To support the Project Director, a Technical Operations Officer was hired by the TA[15]-FSAPP (FAO). The lack of an adequate M&E system initially posed challenges in accurately counting beneficiaries and tracking interventions at the gewog level. However, the PMU's continuous efforts led to the establishment of the project management information system (PMIS), including M&E databases for groups and individual project support. The project successfully migrated its Excel-based M&E data of the initial phases into the PMIS database, enabling automated and standardized reporting on the PDO indicator 4 and most IRIs.

58. **Factors subject to World Bank control.** The FAO's TA played a crucial role in the project's implementation. Initially focused on advisory and capacity building, the FAO's consultancy arrangement was reviewed to align with the PMU's priorities. The FAO-TA support, originally scheduled to end on April 30, 2022, was extended with no cost until June 2024, to continue providing technical and implementation support. The World Bank team processed the FAO-TA contract extension with GAFSP. The World Bank conducted several Implementation Support Missions and provided necessary technical support. Additionally, monthly check-ins were established by the World Bank to closely monitor implementation and procurement progress in the last year, and the country based co-TTL provided day-to-day support to the project team.

59. **Factors outside the control of Government and/or implementing agencies.** The project faced challenges beyond the control of the Government and implementing agency, such as the COVID-19 pandemic and the country elections. The back-to-back lockdowns due to COVID-19 temporarily slowed down project execution, hindering face-to-face interactions necessary for mobilization, training, and coordination with beneficiaries. Although project implementation resumed after restrictions were lifted, it took time for all PIUs to fully resume technical and managerial actions. Additionally, restrictions on public gatherings and meetings imposed by the Election Commission during the general elections in the second and third quarters of 2018 also slowed down project implementation.

IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME

A. QUALITY OF MONITORING AND EVALUATION

M&E Design

60. The M&E design was planned to be comprehensive and well-structured to systematically monitor and evaluate the project's progress and performance. A detailed M&E plan was incorporated into the project's Operations Manual. The PAD featured a well-designed Results Framework (RF) that outlined the roles and responsibilities for gathering the information required for all the project indicators, although not very clear. The M&E plan also included provisions for a baseline study, mid-term evaluation, and end-of-project evaluations, which were intended to be conducted by a third

[15] TA = Technical assistance.

party. Furthermore, specific reviews, analyses, and case studies were planned to be gathered. Recognizing the challenges encountered by previous projects due to the absence of dedicated M&E personnel, the project planned to have a dedicated M&E expert at both the PMU and project support team level (ARDCs). Since the targets for some of the intermediate indicators were too ambitious, the team took advantage of the two restructuring opportunities to revise indicator targets as necessary.

M&E Implementation

61. The M&E activities were initiated through an Excel-based data reporting process during the initial years of the project. The project team developed a simplified M&E framework presenting basic information for each project outcome/result indicator, including targets per geographical area, data collection frequencies, indicator units, and baseline data. However, the proposed source information was often incomplete, and the methodology or tools for data collection and analysis were unclear. The project faced significant challenges in accurately counting beneficiaries and tracking the delivery of specific interventions at the gewog level. Although the project conducted a baseline survey, productivity data were gathered through focus group discussions rather than the usual household or farm-level data collection. There were quality issues with the project baseline data compared with other data sources from similar years. Consequently, the project used official RGoB statistics and AOS to recalculate the baseline and achievements for the PDO indicators (PDO indicator 1, 2, and 3) and IRI 2.4 (area for cardamom and citrus cultivation).

62. As various issues in M&E processes were identified, the project took proactive steps to address them. With the help of an M&E/IT firm, hired through the TA-FSAPP, the PMU developed a system to track the number of unique beneficiaries at the gewog level by type of intervention, group database, BCC tracking database, and georeferenced asset and infrastructure database. This system is a real-time, multi-user PMIS, which replaced the Excel-based M&E database to record and update the delivery of project activities. Two useful case studies, learning notes, and surveys were conducted, including AOS, a market infrastructure survey, a technology adoption report, a school linkages case study, and an IE. Other development partners, such as IFAD, build their own information system based on the one developed by FSAPP. More importantly, this is considered as a template for the farmers' registry, which is important for improving the targeting of government support and monitoring its delivery.

M&E Utilization

63. M&E activities were used to track changes in outcome and IRIs as well as to collect data through specialized studies. During the implementation support missions, the PMIS was used to generate automated, standardized reports on the RF indicators. M&E data was also used to restructure results indicators and assess project performance and objectives at the end of the project. The project data were also used by MOAL to track the performance of the sector and report on the achievement of several targets including CSA technologies, number of piped irrigation and the beneficiaries, and number of market infrastructure, during the final evaluation of the 12th FYP, as FSAPP activities were aligned with the plan.

Justification of Overall Rating of Quality of M&E

64. Overall quality of M&E is rated Substantial. The improvements in data management and reporting using PMIS, the comprehensive IE conducted at project closure, and the effective addressing of initial challenges all contributed to this rating.

B. ENVIRONMENTAL, SOCIAL, AND FIDUCIARY COMPLIANCE

Environmental and Social Compliance

65. The project complied with the World Bank environmental and social safeguards policies. The project was classified as Category 'B' (partial assessment) due to its moderate and reversible E&S impacts. It triggered several policies: Environmental Assessment (OP/BP 4.01), Forests (OP/BP 4.36), Pest Management (OP 4.09) and International Waterways Policy (OP7.50). OP 4.09 was triggered as a precaution to manage potential unforeseen pest and pesticide issues. OP 4.36

was also triggered due to potential vegetation clearing for irrigation and market infrastructure. However, none of these safeguard issues materialized. In addition, the International Waterways Policy (OP 7.50) was triggered due to the project's development of new micro-irrigation schemes involving water withdrawal from streams and tributaries of the Bramhaputra river. The RGoB notified India and Bangladesh, riparians of the river, in March 2016. In response to this, the World Bank received a response indicating no objection to the implementation of the project in November 2016. An Environmental and Social Management Framework (ESMF) was developed and publicly disclosed by the Ministry of Agriculture and Forest in April 2016, with orientation training provided to project implementers. Additionally, the project developed an Environmental and Social Impact Assessment (ESIA), Environmental and Social Management Plan (ESMP), and a Grievance Redress Mechanism (GRM) Manual. To ensure compliance with E&S policies, the PMU hired a short-term E&S expert through the FAO-TA and E&S focal persons at the PMU supported by three E&S focal persons at project support teams. A detailed periodic report on E&S issues was prepared and shared with the World Bank. The GRM successfully resolved 39 grievances reported under the project. At the completion of the project, the overall safeguards performance was deemed Satisfactory.

Fiduciary Compliance

66. Financial management (FM) performance was rated as Moderately Satisfactory in most ISRs due to delays in submission of the internal audit documents. While the PMU made efforts every year to have the project activities reviewed by the internal auditors, the Internal Audit Unit under the MOAL was not able to cater to the PMU's needs due to shortage of manpower, except for the last two years of the project period. The fiduciary performance improved and was upgraded to Satisfactory toward the end of the project with the timely submission of the internal audit report, adequate FM staffing arrangements, and improved compliance with financial reporting and other covenants. In terms of procurement, the project faced several challenges, including staff turnover, weak procurement capacity (particularly in field offices), a lack of understanding of the World Bank's procurement and STEP systems, improper packaging of contracts, and confusion between operating and procurement expenses. Although the RGoB followed the World Bank-supported electronic Government Procurement (e-GP) system for procurement, the World Bank required the use of conventional procurement methods until the fifth year of project implementation. This led to a Moderately Unsatisfactory rating for procurement performance during the early and middle phases of the project. To address these challenges, the project prioritized proper record-keeping, accurate and timely updates to STEP (delegated to field-level implementing agencies), and continuous training to build capacity at the field offices. During the interim, the Project Director assumed direct responsibility for procurement management. As a result of these efforts, procurement performance significantly improved, culminating in a Satisfactory rating by project completion.

C. BANK PERFORMANCE

Quality at Entry

67. The project design was well-aligned with the country's strategic context and sector challenges at the time of appraisal, supporting both the Government and World Bank development agendas. The World Bank team provided essential support during preparation and appraisal, ensuring the design incorporated valuable lessons on institutional and implementation arrangements from previous World Bank projects. Some targets in the RF were ambitious and required modification during project implementation.

Quality of Supervision

68. During the project period, the World Bank team provided regular implementation support through 14 missions including an MTR, virtual missions during COVID-19, and monthly check-in meetings. The team members visited project sites and interacted with the beneficiaries and the local implementing units. The ISRs documented the project's progress and any shortcomings, while the Aide Memoires/Technical Notes included agreed actions and the next steps. Despite frequent changes in the TTLs, the team continued to provide practical recommendations and technical solutions to address challenges faced during implementation. The team was proactive and supportive of the Government's request to restructure the project and ensured that the FAO was fully involved in supporting the project team. The World Bank team

paid considerable attention to project sustainability, especially regarding the BSM concept for market links and training curriculum to strengthen FGs through the DAMC and integration of CRP activities into local administration budget. Overall, the World Bank team's commitment to regular communication, thorough documentation, adaptability, and technical support helped maintain a strong and collaborative working relationship with the counterparts.

Justification of Overall Rating of Bank Performance

69. Based on the quality at entry and quality of supervision, the World Bank performance is rated as Satisfactory. The team demonstrated strong alignment with strategic goals, provided essential support, and maintained proactive and adaptive supervision throughout the project lifecycle.

D. RISK TO DEVELOPMENT OUTCOME

70. Several measures have been designed to ensure the project's activities are sustained and integrated into regular operations, thereby reducing the risk to development outcomes. For instance, the DAMC issued a directive to clarify the roles and responsibilities of MOAL staff at the central and local levels to sustain the BSM concept. Additionally, the DAMC will integrate the curriculum developed by the project into the national program for strengthening FGs and cooperatives. Trained CRPs are expected to continue providing services, with the five FSAPP dzongkhag administration units incorporating CRP activities into their budgets and ARDC nutrition focal persons ensuring continuity in delivery and training. ARDC has committed to scaling up CSA technologies. The project constructed four irrigation schemes in the Samtse and Sarpang Dzongkhags, with two schemes in each district. These schemes have been handed over to water users. The individual water user associations are tasked with routine maintenance, while major renovations will be incorporated into the local government plans according to existing practices. Local governments have agreed to facilitate the connection between schools and FGs to ensure a stable supply of nutritious food for students while supporting local agriculture. While most of the infrastructure has been handed over to the groups, the absence of an O&M plan in most cases and inexperience with group management of such investment poses a risk to sustainability. The project has developed a plan to transfer responsibility to the local governments, research centers, and the Economic Development and Marketing Officer of the DMAC to manage and monitor the utilization of the respective infrastructures. The proper use of these assets, however, relies on effective local management and appropriate resource allocation.

V. LESSONS AND RECOMMENDATIONS

71. Lessons

a. Investing in irrigation infrastructure and efficient water management practices has demonstrated benefits, particularly in terms of enhanced agricultural productivity and resilience. Most of the infrastructure developed under the project has been handed over to the community groups, empowering them to take ownership and responsibility for O&M of the infrastructure.

b. The BCC initiative has demonstrated that raising awareness about dietary diversity and the benefits of a balanced diet can significantly improve nutrition outcomes among project beneficiaries. The establishment of nutrition kitchen gardens has proven to be an effective strategy in providing a sustainable source of diverse and nutritious foods, leading to improved dietary habits. The achievement of medium or high HDDS among beneficiaries underscores the success of these efforts in enhancing dietary quality and nutritional outcomes.

c. The adoption of new technologies was closely linked to the promotion of integrated technology packages and the provision of effective demonstration and training programs through the research centers.

d. BSM organized by the project proved to be a pivotal platform for uniting stakeholders in the agricultural sector. These events facilitated the formation of commercial partnerships between buyers and sellers.

e. FAO-TA provided significant support throughout the project, contributing to critical areas such as BCC strategies, post-harvest and market linking activities, procurement, safeguards, M&E, and overall project management.

72. Recommendations

a. To enhance the technology adoption rate, it is important to develop and promote comprehensive technology packages that are user friendly, address multiple aspects of beneficiaries' needs, and provide clear benefits.

b. To maximize impact and ensure the sustainability of community-level institutions and infrastructures, it is crucial to develop and implement a comprehensive O&M plan, secure funds for major repairs, improve water distribution efficiency, establish capacity-building mechanisms, and create governance structures that empower the community to manage and sustain these systems.

c. To develop and sustain a truly robust commercial partnership, focus should be on enhancing active buyer involvement and ensuring contract enforceability through clear and comprehensive contract terms that outline the responsibility and obligation of the buyers and sellers.

d. Future projects should continue to leverage TA to ensure access to expert knowledge and skills. This will lead to effective implementation and better outcomes across various project components.

e. Future projects can build on the success of the BCC initiative and nutrition kitchen gardens to further improve nutrition outcomes and promote dietary diversity. These initiatives can be tailored to address the specific needs and cultural context of different communities. Continuous advocacy is also needed to sustain these initiatives.

ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS

A. RESULTS FRAMEWORK

PDO Indicators by Outcomes

Enhance productivity and marketable surplus								
Indicator Name	Baseline		Closing Period (Original)		Closing Period (Current)		Actual Achieved at Completion	
	Result	Month/Year	Result	Month/Year	Result	Month/Year	Result	Month/Year
Productivity of targeted crops increased by at least 25 percent in project areas (Percentage)	0.00	Apr/2017	20	Dec/2022	25.00	Dec/2024	24	Dec/2024
	Comments on achieving targets		This indicator is assessed by comparing the treatment group's data from the project's final impact evaluation value with the baseline value. The average agricultural productivity among project beneficiaries increased by 24%, exceeding the initial target of 20% and nearing the revised target of 25%.					
Increase in volume of produce marketed by at least 25 percent (Percentage)	0.00	Apr/2017	20	Dec/2022	25.00	Dec/2024	28	Dec/2024
	Comments on achieving targets		This indicator is assessed by comparing the treatment group's data from the project's final impact evaluation value with the baseline value. The average increase in the volume of priority crops marketed by project beneficiaries is 28%, exceeding the initial target of 20% and the revised target of 25%.					
Increase in value of produce marketed by at least 25 percent (Percentage)	0.00	Apr/2017	20	Dec/2022	25.00	Dec/2024	35	Dec/2024
	Comments on achieving targets		This indicator is assessed by comparing the treatment group's data from the project's final impact evaluation value with the baseline value. The average percentage increase in the value of priority crops marketed by project beneficiaries is 35%, exceeding the initial target of 20% and the revised target of 25%.					
Number of direct project beneficiaries (Number)	0.00	Apr/2017	10,400	Dec/2022	11,938.00	Dec/2024	12,916	Dec/2024
	Comments on achieving targets		The project directly benefited 12,916 people, surpassing the End of Project (EoP) target of 11,938 by 8%. Notably, female beneficiaries accounted for 59.6% (7,689 individuals), exceeding the target of 34%.					
Female Beneficiaries (Percentage)	0.00		30		34.00		59	

Intermediate Indicators by Components

Component 1:Strengthening Farmer and Producer Groups								
Indicator Name	Baseline		Closing Period (Original)		Closing Period (Current)		Actual Achieved at Completion	
	Result	Month/Year	Result	Month/Year	Result	Month/Year	Result	Month/Year
1.1 Number of beneficiary groups receiving technical trainings and other capacity building support (Number)	0.00	Apr/2017	300	Dec/2022	310.00	Dec/2024	335	Dec/2024
	Comments on achieving targets		A total of 335 beneficiary groups received technical training and capacity-building support, surpassing the target of 310 groups.					
1.2 Number of farmers who are members of an association including producer groups, cooperatives etc. (disaggregated by gender) – GAFSP Core Indicator # 14 (Number)	0.00	Apr/2017	10,400	Dec/2022	5,898.00	Dec/2024	10,076	Dec/2024
	Comments on achieving targets		10,076 farmers (44.56 percent female) became members of an association, including producer groups and cooperatives					
Number of Female members of an association including producer groups, cooperatives etc (Number)	0.00	Apr/2017		Dec/2022	2,005.00	Dec/2024	4,490	Dec/2024
1.3 Number of people receiving improved nutrition services and products through the project - GAFSP Core Indicator # 11 (new GAFSP indicators) (Number)	0.00	Apr/2017	6,000	Dec/2022	6,000.00	Dec/2024	6,834	Dec/2024
	Comments on achieving targets		This indicator measures number of people who received nutrition counseling/education and people receiving extension support for nutrition-relevant techniques. The project reached 6,834 individuals, including 3,456 women, with enhanced nutrition services, exceeding the initial target of 6,000 individuals, of which 2,400 were women. Furthermore, 4,856 people received nutrition counseling and education, while 1,978 received extension support, surpassing the targets of 4,000 for nutrition counseling and education and nearly meeting the target of 2,000 for extension support.					
1.3.1 Number of people who received nutrition counseling/education (Number)	0.00				4,000.00		4,856	
1.3.2 Number of people receiving extension support for nutrition-relevant techniques (Number)	0.00				2,000.00		1,978	
Number of Females beneficiaries receiving improved nutrition services	0.00	Apr/2017		Dec/2022	2,400.00	Dec/2024	3,456	Dec/2024

and products through the project-GAFSP Core Indicator # 11 (new GAFSP indicators) (Number)								
Component 2: Enhancing Farmer Productivity								
Indicator Name	Baseline		Closing Period (Original)		Closing Period (Current)		Actual Achieved at Completion	
	Result	Month/Year	Result	Month/Year	Result	Month/Year	Result	Month/Year
2.1 Targeted crop area provided with irrigation – GAFSP CI # 6 (Number)	0.00	Apr/2017	1,596	Dec/2022	2,244.00	Dec/2024	2,275.12	Dec/2024
	Comments on achieving targets		Irrigation extended over 2,275 acres, including 1,924 acres of flood irrigation and 351 acres of micro-irrigation, exceeding the individual targets as well as overall target of 2,244 acres and benefiting 2,395 water users (which is 86% of the target).					
Area covered by Flood Irrigation (Number)	0.00	Oct/2022	1,346	Dec/2022	1,914.00	Dec/2024	1,924.00	Dec/2024
Area covered by Micro Irrigation (Number)	0.00	Apr/2017	250	Dec/2022	330.00	Dec/2024	351.12	Dec/2024
2.2 Number of water users with new/improved irrigation services – GAFSP Core Indicator # 8 (Number)	0.00	Apr/2017	4,065(813 HHs)	Dec/2022	2,767.00	Dec/2024	2,395	Dec/2024
New users with Flood Irrigation (Number)	0.00				744.00		761.00	
New users with Micro Irrigation (Number)	0.00				2,023.00		1,634	
2.3 Number of farmers who have adopted an improved agricultural technology promoted by the project in targeted project areas (Number)	0.00	Apr/2017	10,400	Dec/2022	8,300.00	Dec/2024	10,794	Dec/2024
	Comments on achieving targets		Technology adoption under FSAPP is measured by: (i) individuals adopting established technologies like seeds, fertilizers, and polyhouses, and (ii) individuals adopting new and improved crop management practices promoted and demonstrated by FSAPP. The number of adopters of the first category is measured as the number of project beneficiaries that received the input or technology multiplied by the adoption rate as measured by the Annual Outcome Surveys organized by FSAPP. The number of adopters of the second category is measured as the number of project beneficiaries supported by FSAPP promotion and demonstration activities multiplied by the adoption rates from such activities which is captured through specific surveys conducted by the Agricultural Research and Development centers responsible for promoting these technologies. Altogether, 10,794 beneficiaries (41% female) adopted improved technology, surpassing the End of Project (EOP) target of 8,300.					

Number of Female farmers who have adopted an improved agricultural technology promoted by the project in targeted project areas (Number)	0.00	Apr/2017		Dec/2022	4,059.00	Dec/2024	4,476	Dec/2024
2.4 Total land area under cultivation for citrus and cardamom increased by 6 percent (Percentage)	0.00	Apr/2017	5	Dec/2022	6.00	Dec/2024	5.70	Nov/2024
	Comments on achieving targets		The indicator is measured as the average of the percentage increase of sub indicators cardamom and citrus giving equal weights to each commodity. Achievement is 95%.					
Cardamom- cultivated area (Number)	1,140.00		1,197		1,208.00		1,211	
Citrus- cultivated area (Number)	3,744.00		3,931		3,968.00		3,998	
2.5 Number of beneficiaries reached, who have been helped to cope with impact of climate change; GAFSP Core Indicator # 1 (Number)	0.00	Apr/2017		Dec/2022	1,500.00	Dec/2024	9,946	Dec/2024
	Comments on achieving targets		This is assessed through the delivery of Climate-Smart Agriculture (CSA) technologies in the Project Management System (PMS). The following activities were identified as CSA in the Additional Financing (AF): kitchen gardens, nutrition gardens, low-cost polyhouses, fabricated polyhouses, and water harvesting technology. Through these efforts, FSAPP has significantly contributed to helping 9,946 beneficiaries cope with the impacts of climate change. Notably 42% of these beneficiaries are women.						
Number of female beneficiaries reached, who have been helped to cope with impact of climate change (Number)	0.00				510.00		4,150	

Component 3: Enhancing Access to Markets

Indicator Name	Baseline		Closing Period (Original)		Closing Period (Current)		Actual Achieved at Completion	
	Result	Month/Year	Result	Month/Year	Result	Month/Year	Result	Month/Year
3.1 Number of beneficiaries of project supported market infrastructure (Number)	0.00	Apr/2017	30	Dec/2022	59.00	Dec/2024	64	Dec/2024
	Comments on achieving targets		The project supported 64 market infrastructure, exceeding the target of 59.					
3.2 Number of producer groups receiving market information (Number)	0.00	Apr/2017	30	Dec/2022	40.00	Dec/2024	78	Dec/2024
	Comments on achieving targets		78 producers groups received market information surpassing the target of 40.					

3.3 Number of farmer groups linked to schools (Number)	0.00	Apr/2017	10	Dec/2022	25.00	Dec/2024	23	Dec/2024
	Comments on achieving targets		The project linked 45 PGs to 23 schools within the five project dzongkhags.					
3.5 Proportion of beneficiaries with medium or high (>7) Household Dietary Diversity Score (Percentage)	50.00	Apr/2017		Dec/2022	70.00	Dec/2024	83.73	Dec/2024
	Comments on achieving targets		The percentage of beneficiaries achieving a medium or high Household Dietary Diversity Score (greater than 7) reached 88.7%, exceeding the target of 70%.					
3.6 Number of post-harvest facilities constructed and or rehabilitated includes markets, agro-processing/storage/quality control facilities (Number)	0.00	Apr/2017		Dec/2022	32.00	Dec/2024	28	Dec/2024
	Comments on achieving targets		The project facilitated the construction and/or renovation of 28 post-harvest facilities, encompassing markets, agro-processing mills, storage quality control facilities, centralized pack house, integrated cold storage, food processing and packing equipment and materials, and farmer shops. This achievement accounts for 88% of the End of Project (EoP) target.					

Component 4: Project Management

Indicator Name	Baseline		Closing Period (Original)		Closing Period (Current)		Actual Achieved at Completion	
	Result	Month/Year	Result	Month/Year	Result	Month/Year	Result	Month/Year
4.1 Learning notes or case studies published and disseminated (Number)	0.00	Apr/2017	5	Dec/2022	4.00	Dec/2024	4	Dec/2024
4.2 Progress reports satisfactory (Text)	reports prepared	Apr/2017	Accurate and timely reports	Dec/2022	Accurate and timely reports	Dec/2024	Yes	Dec/2024
4.3 Procurement satisfactory (Text)	reports prepared	Apr/2017	Contracts awarded and completed on schedule	Dec/2022	Contracts awarded and completed on schedule.	Dec/2024	Upgraded to MS	Dec/2024
4.4 Percentage of beneficiaries satisfied with services provided by the project. (Percentage)	0.00	Apr/2017	50	Dec/2022	50.00	Dec/2022	99.28	Dec/2024

B. KEY OUTPUTS

1. **Enhance productivity and marketable surplus**	
PDO Indicators	1. Productivity of targeted crops increased by at least 25 percent in project areas 2. Increase in volume of produce marketed by at least 25 percent 3. Increase in value of produce marketed by at least 25 percent 4. Number of direct project beneficiaries; 34 percent women
Key Outputs (linked to the achievement of the PDO Outcome)	1. 24 percent increase in productivity of targeted crops 2. 28 percent increase in volume of produce marketed 3. 35 percent increase in value of produce marketed 4. 12,916 direct project beneficiaries; 59 percent women
Component 1:Strengthening Farmer and Producer Groups	
Intermediate Results Indicators	1.1 Number of beneficiary groups receiving technical trainings and other capacity building support 1.2 Number of farmers who are members of an association including producer groups, cooperatives etc. (disaggregated by gender) – GAFSP Core Indicator # 14 1.3 Number of people receiving improved nutrition services and products through the project - GAFSP Core Indicator # 11 (new GAFSP indicators)
Key Outputs (linked to the achievement of the Component)	1.1. 335 beneficiary groups received technical trainings and other capacity building support 1.2. 10,076 farmers are members of an association, including PGs and cooperatives (4,490 female farmers) 1.3. 6,834 people received improved nutrition services and products
Component 2: Enhancing Farmer Productivity	

Intermediate Results Indicators	2.1 Targeted crop area provided with irrigation – GAFSP CI # 6 2.2 Number of water users with new/improved irrigation services – GAFSP Core Indicator # 8 2.3 Number of farmers who have adopted an improved agricultural technology promoted by the project in targeted project areas 2.4 Total land area under cultivation for citrus and cardamom increased by 6 percent 2.5 Number of beneficiaries reached, who have been helped to cope with impact of climate change; GAFSP Core Indicator # 1
Key Outputs (linked to the achievement of the Component)	2.1. 2,275.12 acres provided wiith irrigation (1,924 acres: flood irrigation; 351 acres: micro irrigation) 2.2. 2,395 water users with new/improved irrigation services 2.3. 10,794 farmers adopted an improved agricultural technology 2.4 5.7 percent increase in total land area under cultivation for citrus and cardamom 2.5. 9,946 beneficiaries helped to cope with impact of climate change (4,150 femal beneficiaries)
Component 3: Enhancing Access to Markets	
Intermediate Results Indicators	3.1 Number of beneficiaries of project supported market infrastructure 3.2 Number of producer groups receiving market information 3.3 Number of farmer groups linked to schools 3.4 Proportion of beneficiaries with medium or high (>7) Household Dietary Diversity Score 3.5 Number of post-harvest facilities constructed and or rehabilitated includes markets, agro-processing/storage/quality control facilities
Key Outputs (linked to the achievement of the Component)	3.1. 64 beneficiares of project supported market infrastructure 3.2. 78 producer groups received market information 3.3. 23 farmers groups linked to schools 3.4. 84 percent of beneficiaries with medium or high (>7) HDDS 3.5. 28 post harvest facilities constructed or rehabilitated
Component 4: Project Management	
Intermediate Results Indicators	4.1 Learning notes or case studies published and disseminated 4.2 Progress reports satisfactory 4.3 Procurement satisfactory 4.4 Percentage of beneficiaries satisfied with services provided by the project.

Key Outputs (linked to the achievement of the Component)	4.1. 4 learning notes or case studies 4.2. Progress reports are submitted biannually 4.3. Contracts awarded and completed on schedule and procurement progess upgraded to Moderately Satisfactory 4.4. 99.28 percent beneficiaries satisfied with project services

ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION

A. TASK TEAM MEMBERS

At Preparation		At Completion	
Name	**Role**	**Name**	**Role**
Winston Dawes	Task Team Leader	Sheu Salau	Task Team Leader
Imtiaz Alvi	Co-Task Team Leader	Joachim Vandercasteelen	Co-Task Team Leader
Tanvir Hossain	Procurement Specialist	Mirza Omer Baig	Financial Management Specialist
Savinay Grover	Financial Management Specialist	Hasib Chowdhury	Financial Management Specialist
Bandita Sijapati	Social Safeguards Specialist	Mohammad Chowdhury	Financial Management Specialist
Farhat Jahan Chowdhury	Environmental Safeguards Specialist	Md Kamruzzaman	Procurement Specialist
John Prakash Badda	Team Member	Fatema Samdani Roshni	Procurement Specialist
Mio Takada	Team Member	Md Istiak Sobhan	Environmental Specialist
Purna Bahadur Chhetri	Team Member	Shabbir Ahsan	Social Specialist
Raj Ganguly	Team Member	Shourov Kumar Sharma	Procurement Team
Saleha Waqar	Team Member	Karma Wangdi	Procurement Team
Chris Landon-Lane	Team Member	Shahnun Nima Tania	Procurement Team
Shyam Ranjitkar	Team Member	Zibun Nessa Pinu	Procurement Team
		Pamela Patrick	Procurement Team
		Ama Esson	Team Member
		John Prakash Badda	Team Member

B. STAFF TIME & COST

Stage of Project Cycle	Staff Time & Cost	
	No. of Staff Weeks	US$ (including travel and consultant costs)
Preparation		
FY15	5.550	37,950.09
FY16	53.835	256,638.83
FY17	11.487	95,882.74
FY18	6.650	57,631.51
FY19	0.000	987.68
Total	77.52	449,090.85
Supervision/ICR		
FY16	0.000	2,708.53
FY17	0.000	1,845.17
FY18	17.075	154,114.74
FY19	25.657	318,725.58
FY20	29.023	289,277.67
FY21	22.086	144,758.25
FY22	20.359	156,746.10
FY23	27.677	259,448.67
FY24	19.150	216,960.86
FY25	24.775	225,152.79
Total	185.80	1,769,738.36

ANNEX 3. PROJECT COST BY COMPONENT

Component	Amount at Approval (US$, millions)	Amount at Project Closing (US$, millions)	Percent of approval amount (%)
Component 1: Strengthening Farmer and Producer Groups	1.2	0.740	62
Component 2: Enhancing Farmer Productivity	8.0	8.369	105
Component 3: Enhancing Access to Markets	2.4	2.168	90
Component 4: Project Management	0.9	1.091	121
Total	12.64	12.37	98

ANNEX 4. EFFICIENCY ANALYSIS

Methodology

1. **EFA at completion.** An ex-ante EFA consisting of a cost-benefit analysis (CBA) was undertaken at appraisal (2017) and was updated as part of the Project Paper for an AF that was approved in 2021. In line with the IEG guidelines for ICR, the EFA of the project was re-run and its indicators (ERR and NPV) were re-estimated at the time of the ICR mission (February–March 2025) and compared to the values projected at both the appraisal and AF stage. While the original PAD EFA did not include the economic value of GHG emissions, such value was introduced at the AF stage and re-estimated at completion as well. Project costs and benefits were therefore re-estimated at completion stage in the following way.

2. **Updating project costs and prices.** The ICR team updated annual project costs between 2017 and 2024 based on actual project disbursements. Financial prices of inputs and outputs were also updated to their levels in February 2025. Regarding economic prices, the ICR broadened the range of key commodities for which parity prices were calculated at completion. These include import parity prices for rice and urea and export parity prices for citrus and potato. The other parameters used for the EFA remained largely unchanged, for example, the standard conversion factors for non-tradable goods (at 0.9) and the discount rate at 10 percent to evaluate the project's NPV.

3. **EFA methodology.** The ICR team applied as much as possible the methodology used at the appraisal and AF stages with some necessary adjustments to account for changes of some activities during implementation.

- The crop budgets in the with and without project situations developed at appraisal and confirmed at the AF stage were updated for all priority crops. Actual performances were assessed at completion, resulting from project research, demonstration, and adoption campaigns leading to improved technology adoption.
- Some adjustments were introduced in activity models to assess the most significant interventions financed by the project. EFA performances of the five most impactful project interventions (besides the technology adoption) were assessed: (a) rehabilitation of irrigation schemes, (b) electric fencing, (c) the provision of greenhouses, (d) the FSOs, and (e) the cold storage and pack house facilities.
- The financial crop budgets and activity models were converted into economic models by converting market prices by economic value and aggregating models at the project level based on actual coverage by the project, as documented by the PMIS.
- The impact of the project on GHG emissions was assessed and valued at the shadow price of carbon as recommended by the World Bank.
- Finally, given the importance of the nutrition element of the project, an attempt to assess the economic value of nutrition benefits was undertaken and added to the economic streams of the project to calculate the ERR.

Project Benefits

4. **Sources of information.** The ICR team used four main sources of information to estimate project impacts and agricultural performances as a result of project interventions:

(a) The '**EoP IE Survey'** by an independent consultant at project completion (full report released in early March 2025) surveyed a representative random sample of 838 households and 146 FGs throughout the 29 gewogs across five dzongkhags. Interviewees were randomly selected in the 29 project gewogs (beneficiaries) and the 29 non-project gewogs in the same five dzongkhags. The impact assessment contains a wealth of information related to socioeconomic characteristics, household incomes, land use, access to markets and financial services, crop and livestock production and marketing, the impact of project interventions and support, and nutrition diversity and behaviors.

(b) The **successive AOSs** were undertaken on a yearly basis between 2018 and 2023 to collect data on crop productivity, marketing of products, and the value of produce and nutrition indicators. They also contained more qualitative information based on group discussions. The AOSs have been a major source of information to assess crop performance.

(c) **Specific thematic reports** were produced by the project M&E team on (a) the benefit of the Ratey Khola Irrigation scheme; (b) the technology adoption report of the various technologies promoted by the project; (c) the FSOs report; (d) the Technical Assistance Output Report; and (e) the BCC report.

(d) The **ICR team conducted field visits and interviews** with water users of the Ratey Khola irrigation schemes, producer and marketing groups, owners of greenhouses, FSOs, and cold storage facilities.

Revised Financial Analysis

5. The crop budgets projected at the appraisal and AF stages were recalculated at completion using the actual crop performances documented by the AOS and the Impact Assessment Survey. To attenuate the effect of interannual climatic variations on crop performances, an average of the three latest AOSs (2021, 2022, and 2023) and the Impact Assessment Survey (2024) was used as proxy of performances with the project and compared with the without-project scenario at project inception (2018). Market prices were also updated to their early 2025 levels. Crop budgets and performance were updated, and the results are summarized in Table 4.1. Crop productivity increased by an average of 45 percent, ranging from −6 percent (pea) to 146 percent for cardamom. As a result, the net benefit per acre increased to levels ranging from BTN 24,398 to BTN 297,763 per acre (respectively, US$287 and US$3,503). The return per labor day for a family with the project ranges from BTN 483 to BTN 7,491, equivalent to US$5.7 and US$88.1. Table 4.1 summarizes the financial indicators of crop budgets with and without the project.

Table 4.1. Summary Results of Crop Budgets without and with the Project

Crop	Yields (kg/acre)		Net Return per Acre (BTN/acre)		Net Return per Labor (BTN/labor day)	
	Without[a]	With[b]	Without	With	Without	With
Paddy	1.021	1,276	37,310	42,855	642	906
Maize	1,640	2,050	44,765	65,422	995	1,392
Potato	1,985	3,058	19,447	24,398	454	483
Mandarin	2,715	3,315	84,730	189,754	3,562	6,991
Cardamom	93	229	38,521	297,763	1,482	7,491
Onion	1,206	1,657	43,923	49,149	1,127	1,194
Tomato	1,964	3,868	67,166	171,021	1,335	2,543

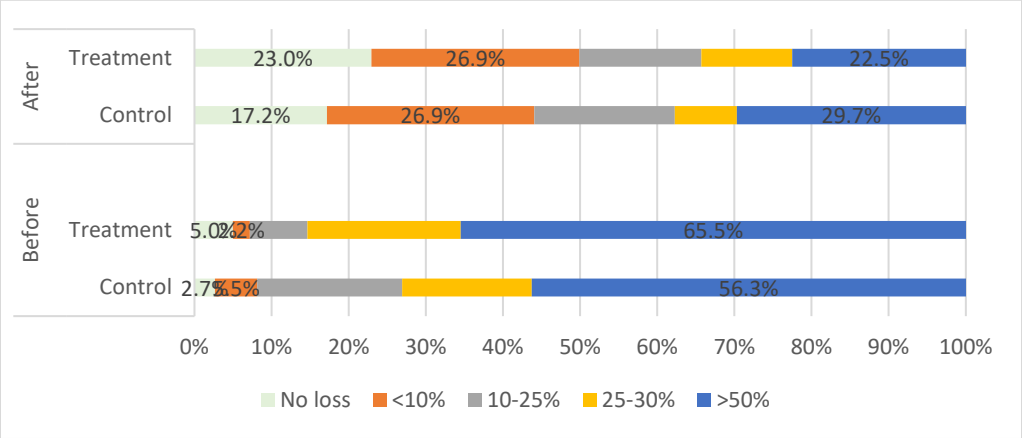
Note: a. At baseline (2018).
b. Average 2022–2024 AOS and Impact Assessment Survey.

6. Table 4.2 shows the financial results of the five most impactful interventions for which activity models were developed based on performance data available at completion. Electric fencing appears to be the most profitable investment with a financial rate of return (FRR) at 76.5 percent. The result of the reduction in crop losses by 32 percent every year is evidenced by the Impact Assessment Report (Figure 4.1). At the other end of the spectrum, greenhouses appear less profitable with an FRR of 6.5 percent. While the benefits are substantial for the farmers, the important investment cost (BTN 80,000; US$940 for 100 m^2) reduces the project's financial performance, thereby justifying some cost sharing with the Government.

Table 4.2. Financial Results of the Five Main Project Interventions

Activity/Scope	Benefits	FRR (%)	NPV (10% discount rate)
Rehabilitation of five irrigation schemes covering 1,914 acres	Increased productivity on both wetland (paddy fields) and 'dryland' receiving complementary irrigation	17.4	BTN 80.8 million US$0.95 million
Electric fencing of 400 km protecting a total of 6,169 acres	Reduced losses by an average of 32% annually on 6,169 acres	76.5	BTN 522 million US$6.14 million
Provision of 2,434 greenhouses for protected agriculture (20 × 5 m)	Increase from 1 to 3 crops of vegetables and legumes per year	6.5	−BTN 32.3 million −US$0.38 million
Construction of five FSOs	Value addition estimated at BTN 80 per kg of goods—450 kg of goods sold per week	28.1	BTN 29.3 million US$0.35 million
Construction of two cold storage and packing house facilities	Total capacity of 300 metric tons—price increases between BTN 15 and 20 per kg per season	17.9	BTN 7.6 million US$0.09 million

Figure 4.1. Intensity of Crops Lost before and after the Fencing Support



Source: EoP Impact Assessment Report

Revised GHG Accounting

7. GHG accounting was not undertaken at appraisal but was introduced by the GAFSP in 2020, who requested the FAO for accounting of its entire portfolio including the Bhutan FSAPP using its Ex-Ante Carbon-balance Tool (EX-ACT). The purpose is to assess the project's net carbon balance, that is, the balance between emission and sequestration of tons of carbon dioxide equivalent (tCO_2e) as a result of project implementation compared to a 'without project' scenario. The World Bank team updated this accounting exercise in 2022 in the AF Project Paper as part of the revised EFA. This analysis at the ICR stage builds on the AF analysis and applies the same methodology, in which quality had been assessed and confirmed through a quality assurance process. The ICR team revised assumptions and parameters based on actual achievements at completion. It uses the most recent version of the EX-ACT software (version 9.4.2).

8. The ICR team confirmed the key Intergovernmental Panel on Climate Change parameters used at the AF stage: the FSAPP project area mostly has a warm temperate moist climate, and the dominant soil type is high activity clay. The analysis at completion uses Tier 1 coefficients, and the dynamics of change are also assumed to be linear. The project implementation period was adjusted to 6 years and capitalization period to 14 years. The analysis also assumes that the without-project scenario (business as usual) is the same as the current scenario. The ICR team revised some of the expected assumptions and identified the following set of impacts on GHG emissions, some of which were negative (increased

emissions) and some positive (reduced emission with project compared with the business-as-usual scenario. The detailed calculations and assumptions are contained in the separate EX-ACT file.

Table 4.3. Summary Assumption for GHG Calculation in EX-ACT

Expected Project Impact	Current/without Project Scenario	With Project Scenario	Source of Data	Net Emissions[a]
Land Use Change				
Increased area in perennial crops	Citrus: 3,744 acres Cardamom: 1,140 acres	Citrus: 3,998 acres Cardamom: 1,211 acres	RF at completion (indicator 2.4)	+
Reduced land left fallow	20% of land left fallow by beneficiaries	15% of land left fallow (reduction of 5%)	Impact Assessment Survey	+
Crop Management				
Conversion of wetland into fully irrigated area	1,914 acres in the command area relying on rainfall	1,914 acres flooded irrigation in the command area of the four rehabilitated schemes	RF at completion and report on the Ratey Khola scheme	+
Conversion of rainfed area in irrigated land with sprinklers	351 acres rainfed	351 acres irrigated with sprinklers	RF at completion	+
Better management of citrus orchard	No-tillage, low-input orchards	No-tillage, medium-input system adopted by 75% of the 10,794 HHs adopting improved technology on their orchards (0.85 acre each)	RF at completion (No. of HHs) Adoption report (75% adoption rate) Impact assessment (average land per HH)	-
Improved CSA as a result of project demonstration and adoption	Annual crops under traditional crop management—full tillage, medium Carbon inputs	Annual crops under improved management by 75% of the 10,794 HHs adopting improved technology (1.85 acres of cropland each)—full tillage, high Carbon inputs (better nutrient management)	RF at completion (No. of HHs) Adoption report (75% adoption rate) Impact assessment (average land per HH)	-
Increased Use of Inputs				
Fertilizer and herbicide use on land where improved technology is adopted	Low level of input use on annual crop and orchards	Increased use of N fertilizers (urea) estimated at 30 kg per acre on 75% of cropland and orchards of beneficiaries adopting improved technologies (10,794)	RF at completion (No. of HHs) Adoption report (75% adoption rate) Impact assessment (average land per HH); crop budgets	+
Agricultural buildings	n.a.	Construction material for 2 cold storage/0 packing houses facilities, 5 FSOs (total 3,000 m^2 - cement) and 2,434 greenhouses (total 243,400 m^2 - steel)	PMIS (quantities of buildings and greenhouses) and ICR team estimates (on construction material and their climate change impact	+

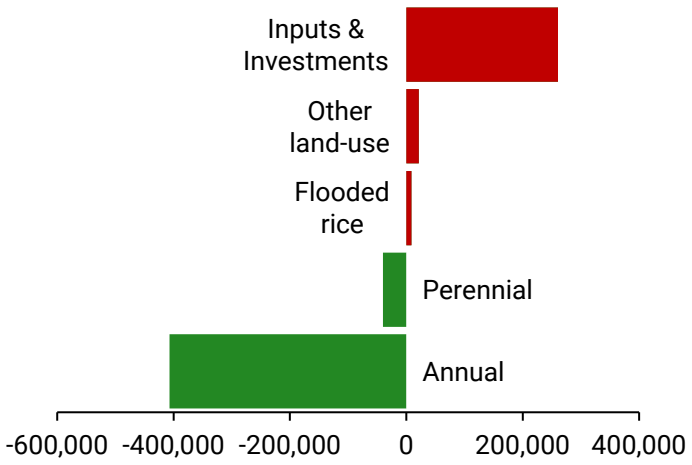
Expected Project Impact	Current/without Project Scenario	With Project Scenario	Source of Data	Net Emissions[a]
Use of plastics in greenhouses and field mulching	n.a.	Plastic used and replaced for the 2,911 greenhouse shed nets and 3,468 units of plastic mulches installed	PMIS and ICR team estimates of GHG emissions of plastics from greenhouse sheds and mulches	+
Gasoline for women-friendly machinery	n.a.	Gasoline consumption of the 1,615 pieces of machinery provided by the project (mini tillers, rice mills, and grass cutters)	PMIS data; ICR team estimate on annual fuel consumption of the machinery	+

Note: HH = Household.

a. In line with EX-ACT convention, + in red means increased GHG emissions as a result of the project (negative impact) while a – in green means reduced GHG emissions (mitigation potential)

9. The net carbon balance of the project is estimated as positive with a mitigation potential of 156,206 tCO_2e over 20 years, that is, an average of 9,189 tCO_2e per year at full development. Figure 4.2 shows the contributions of the various categories (inputs and investments, annual, perennial, flooded rice and other types of land use) on the total balance. In summary, the improvement in practices and nutrient management on orchards (perennial) and annual crops offsets the increased emissions from some land use change such as the increased use of construction material and inputs. However, the chart shows the substantial contribution of inputs and investments to increased GHG emissions. According to the ICR team estimates using EX-ACT, the emissions from increased use of plastic (for greenhouses and mulching) alone contribute to half of the GHG emissions from the project, at an estimated 130,000 tCO_2e.

Figure 4.2. Estimated net project contributions by categories of interventions



Source: ICR team estimates using EX-ACT tool

10. The annual net mitigation benefits of the project have been valued following the recommendations contained in the World Bank 2024 Guidance Note on Shadow Price of Carbon in Economic Analysis (https://documents1.worldbank.org/curated/en/099553203142424068/pdf/IDU1c94753bb1819e14c781831215580060675b1.pdf). The ERR and NPV have thus been calculated with and without accounting for the reduced GHG emission benefits.

Economic Valuation of Nutrition Benefits

11. The impact assessment and the AOSs documented the impact of the project on the combination of both diet diversity (through measuring the Diet Diversity Scores) and (as a result of the BCC activities) changed behaviors documented by the impact assessment such as handwashing, food safety, food storage, and consumption habits. A substantial body of evidence suggests that this combination can lead to a reduction in malnutrition and consequently child stunting, low weight at birth, and anemia, thereby generating economic benefits through (a) deaths averted, (b) reduced incidence of nonfatal health risks, and (c) improved lifetime productivity. The EFA at completion attempted to value these economic benefits.

12. The Nutrition International Cost of Inaction Tool is an online, evidence-based, and user-friendly analytical tool built for country-level policy makers and advocates. It was created to rapidly generate estimates on the health, human capital, and economic costs of inaction on stunting, low birth weight, and anemia (in women and children) for over 140 countries, including Bhutan. The total annual economic cost of the current level of undernutrition in Bhutan is estimated at US$47 million, equivalent to 2 percent of the gross national income (https://www.nutritionintl.org/learning-resource/cost-inaction-tool). This is the combination of the economic costs of stunting, low birth weight, anemia in children, and anemia in adolescent girls and women.

13. The combination of improved Diet Diversity Score and the behavior changes would result in a corresponding reduced cost of malnutrition as evidenced in the tool. The AOSs have shown an improvement in the Diet Diversity Score from 7.7 (out of 12 food groups) in 2019 to 8.04 in 2023. This is an increase of 7.2 percent. The impact assessment indicated a 4.6–10.6 percent improvement in beneficiary behaviors, depending on the specific behavior or practice measured. The combined influence of these factors is estimated to have had a positive impact on approximately 8.65 percent of project beneficiaries. As a result, improvements in nutrition are projected to yield annual economic benefits by reducing the cost of inaction by 8.65 percent for the affected project beneficiaries, estimated at 11,938 individuals out of Bhutan's total population of 791,524. This translates to an annual reduction in the cost of inaction calculated as

Total Cost of Inaction × Percentage Improvement × (Project Beneficiaries / Total Population)

= US$47 million × 8.6% × (11,938 / 791,524) = US$62,445 per year

14. These benefits have been incorporated in the calculation of the project ERR and NPV.

Revised Economic Analysis

15. **Economic models.** The financial crop budgets and activity models were converted into economic models by replacing market prices by their economic values estimated at completion in the following manner: (a) import parity prices were calculated for main imported products including rice and fertilizers, (b) export parity prices were calculated for main exported commodities such as potato and citrus, (c) market prices were used for non-tradable products such as most vegetables, (d) farm labor was valued at BTN 550 per working day, and (e) a standard conversion of 0.9 was applied to most other items such as investment costs.

16. **Aggregation at the project level.** The unit economic crop budget and activity models were then aggregated at the project level by the number of units recorded by the PMIS and the benefits phased in line with the actual project expenditures between 2017 and 2024. These investment expenditures were also deducted from the project benefits to calculate the project ERR and NPV (in US$) when applying a 10 percent discount rate.

17. A sensitivity analysis was performed on two aspects: (a) the reduced GHG emissions were valued at the shadow price of carbon as mentioned above and the nutrition benefits phased in as described above and both were added to the project economic streams and (b) a more pessimistic scenario was assumed by reducing expected project benefits by 20 percent. The results are summarized in Table 4.4 and compared with the corresponding values estimated during the appraisal and AF stages.

18. In summary, when GHG benefits are accounted for, the **ERR of the project is estimated at 23.2 percent, which is slightly higher than the projection at appraisal (22.8 percent) but higher than the projection updated at the AF stage (15.9 percent).** At completion, the NPV is estimated at US$6.7 million, which is slightly higher than the appraisal figure (that

was however not including GHG benefits and was calculated on the original project budget of US$8.0 million) and is substantially higher than the NPV calculated at the AF stage (US$3.1 million).[16]

19. The **sensitivity analysis** shows that (a) even without accounting for GHG and nutrition benefits, the project remains viable with 18.0 percent ERR and US$3.9 million NPV and (b) a 20 percent reduction of anticipated benefits would reduce the ERR to 17.2 percent and the NPV to US$3.5 million, indicating that the project would still be economically viable.

Table 4.4. Main Economic Results of the Project

Expected Project impact	At Appraisal	At AF Stage	At Completion
Total Project Cost	US$8.0 million	+US$4.6 million = US$12.6 million	US$12.6 million
ERR without GHG emissions	22.8%	15.5%	18.0%
NPV (10%) without GHG benefits	US$4.9 million	US$2.9 million	US$3.9 million
ERR with GHG and nutrition benefits	**22.8% (no GHG accounting)**	**15.9%**	**23.1%**
NPV with GHG benefits	**US$4.9 million (no GHG accounting)**	**US$3.1 million**	**US$6.7 million**
ERR with 20% reduced benefits	18.4%	9.2%	17.5%
NPV with 20% reduced benefits	US$2.8 million	US$1.0 million	US$3.6 million

20. **Comparison between ICR results and previous projections.** The ERR and NPV are stronger at completion than the projections at the AF stage (2022), indicating that the last phase of the project demonstrated strong results as documented by the impact assessment. The ERR is slightly higher at completion (23.1 percent) than the projections at the appraisal stage (22.8 percent) but lower than the appraisal figures if GHG and nutrition benefits are not accounted for. The reasons include the following:

- The ICR team was very **conservative** when estimating the areas benefitting from productivity enhancement by only considering the figures recorded by the PMIS that have directly benefitted from the demonstrations financed by the project. The ICR did not account for any spillover effect resulting in the adoption of more farmers while the PAD team anticipated a more 'ambitious/optimistic' scenario, with an area under improved practices more than double the actual area recorded by the PMIS.
- **Some slower than anticipated implementation** in the first years as well as the AF led to a longer project life than anticipated at appraisal: the project benefits were therefore slower to materialize than initially projected: for instance, the project appraisal EFA had assumed that full project benefits would be reached in 2022/2023 while they were actually achieved at actual completion (2025).
- The benefits from the **irrigation schemes** were probably overestimated at appraisal in terms of increased yields. The ICR team used actual data from one scheme: as a result, the ICR ERR of irrigation is 19.7 percent while it was overestimated at 30.0 percent at appraisal.
- The PAD EFA had anticipated some benefits from **food processing**. These did not fully materialize during implementation as investment in processing was scattered and not documented. Thus, the ICR team has no evidence to estimate value addition from processing. Instead, the ICR team estimated the value addition from the FSOs.

[16] The NPV included in the AF Project Paper is much higher than this figure because the AF economist had used a 5 percent discount rate. The NPV at the AF stage was therefore re-calculated by applying a 10 percent discount rate to enable the comparison between the PAD, the AF Project Paper, and ICR estimates, by applying the usual 10 percent discount rate.

- The benefits of **electric fencing** appear more important at the ICR stage than at appraisal, with the scope of fencing (400 km protecting 6,169 acres benefiting from a reduced crop loss of 32 percent) higher than anticipated at appraisal.

ANNEX 5. BORROWER, CO-FINANCIER AND OTHER PARTNER/STAKEHOLDER COMMENTS

1. The Royal Government of Bhutan (RGoB), through the Ministry of Agriculture and Livestock (MOAL), acknowledges the successful implementation and completion of the Food Security and Agriculture Productivity Project (FSAPP). The project made significant contributions toward improving agricultural productivity, increasing marketable surplus, and enhancing rural livelihoods in the targeted gewogs across the five project dzongkhags.

2. The Ministry appreciates and acknowledges the findings and assessments presented in the Implementation Completion and Results Report (ICR) for the project. We commend the ICR team for its comprehensive analysis, objectivity, and well-structured presentation of outcomes, challenges, and lessons learned.

3. FSAPP has contributed significantly to Bhutan's agricultural transformation by enhancing food security, diversifying livelihoods, and improving market access for smallholder farmers. The project's alignment with national development goals and its integration into the 11th and 12th Five-Year Plans (FYPs) underscore its strategic relevance. The collaborative design process, strong government ownership, and effective partnerships—especially with the World Bank and FAO—were instrumental to the project's success.

4. The project objectives were highly relevant to Bhutan's national development priorities and the World Bank's Country Partnership Framework. FSAPP supported Bhutan's 11th and 12th FYPs, focusing on food self-sufficiency, nutrition-sensitive agriculture, and market-oriented farming. It also aligned well with Bhutan's national priorities to reduce rural poverty, increase farmer incomes, and promote inclusive growth, particularly among smallholder farmers and vulnerable groups. By improving productivity and access to services, the project addressed key barriers faced by farmers, such as limited irrigation, weak market links, and poor access to quality inputs and knowledge.

5. We value the ICR's recognition of the project achievements in climate-smart agriculture, behavior change communication for nutrition, and community engagement. The development and promotion of farmer producer groups, water user associations, and the buyer-seller meet (BSM) platform have laid a strong foundation for sustainable rural development and market-driven agriculture.

6. Overall, the project has met or exceeded most of its development objectives. Notably, key PDO indicators—such as increases in the productivity (59.05 percent), volume (42.33 percent), and value (55.56 percent) of marketed produce—surpassed the original targets of 25 percent. Moreover, the number of direct beneficiaries reached (12,897), with 59.6 percent women, reflecting strong gender inclusion and widespread reach.

7. Under Component 1, FSAPP successfully strengthened 335 farmer and producer groups, and over 10,000 farmers are now members of associations. Nutrition-related services also exceeded targets, with 6,834 individuals receiving improved services and products.

8. Component 2 interventions significantly boosted productivity through irrigation, technology adoption, and climate-smart agriculture. Irrigation coverage reached 2,275 acres, and over 10,700 farmers adopted improved technologies. Furthermore, the project supported nearly 10,000 beneficiaries in adapting to climate change impacts.

9. Component 3 made important strides in improving market access, linking farmers to institutional markets such as schools, and rehabilitating 28 post-harvest facilities. Household Dietary Diversity Scores also improved substantially, with 83.73 percent of beneficiaries reporting medium to high dietary diversity.

10. Component 4 ensured strong project management, learning dissemination, and high levels of beneficiary satisfaction (99.28 percent).

11. While the project achieved most of its targets, some challenges were encountered, including delays due to COVID-19, structural issues in productivity for certain crops (for example, citrus), and initial overestimations in target setting.

However, timely restructuring and adaptive management allowed for realistic target revision and continued relevance to the evolving context.

12. The Government expresses its appreciation for the support of the World Bank, GAFSP, FAO-TA and all development partners and reiterates its commitment to sustaining and scaling up successful FSAPP interventions through national programs.

13. We recognize that initial implementation challenges, including capacity gaps and M&E system limitations, affected early project performance. However, these were systematically addressed through adaptive management, the establishment of a comprehensive Project Management System, and ongoing technical support. The project's transition to digital monitoring tools and the production of knowledge products like outcome surveys and case studies are particularly commendable.

14. The Ministry acknowledges and values the support and guidance extended by the World Bank team for implementing the project smoothly through Implementation Support Missions and other backstopping assistance to the project team. The Ministry values the initiatives undertaken by the project team, FAO-TA, and concerned stakeholders for the achievement of a 'Satisfactory' rating and effective implementation of the project.

15. Looking ahead, we remain committed to sustaining the project outcomes through institutional integration, capacity building, and strategic budgetary allocations. The lessons from FSAPP will inform the design and implementation of future agriculture and rural development programs, including those in the upcoming 13th FYP.

16. We extend our appreciation to the World Bank team for their guidance, flexibility, and responsiveness throughout the project lifecycle. The Government remains committed to deepening collaboration with development partners to advance Bhutan's food and nutrition security agenda.

ANNEX 6. SUPPORTING DOCUMENTS

- Project Appraisal Document
- Grant Agreement
- Restructuring Papers
- World Bank's Country Partnership Strategy (CPS) (FY15–19)
- World Bank's Country Partnership Framework (CPF) (FY 25-29)
- Aide Memoires
- Implementation Status Reports
- Bhutan Poverty Assessment Report
- End of Project Impact Assessment Reports
- Annual Outcome Survey Reports
- Farm to School Assessment Reports
- Technology Adoption Report
- Behavior Change Communication Report
- Impact Assessment Report on Irrigation Schemes
- Report on Buyer Seller Meeting on Agricultural Business Alliance

ANNEX 7. SUMMARY OF IRIs

Indicator Name	Revision during First Restructuring	Revision during Second Restructuring
IRI 1.1 Number of beneficiary groups receiving technical trainings and other capacity building support (Number)	EOP target was increased from 300 to 310.	
IRI 1.2 Number of farmers who are members of an association including producer groups, cooperatives etc. (disaggregated by gender) - GAFSP Core Indicator # 14 (Number)	EOP target was increased from 10,400 to 11,938.	EOP target was revised to 5,899.
Number of Female members of an association including producer groups, cooperatives etc (Number)	The EOP target was revised to 34% of the parent indicator.	EOP target was revised to 2,005.
IRI 1.3 Number of people receiving improved nutrition services and products through the project - GAFSP Core Indicator # 11 (new GAFSP indicators) (Number)	Information on definitions and the M&E plan were added.	
IRI 1.3.1 Number of people who received nutrition counseling/education (Number)	The indicator was simplified to reflect the actual project interventions focused on nutrition education. The target was set to 2,000.	EOP target was revised to 4,000 individuals.
IRI 1.3.2 Number of people receiving extension support for nutrition-relevant techniques (Number)	The target was set to 4,000.	EOP target was revised to 2,000 individuals.
Number of Females beneficiaries receiving improved nutrition services and products through the project-GAFSP Core Indicator # 11 (new GAFSP indicators) (Number)	EOP target was set to 2,400.	
IRI 2.1 Targeted crop area provided with irrigation – GAFSP Core Indicator # 6 (Acres)	The EOP target was increased from 1,596 to 2,244 acres.	
Area covered by Flood Irrigation (Acres)	The EOP target was increased from 1,346 to 1,914 acres.	
Area covered by Micro Irrigation (Acres)	The EOP target was increased from 250 to 330 acres.	
IRI 2.2 Number of water users with new/improved irrigation services – GAFSP Core Indicator # 8 (Number) New users with Flood Irrigation (Number)	The original target was reported as individuals, which was revised to measure number of households. The target was increased from 813 to 2,767 households. The sub-indicator was added to report on beneficiaries of flood and micro irrigation separately. The initial number of beneficiaries was 744 households.	

Indicator Name	Revision during First Restructuring	Revision during Second Restructuring
New users with Micro Irrigation (Number)	The sub-indicator was added to report on beneficiaries of flood and micro irrigation separately. The revised target was 2,023 households which reflected an increase of 1,792 beneficiaries above the midterm achievement of 231 households.	
IRI 2.3 Number of farmers who have adopted an improved agricultural technology promoted by the project in targeted project areas (Number)	The initial number of households targeted was 10,400 in 24 gewogs, later corrected to 9,682 households based on the new census. The EOP target was increased to 11,938 households, covering 29 gewogs in the same five project dzongkhags. This increase included 2,106 beneficiaries from the five additional gewogs and an additional 150 displaced/laid-off individuals due to the COVID-19 pandemic.	EOP target revised to 8,300. Adoption of technologies already established and known by farmers: EOP 4,800 Adoption of new and improved crop management practices that FSAPP promoted and demonstrated to farmers for the first time: EOP 3,500
Number of female farmers who have adopted an improved agricultural technology promoted by the project in targeted project areas (Number)	The target was revised to equal 34 percent of the parent indicator.	
IRI 2.4 Total land area under cultivation for citrus and cardamom increased by 5 percent (Percentage)	Sub-indicators added to measure cardamom and citrus area separately.	
Cardamom-cultivated area (Acre)	Cultivated area increased from 1197 to 1208 acres.	
Citrus-cultivated area (Acre)	Cultivated area increased from 3931 to 3968 acres.	
IRI 2.5 Number of beneficiaries reached, who have been helped to cope with impact of climate change; GAFSP Core Indicator # 1	New indicator added with an EOP target of 1,500.	
Number of female beneficiaries reached, who have been helped to cope with impact of climate change	New indicator added with an EOP target of 510.	
IRI 3.1 Number of beneficiaries of project supported market infrastructure (Number)	EOP target increased from 30 to 59.	Clarified the definition as tracking the number of beneficiary households from the project-supported market infrastructure
IRI 3.2 Number of producer groups receiving market information (Number)	EOP target increased from 30 to 40.	
IRI 3.3 Number of farmer groups linked to schools (Number)	EOP target increased from 10 to 25.	

Indicator Name	Revision during First Restructuring	Revision during Second Restructuring
IRI 3.4 Number of children receiving the recommended 5 servings of fruits/vegetables per day (Number)	This indicator was removed given the lack of project interventions to change school menus and influence diets of children in schools. It was replaced by 'Proportion of beneficiaries with medium or high (>7) Household Dietary Diversity Score (Percentage)' with an EOP of 70%, which better reflects project interventions to increase dietary diversity at the household level.	
IRI 3.6 Number of post-harvest facilities constructed and or rehabilitated includes markets, agro-processing/storage/quality control facilities (Number)	New indicators added to track post-harvest facilities with an EOP target of 32. This was part of the GAFSP core indicators (GAFSP Tier 2 indicator #8).	Clarified the definition as count of post-harvest facilities and market infrastructures constructed or rehabilitated by the project.
IRI 4.1 Learning notes or case studies published and disseminated (Number)	EOP target reduced from 5 to 4.	
IRI 4.2 Progress reports satisfactory (Text)	Indicator name shortened.	
IRI 4.3 Procurement satisfactory (Text)	Indicator name shortened.	
IRI 4.4 Percentage of beneficiaries satisfied with services provided by the project. (Percentage)	The gender disaggregation of the beneficiary satisfaction indicator was added.	

ANNEX 8. OVERALL ADOPTION RATE OF IMPROVED TECHNOLOGIES ACROSS ARDCS[17]

	ARDCs		
Adoption rate	ARDC Samtenling	NCOA Yusipang	ARDC Bajo
Overall technology adoption rate (%)	71.95	61.79	82.6
Weighted adoption rate (%)[18]	75.64	62.00	81.9

[17] Technology Adoption Report 2023.
[18] Weighted adoption rate is the weighted average of technology-specific adoption rates. The weight is the share of households in the total survey sample that received the technology.

ANNEX 9. BENEFICIARIES' CONTRIBUTION

Type of Contribution	Particulars	Total Cost (US$, millions)	Beneficiary Contribution (US$, millions)	Percentage Share
Beneficiary Contribution in cash	Agriculture inputs	2.00	0.40	20
	Agriculture Machineries	0.42	0.21	50
	Seeds and Seedlings	0.10	0.03	20 for all seeds and seedlings and 30 for potato seeds
Beneficiary Contribution in Kind		0.19	0.05	30 for electric fencing and 20 for all
TOTAL		**2.71**	**0.68**	