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Report No: ICR00005445

IMPLEMENTATION COMPLETION AND RESULTS REPORT

(TF018462)

ON A

GRANT FROM THE GLOBAL AGRICULTURE AND FOOD SECURITY PROGRAM

IN THE AMOUNT OF US$22.9 MILLION

TO THE

UNITED REPUBLIC OF TANZANIA

FOR THE

EXPANDING RICE PRODUCTION PROJECT

AUGUST 25, 2021

Agriculture And Food Global Practice
Eastern and Southern Africa Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective {Jan 19, 2021})

Currency Unit =	TZS
2,321 TZS =	US$1
US$1 =	SDR 0.710

FISCAL YEAR
July 1 - June 30

Regional Vice President: Hafez M.H. Ghanem

Country Director: Mara K. Warwick

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ABBREVIATIONS AND ACRONYMS

ASDP	Agriculture Sector Development Program
ASA	Agricultural Seed Agency
BRN	Big Results Now
CAADP	Comprehensive Africa Agriculture Development Program
CET	Common External Tariff
CPF	Country Partnership Framework
EAC	East African Community
EFA	Economic and Financial Analysis
EIRR	Economic Internal Rate of Return
ERPP	Expanding Rice Production Project
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
FAO	Food and Agriculture Organization
FM	Financial Management
GAFSP	Global Agricultural Food Security Program
GAPs	Good Agricultural Practices
GDP	Gross Domestic Product
GNI	Gross National Income
GRM	Grievance Redress Mechanisms
Ha	Hectares
ICRR	Implementation and Completion Results and Report
IDA	International Development Association
IOs	Irrigators Organizations
IPMP	Integrated Pest Management Plan
ISR	Implementation Status Report
KATRIN	Kilombero Agricultural Training and Research Institute
MANR	Ministry of Agriculture and Natural Resources
MIS	Management Information Systems
MoA	Ministry of Agriculture
MTR	Mid Term Review
M&E	Monitoring and Evaluation
NSGRP	National Strategy for Growth and Reduction of Poverty
NPV	Net Present Value
PCU	Project Coordination Unit
PDO	Project Development Objectives
RAP	Resettlement Action Plan
RF	Results Framework
RPF	Resettlement Policy Framework
SRI	System of Rice Intensification
TAFSIP	Tanzania Agriculture and Food Security Investment Plan
TARI	Tanzania Agriculture Research Institute
TOC	Theory of Change
TOSCI	Tanzania Official Seed Certification Institute
TTL	Task Team Leader
TZS	Tanzanian Shilling
ZARI	Zanzibar Agricultural Research Institute

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DATA SHEET

BASIC INFORMATION

Product Information

Project ID	Project Name
P144497	Tanzania: Expanding Rice Production
Country	**Financing Instrument**
Tanzania	Investment Project Financing
Original EA Category	**Revised EA Category**
Partial Assessment (B)	Partial Assessment (B)

Organizations

Borrower	Implementing Agency
United Republic of Tanzania	Ministry of Agriculture, Ministry of Agriculture and Natural Resources - Zanzibar

Project Development Objective (PDO)

Original PDO

To increase the productivity and production of rice among smallholders in targeted areas of Morogoro and Zanzibar

FINANCING

	Original Amount (US$)	Revised Amount (US$)	Actual Disbursed (US$)
World Bank Financing			
TF-18462	22,900,000	22,900,000	22,897,585
Total	**22,900,000**	**22,900,000**	**22,897,585**
Non-World Bank Financing			
Borrower/Recipient	0	0	0
Total	**0**	**0**	**0**
Total Project Cost	**22,900,000**	**22,900,000**	**22,897,585**

KEY DATES

Approval	Effectiveness	MTR Review	Original Closing	Actual Closing
12-Mar-2015	18-May-2015	01-Oct-2018	30-Apr-2020	31-Jan-2021

RESTRUCTURING AND/OR ADDITIONAL FINANCING

Date(s)	Amount Disbursed (US$M)	Key Revisions
24-Nov-2019	12.68	Change in Results Framework Change in Components and Cost Reallocation between Disbursement Categories
23-Apr-2020	16.33	Change in Results Framework Change in Loan Closing Date(s)

KEY RATINGS

Outcome	Bank Performance	M&E Quality
Moderately Satisfactory	Moderately Satisfactory	Substantial

RATINGS OF PROJECT PERFORMANCE IN ISRs

No.	Date ISR Archived	DO Rating	IP Rating	Actual Disbursements (US$M)
01	22-Dec-2015	Moderately Unsatisfactory	Moderately Unsatisfactory	0
02	29-Jun-2016	Moderately Unsatisfactory	Moderately Unsatisfactory	3.00
03	31-Dec-2016	Moderately Unsatisfactory	Moderately Unsatisfactory	3.74
04	28-Jun-2017	Moderately Satisfactory	Moderately Satisfactory	4.34
05	19-Jan-2018	Moderately Unsatisfactory	Moderately Unsatisfactory	5.15
06	25-Jul-2018	Moderately Unsatisfactory	Moderately Unsatisfactory	6.46
07	28-Nov-2018	Moderately Unsatisfactory	Unsatisfactory	6.57
08	14-Jun-2019	Moderately Unsatisfactory	Moderately Unsatisfactory	8.27
09	30-Dec-2019	Moderately Unsatisfactory	Moderately Satisfactory	14.66
10	19-May-2020	Moderately Satisfactory	Moderately Satisfactory	18.70
11	06-Nov-2020	Moderately Satisfactory	Moderately Satisfactory	20.71
12	21-Jan-2021	Moderately Satisfactory	Moderately Satisfactory	22.62

SECTORS AND THEMES

Sectors

Major Sector/Sector	(%)
Agriculture, Fishing and Forestry	**100**
Agricultural Extension, Research, and Other Support Activities	5
Crops	51
Irrigation and Drainage	31
Public Administration - Agriculture, Fishing & Forestry	13

Themes

Major Theme/ Theme (Level 2)/ Theme (Level 3)	(%)
Urban and Rural Development	**100**
Rural Development	100
Rural Markets	17
Rural Infrastructure and service delivery	83

ADM STAFF

Role	At Approval	At ICR
Regional Vice President:	Makhtar Diop	Hafez M. H. Ghanem
Country Director:	Philippe Dongier	Mara K. Warwick
Director:	Juergen Voegele	Mark R. Lundell
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I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES

A. CONTEXT AT APPRAISAL

1. **At appraisal, the Government of Tanzania was making considerable progress on economic growth and reducing poverty levels.** The Gross Domestic Product (GDP) per capita grew at 7 percent per annum, inflation was relatively low at 6 percent, and macro-economic and fiscal management were strong. Despite impressive macroeconomic performance, growth was not broad based, amidst high population growth of 3 percent[1]. The main beneficiaries of the country's economic growth were concentrated in urban areas and in capital-intensive sectors, such as mining, communication, construction, and banking. Poverty declined slowly, from 33 percent in 2007 to 28 percent in 2012. Poverty remained high, with most of the workforce employed in the agriculture sector. Export performance was strong, driven by gold and tourism, with imports of capital and intermediate goods, particularly oil, which kept the current account deficit wide, at 11 percent of the GDP. In July 2020, Tanzania graduated from low-income to lower-middle-income country status, the reclassification reflecting the country's rising Gross National Income (GNI) per capita which reached US$1,080 in 2019.

2. **The agriculture sector remained strategic to Tanzania's economic growth, food security and poverty reduction**. The sector contributed to 75 percent of employment, 25 percent of GDP, 35 percent of export earnings and grew at an average of 4 percent[2]. The relative contribution to agricultural GDP by crop, livestock, forestry/hunting, and fisheries in recent years averaged 18 percent, 5 percent, 3 percent, and 1.4 percent respectively. Tanzania had 7.1 million hectares (ha) of high and medium potential land (2.3 million ha and 4.8 million ha respectively) suitable for irrigation, supported by rivers, lakes, wetlands, and aquifers. Of the 2.3 million ha classified as high potential, only 461,326 ha had improved irrigation infrastructure in 2015.

3. **Despite growth and potential of the agricultural sector, challenges prevailed.** The growth of the agricultural sector had been hampered by low productivity of land and labor, with the following key aggravating factors: (i) poor production techniques; (ii) underdeveloped markets, market infrastructure and farm-level value addition; (iii) poor rural infrastructure, including rural roads, telecommunications, and electricity; and (iv) inadequate agricultural finance, including public expenditure. Most of the sector's growth was derived from expanding the area under agricultural production rather than increasing productivity. This was partly due to limited adoption of improved agricultural productivity enhancing technologies by farmers. Smallholder crop yields stagnated at only 20 to 30 percent of their potential. Only 16 percent of farmers in Tanzania used improved seed varieties, 17 percent used organic fertilizer and less than 1 percent farmers were exposed to improved agricultural technologies, with limited irrigation infrastructure across the country. The use of productivity enhancing agricultural inputs was among the lowest in the Sub-Saharan Africa region. Further, rapid urbanization and rising incomes contributed to increased demand for value-added products in the agriculture sector. On the supply side, the under-developed agro-processing industry failed to provide significant levels of import substitution for the urban food market. The mismatch between demand and supply for value-added food products resulted in the country's increased food import bill.

4. **The rice subsector was and remains a strategic priority for agricultural development in Tanzania.** Rice was grown by over 1 million farmers in the Mainland and 72,000 farmers in Zanzibar. On the Mainland, rice was the second

[1] Based on 2012 Census, Tanzania had a population of 49.2 million.
[2] This is below 5 percent growth rate target envisioned in the Agriculture Sector Development Strategy (ASDS).

most important cereal after maize, recognized as a valuable food and cash crop and preferred staple in the urban markets. In Zanzibar, rice was the most important cereal grain. However, the rice subsector was plagued by low productivity because of the limited adoption and use of appropriate inputs and technologies. Average rice yields stagnated at about 1.2 to 2 tons/ha against a demonstrated on-farm potential of 6 to 8 tons/ha. This was due to limited improved seed availability[3], with only 15 percent of paddy farmers growing improved varieties, less than 1 percent exposed to improved technologies including System of Rice Intensification (SRI) and farmers only growing one cropping season due to poor irrigation infrastructure and water management.

5. **Most of the rice was grown by smallholders under rain-fed conditions, with women playing a critical role in the labor force.** Very few farmers produced rice under irrigation, often initiated and controlled by the Government. Low productivity of rice coupled with increasing demand for rice consumption underscored the need to promote irrigated rice production. As incomes rose, rice was the preferred grain as consumers shifted from sorghum and maize towards rice and wheat products. Most rice farmers were smallholders who produced rice for home consumption and sold the surplus directly to traders and cultivated over a farm size ranging from 0.5 to 3 ha. Almost 1 in 5 farmers were involved in rice production. Most rice farmers were women who made a significant contribution to food production, while men were more involved in processing and marketing. Women comprised 80 percent of the agricultural labor force in the rural areas. They were highly involved in all aspects of the rice value chain particularly planting, weeding, bird scaring, harvesting, processing, and trading.

6. **Increased rice hectarage outpaced production levels, as high consumption fueled rice imports.** Even when total harvested rice area increased by 90 percent (from 0.5 million ha in 2002 to 0.9 million ha in 2012), total production increased by only 53 percent (from 500,000 tons to 990,000 tons). Although consumption increased by only 30 percent (from 845,000 tons to 1,100, 000 tons), there was still a gap of 104,000 tons per year that was filled by imports. Further, the agricultural policy environment was not conducive, especially the East African Community (EAC) common external tariff[4] and unpredictable export bans which constrained increased productivity and competitiveness of the agricultural sector.

Rationale for World Bank Support

7. **The Expanding Rice Production Project (ERPP) was consistent with the Government of Tanzania's priorities, which identified rice as a strategic crop for improving food security.** This was enshrined in the National Rice Development Strategy (2009) which aimed to double rice production to meet domestic demand and expand rice exports. The Project was also aligned with the Big Results Now (BRN) initiative which aimed to strengthen rice production and marketing as part of efforts to increase agricultural growth, food and nutrition security and poverty reduction.

8. **ERPP was fully aligned with the National Strategy for Growth and Reduction of Poverty (NSGRP) for both Tanzania Mainland and Zanzibar, the Long-Term Perspective Plan 2011/12-2025/26, and the Tanzania Five Year Development Plan 2011/12-2015/16.** Each of these commitments highlight agriculture's importance to the Tanzanian economy and emphasize the need to commercialize the agricultural sector through productivity growth and expanding trade. The Project was supported by the Global Agricultural and Food Security Program (GAFSP) with a US$22.9 million

[3] Only 1,800 tons of improved rice seeds were available in Mainland against required 44,400 tons of seed for the 1.2 million ha cropped area.
[4] The EAC is a customs union governed by a Common External Tariff (CET). The CET included higher rates of external protection and an increase in the number of tariff bands. The applied CET ranged from 25 percent to 75 percent.

grant[5], following the country's Comprehensive Africa Agriculture Development Program (CAADP) compliance in preparation of the Tanzania Agriculture and Food Security Investment Plan (TAFSIP).

9. **The Project was fully aligned with the World Bank's Tanzania Country Assistance Strategy (2012-2015).** This was particularly reflected under Objective 1 (promoting inclusive, sustainable private sector-led growth through increasing productivity and income), and Outcome 1.2 (increasing productivity and commercialization of agriculture). It continued to align with the Country Partnership Framework (CPF, 2018-2022), under Focus Area 1 (enhancing productivity and accelerating equitable and sustainable development), which included promoting agricultural diversification and commercialization. The Project was in line with the World Bank's Strategy for Africa, contributing to the theme on competitiveness and employment. The technical design of the Project was informed by analytical work (technical studies and review of past Bank and other donor-financed projects), which underpinned the development of the GAFSP proposal. Specifically, these analytical pieces included: (i) technical papers developed for the Tanzania Agriculture Food Security Investment Plan (AFSIP); (ii) external technical review report of the TAFSIP; (iii) Public Expenditure Review conducted in Tanzania (2008-2011); (iv) Agricultural Sector Development Program Implementation Review; (v) Reviews of District Agriculture Development Plans Formulation and Implementation; and (vi) Special study assessing agricultural extension services (2010).

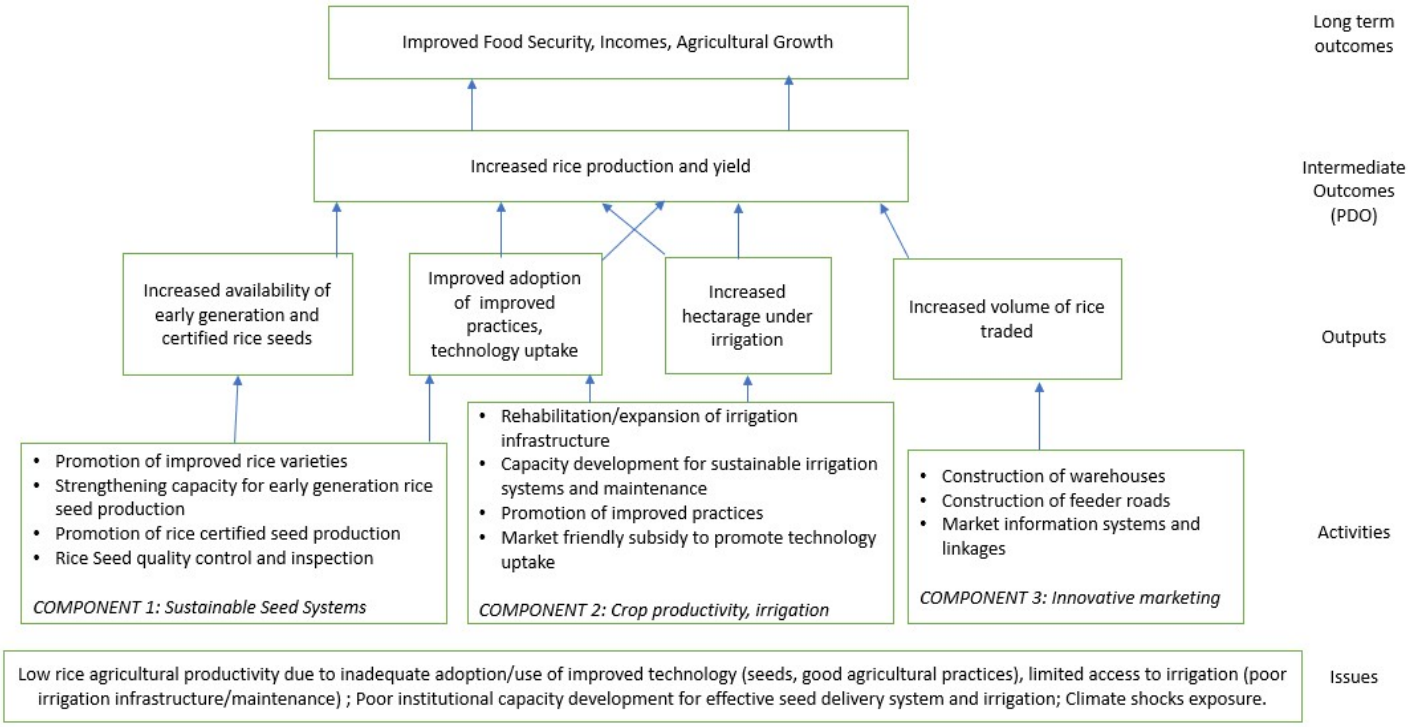
Theory of Change (Results Chain)

10. **ERPP incorporated a results framework (RF), but it did not have an explicit Theory of Change (TOC) at appraisal[6].** The Project Development Objective (PDO) of increasing rice production and productivity (intermediate outcomes) was delivered through: (i) increasing the use of improved rice seeds; (ii) increasing adoption of improved technologies and expanded hectarage under irrigation; and (iii) promoting rice marketing through improved storage, market access (feeder roads), and market linkages. As farmers adopt improved technologies, use improved rice seeds, and expand hectarage under irrigation, the resultant increased rice production and yield would further contribute to medium and long-term food security, incomes, and agricultural growth.[7]

11. **The TOC was constructed for the Implementation Completion and Results Report (ICRR) based on appraisal, Project restructuring and RF information.** The TOC includes assumptions, both within and beyond the Project's control as presented in Figure 1 below:

[5] The project was 100 percent grant funded by the GAFSP. There was no International Development Association (IDA) and Borrower contribution to the project. Beneficiary farmers contributed US$0.408 million to the project.
[6] A TOC was not a corporate requirement at appraisal.
[7] Previous assessments by FAO have shown that for every 1 percent growth in agricultural output, poverty fell by 0.6 percent. Rice, as a strategic crop, can greatly contribute to increasing agricultural output.

Figure 1: Constructed Theory of Change of ERPP



Key Assumptions on factors within the project control

- Smallholder farmers interested in adopting technologies promoted by the project
- Qualified service providers to support irrigation maintenance, warehouses and other infrastructure available
- Private sector interest in seed systems development (particularly certified seed production)
- Market friendly subsidies to promote technology uptake
- Warehouses, feeder roads construction/rehabilitation promote marketing of rice

Key Assumptions on factors beyond the project control

- Climate change shocks – droughts, floods
- Complimentary investments by other partners, e.g., Exim Bank

Project Development Objectives (PDOs)

12. The PDO of the ERPP was to increase productivity and production of rice among smallholders in the targeted areas of Morogoro[8] and Zanzibar.

[8] In Mainland, the project targeted Tanzania Morogoro region, thus all reference to Mainland is for this Project targeted area.

Key Expected Outcomes and Outcome Indicators

13. The key expected outcome of the ERPP was to increase productivity and production of rice among smallholder farmers in the selected Project areas. The PDO indicators were as follows, with their corresponding targets:

> **PDO 1:** Average yields of targeted smallholder farmers growing paddy – *with a target of 3.5 tons/ha in Mainland (revised to 5 tons/ha), and 5.5 tons/ha in Zanzibar.*
>
> **PDO 2**: Additional quantity of rice produced in targeted areas – *with a target of 56,500 tons in Mainland, and 9,660 tons in Zanzibar (revised to 6,000 tons for Zanzibar).*
>
> **PDO 3:** Number of direct beneficiaries (disaggregated by gender) – *with a target 33,069 (of which 50 percent female), (revised to 30,000 people, 50 percent female).*

Components

14. **Component 1: Sustainable Seed Systems: US$2.44 million (US$2.11 million for Morogoro (Mainland) and US$0.33 million for Zanzibar):** The objective of this component was to enhance adoption and sustained use of improved rice varieties, through: (1) Introducing new rice varieties to smallholder farmers through on-farm participatory demonstrations, field days, exchange visits and dissemination; (2) Promoting sustainable production and delivery of preferred rice varieties through strengthening the capacity of Kilombero Agricultural Training and Research Institute (KATRIN) and Zanzibar Agricultural Research Institute (ZARI) on pre-basic seed production, and supporting the Agricultural Seed Agency (ASA) and the Seed Unit of the Ministry of Agriculture and Natural Resources (MANR) in Zanzibar to produce adequate quantities of basic seed, while encouraging private sector to produce certified rice seeds; and (3) Strengthening seed quality control through rehabilitation and operation of seed laboratory infrastructure at ASA in Morogoro (Mainland) and Kizimbani in Zanzibar as well as strengthening the Tanzania Official Seed Certification Institute (TOSCI) on inspection and testing of pre-basic and basic seed and the rice seed certification.

15. **Component 2: Improving crop productivity through better irrigation and crop management: US$14.51 million (US$10.50 million for Tanzania Mainland and US$4.01 million for Zanzibar):** This component aimed at expanding and/or rehabilitating selected irrigation schemes and promoting adoption of improved agronomic practices. Specifically, this was delivered through: (i) rehabilitating/expanding irrigation schemes in Morogoro (Mainland) and Zanzibar, strengthening irrigation scheme operations, maintenance and professional capacity development; and (ii) promoting adoption of improved agronomic practices in the irrigation schemes, training front line workers/lead farmers and supporting market-friendly subsidies to promote uptake of technologies.

16. **Component 3: Innovative marketing strategies: US$2.37 million (for Morogoro in Mainland) only):** This component aimed at improving market infrastructure, market linkages and information, through: (i) construction of 5 warehouses in each of the 5 rehabilitated/expanded irrigation schemes, and rehabilitation of feeder roads to facilitate market access, and (ii) strengthening market linkages and market information systems. This component targeted only Morogoro Region of Tanzania Mainland due to the absence of marketable surpluses and limited marketing challenges in Zanzibar.

17. **Component 4: Project Management and Coordination: US$3.58 million (US$1.59 million for Morogoro (Mainland) and US$1.99 million for Zanzibar):** This component was designed to support Project management, coordination including, financial management, procurement, environment and social safeguards management,

monitoring, reporting and evaluation of project activities. The Project used existing Government structures, coordinated by a dedicated project implementation team.

B. SIGNIFICANT CHANGES DURING IMPLEMENTATION

Revised PDOs and Outcome Targets

18. In November 2019, the Project was restructured to reallocate resources in the project disbursement categories and modify the RF. The proposed change was influenced by the Government of Tanzania's directive to move away from traditional subsidies, which was under disbursement category 2 of the grant. The PDO remained the same but there was a change on one target of the PDO indicator on "Average yields of targeted farmers growing paddy (tons/ha)" – for Morogoro (Mainland).

19. In April 2020, the Project underwent a second restructuring to extend Project closing date by 9 months, from April 30, 2020 to January 31, 2021, as requested by the Government of Tanzania, to allow for successful completion of the Project activities. The restructuring modified targets of two PDO indicators. There was no change to the PDO or reallocation of proceeds. The changes made are summarized in Table 1 below.

Table 1: Appraisal and final PDO Indicators and targets

Appraisal Indicators	Appraisal Targets	Final Revised Indicators	Final Revised Targets
1. Average yields of targeted farmers growing paddy (tons/ha) - Mainland	3.5	No change.	5
2. Additional quantity of rice produced (tons) - Zanzibar	9,660	No change.	6,000[9]
3. Direct beneficiaries (number)	33,069	No change	30,000

Revised PDO Indicators

20. The November 2019 restructuring increased the end target of the PDO indicator on "average yields of targeted farmers growing paddy in the Mainland" from 3.5 to 5.0 tons/ha, which aligned to the actual yields achieved at that time.

21. The April 2020 restructuring modified two PDO indicator targets as follows: (i) additional quantities of rice produced in Zanzibar from 9,660 tons to 6,000 tons, and (ii) direct beneficiaries, from 33,069 smallholder farmers to 30,000 smallholder farmers.

[9] At appraisal, there was external financing from Exim Bank to support irrigation schemes (in Zanzibar) to cover approximately 1,524 ha, support to seeds and farmers training was to be provided to the ERPP project. During implementation, this financing did not materialize, hence revisions of the targets, including number of beneficiaries.

Revised Components

22. The design of the components did not change during the Project restructurings. The only changes included the reallocation of funds across categories/components and revision of the RF.

Other Changes

23. In the November 2019 restructuring, disbursement category 2 (subsidies) was reallocated to category 1 of the Project, as shown in table 2 below:

Table 2: The 2019 restructuring of disbursement categories

Category	Grant amount (US$)	Grant amount reallocated (US$)
1) Goods, works, non-consulting services, consulting services, Training and Operating Costs for Part A, Part B.1, Part B.2 (i) and (iii), Part C, and Part D of the Project.	18,460,000	22,257,342
2) Subsidies under Part B.2 (iv) of the Project	4,440,000	642,658
TOTAL AMOUNT	**22,900,000**	**22,900,000**

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

24. **The primary reason for the first Project restructuring was to align to the Government's directive to move away from traditional input subsidies[10] which was under disbursement category 2.** This meant that US$3,797,342 was removed from disbursement category 2 (subsidies) to component 1 (goods, works, non-consulting, training and operational costs). This followed recommendations from the Mid Term Review (MTR, 2018), which led into adjusting RF indicators, including outcome target on rice paddy yield (PDO) indicator in Mainland to reflect actual achievements.

25. **The second Project restructuring aimed to provide enough time to finalize outstanding irrigation works which were delayed during Project implementation.** Complementary irrigation investment (by Exim Bank funded irrigation project) did not materialize, which led to adjusting the beneficiaries and rice production levels downwards. These changes were reasonable to ensure that the revised targets reflected the level of available financing. Overall, the constructed TOC remained applicable and valid throughout the Project life.

[10] This national directive was to move away from traditional subsidies to wean farmers out of dependency and enhance sustainability, while reducing fiscal burden from general subsidies.

II. OUTCOME

A. RELEVANCE OF PDOs

26. The ERPP's PDO was highly relevant as improving agricultural productivity, irrigation development and commercialization remained central to the TAFSIP (2011-2021). The Project was consistent with the Agricultural Sector Development Strategy II (2015-2025), including sector initiatives such as BRN which aimed to transform agriculture into a modern market to achieve food security and poverty reduction that contributed to the Tanzania Development Vision 2025. The Project contributed to the National Rice Development Strategy (NRDS II, 2009) for Mainland and Zanzibar Agricultural Transformation Initiative (ZATI, 2010-2020) which guided rice subsector development.

27. The PDO was well aligned with the Tanzania CPF (2018-2022). Specifically, the Project contributed to Focus Area 1 (enhance productivity and accelerate equitable and sustainable growth) that was closely aligned with Tanzania's Second Five-Year Development Plan (2016-2021) and Zanzibar's Third Strategy for Growth and Reduction of Poverty (ZSGRP III). These policy frameworks recognized agriculture as a pathway towards industrialization and ultimate transformation of the Tanzanian economy.

28. With the clear evidence of the alignment of the PDO to the Government strategies and the World Bank Group's CPF, as described above, the relevance of the PDO is rated High.

B. ACHIEVEMENT OF PDOs (EFFICACY)

29. This section provides key outcomes from ERPP investments and evidence from other assessments. Additional outcomes related to the ERPP objectives are provided in Section E (Other Outcomes and Impacts). Table 3 shows the summary of the achievement of the PDO indicators:

Table 3: Summary of the PDO indicators and achievement

PDO Indicators	Unit of Measure	Baseline	End Target Value	End Actual Value	Achievement (percent)
PDO 1: Average yield of targeted farmers growing paddy					
- Morogoro (Mainland)	tons/ha	1.8	5.0	5.7	114
- Zanzibar	tons/ha	1.8	5.5	4.9	89
PDO 2: Additional quantity of rice produced in targeted areas					
- Mainland	tons	0	56,500	88,637	157
- Zanzibar	tons	0	6,000	4,395	73
PDO 3: Direct Project Beneficiaries	number		30,000	41,485	138
Of which, female (percentage)	(percent)		50	51	102

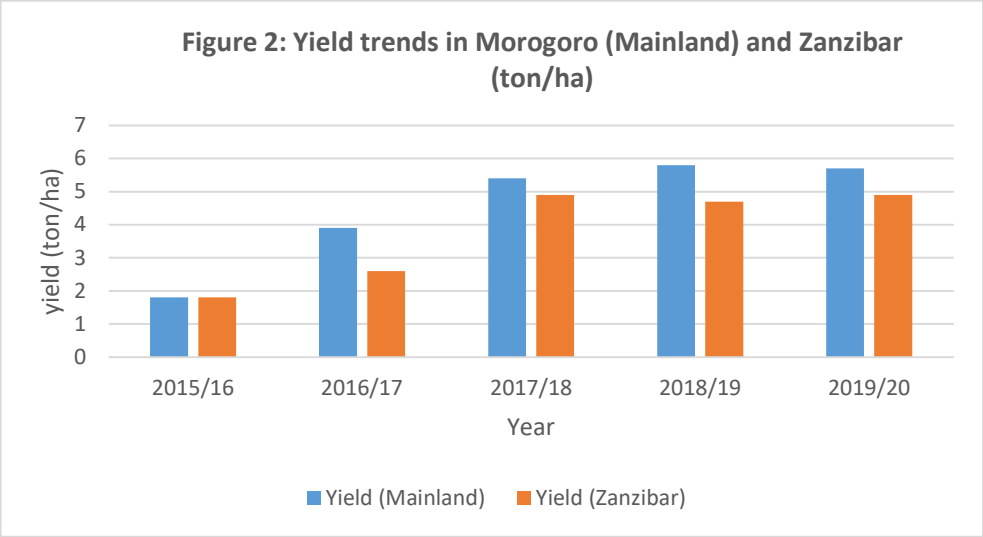
Assessment of Achievement of Each Objective/Outcome

PDO 1: Average yields of targeted farmers growing paddy rice

30. The PDO indicator on average rice yields captured results from Project investments on seed systems, improved agronomic practices and irrigation infrastructure in the targeted areas of Morogoro (Mainland) and Zanzibar. Yield was measured by rice production (tons) per ha as compared to baseline values and Project targets.

31. **In Morogoro (Mainland), rice yields increased by approximately three times, from baseline of 1.8 tons/ha (in 2015/16) to 5.7 tons/ha (in 2019/20) exceeding the Project target of 5 tons/ha.** As can be shown in Figure 2, the rice yields had been on the increase, with the biggest jump from 2017/18 when the yield was approximately above 5 tons/ha when Project interventions were intensified, with farmers adopting improved technologies promoted by the Project and utilizing improved hectarage under irrigation. The final achieved yield far much exceeded yield of the farmers outside the Project which staggered at approximately 2.9 tons/ha[11].

32. **In Zanzibar, the rice yield achieved more than doubled from a baseline of 1.8 tons/ha in 2015/16 to 4.9 tons/ha, representing a substantial achievement of 89 percent, as compared to the Project target of 5.5 tons/ha.** The rice yields in Zanzibar were relatively lower than the Project target due to floods, while on the other hand, some irrigation schemes such as Koani, Bandamaji, Mchangani could not be utilized at times during the dry season due to non-availability of water. Overall, the achieved rice yields though relatively lower, far exceeded the yields outside the irrigation schemes which were at around 1 ton/ha[12].



Source: Author analysis from annual surveys

33. **Underlying the yield increase had been the use of Good Agricultural Practices (GAPs), including improved rice seeds, fertilizers, SRI and utilization of water from the irrigation schemes.** With improved irrigation facilities, farmers were able to harvest rice in two cropping seasons per year as opposed to only a single season before the Project, which greatly contributed to increased rice yield and production. The Project provided 271.2 ha of supplemental (or new) and

[11] Based on average Annual Project Survey (2017/18 to 2019/20)
[12] ibid

improved irrigation (or rehabilitation) of 1,501.7 ha – all providing increased area under irrigation and drainage. It is expected that benefits will further increase, as more hectarage was put under irrigation, more also as finalization of irrigation works was made towards the last years of the Project. Irrigation development serves as a climate change mitigation measure as droughts become a common phenomenon in Tanzania.

34. **A comparison between Project beneficiaries and non-beneficiaries indicated substantial yield increase by farmers supported by the Project** (Refer to Table 4). During the dry season, beneficiaries in Morogoro (Mainland) realized rice yield of 1.4 tons/ha more than non-beneficiary farmers. In Zanzibar, they realized almost 9 times more than non-beneficiaries. Similar trends applied during the wet season. The effectiveness of irrigation improvement was observable during the dry season when irrigation was the only source of supply for crop water requirement. Based on the overall yield, it can be concluded that Project beneficiaries had their yields at least twice more than non-beneficiaries. Interventions that promoted input uptake (fertilizers[13], improved rice seeds), GAPs, including SRI were perceived by farmers as great drivers towards increased rice production and yield.

Table 4: Average paddy yields (dry and wet season, 2019/20)[14]

Variable	Tanzania Mainland		Zanzibar		Overall	
	Beneficiary	Non-beneficiary	Beneficiary	Non-beneficiary	Beneficiary	Non-beneficiary
Rice harvested (kg), dry season	3,407.7	2,395.1	540.0	113.5	2,077.2	1,254.3
Yield (ton/ha), dry season	5.7	4.3	4.4	0.5	5.0	2.4
Rice harvested (kg), wet season	3,590.4	2,279.7	676.5	420.0	2133.45	1349.85
Yield (ton/ha) wet season	5.6	3.8	4.0	1.1	4.8	2.45
Average Rice Quantity (kg)	3,499.1	2,337.4	608.3	266.75	2,105.3	1,302.1
Average Yield (tons/ha)	5.65	4.05	4.2	0.8	4.9	2.4

Source: Project Annual Survey 2019/20

[13] 95 percent of farmers use fertilizer in paddy production, mostly Urea and DAP which were easily available as subsidy under the project. Under the subsidy program, the Project provided a total of 13kg/0.25 acre for DAP and 26kg/0.25 acre of Urea (enough for most farmers).

[14] Based on a sample collected during the 2019/20 Annual Project Survey. The survey sampled 400 farmers of which 260 farmers (or 65 percent) were beneficiaries, and the remaining 140 farmers being non-beneficiaries (35 percent).

Box 1: Adoption of Good Agricultural Practices (GAPs) and System of Rice Intensification (SRI)

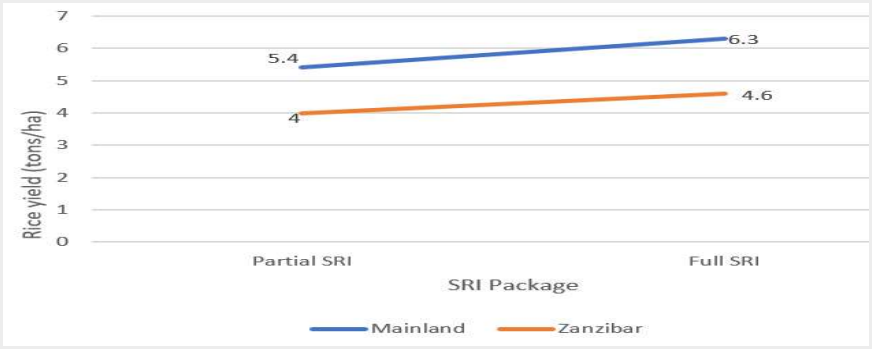
GAPs and SRI were promoted through trainings, exchange visits and demonstrations. SRI is a multi-practice package of technologies for increasing productivity of irrigated rice by changing the management of plants, soil, water, and nutrients. It constitutes four technologies, which include: transplanting 8-12 days seedling, one seedling per hole; spacing of 25x25 cm and alternate wetting and drying. Beneficiaries adopted GAPs and SRI significantly more than non-beneficiaries, as can be shown under Table 5 below).

Table 5: Adoption of GAPs/SRI technologies

Technology	Tanzania Mainland				Zanzibar			
	Beneficiary		Non-beneficiary		Beneficiary		Non-beneficiary	
	n	%	n	%	n	%	n	%
Land preparation, leveling	288	71.3	151	37.4	263	84.3	79	28.2
Use of improved seeds	285	70.5	152	37.6	272	87.2	105	37.5
Use of fertilizer	290	71.8	159	39.4	245	78.5	110	39.3
Used of insecticides	272	67.3	159	39.4	116	37.2	21	7.5
Transplant 8-12 days seedling	278	68.8	98	24.3	269	86.2	3	1.1
One seed per hole	259	64.1	99	24.5	271	86.9	10	3.6
Spacing (25x25 cm)	282	69.8	98	24.3	271	86.9	2	0.7
Alternate wetting and drying	257	63.6	97	24.0	87	27.9	77	27.5
Weed control (herbicides)	245	60.6	122	30.2	88	28.2	0	0.0
Weed control (push weeder)	159	39.4	58	14.4	262	84.0	100	35.7
Weed control (manual)	219	54.2	154	38.1	263	84.3	79	28.2

SRI has core techniques that constitute the technological package; hence the farmer can adopt either partial or full package, which correlates highly with yield. Figure 3 shows that the final achieved yield among Project beneficiaries realized in Morogoro (Mainland) was 6.3 tons/ha on full SRI, as opposed to 5.4 tons/ha. Similar trends applied for Zanzibar.

Figure 3: Rice yields under different SRI packages

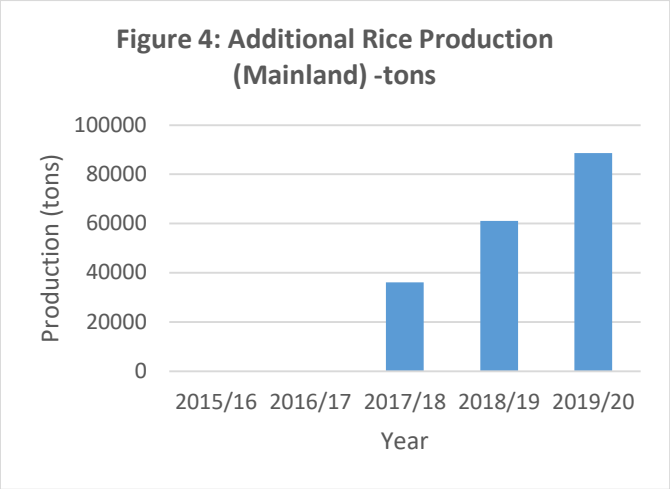


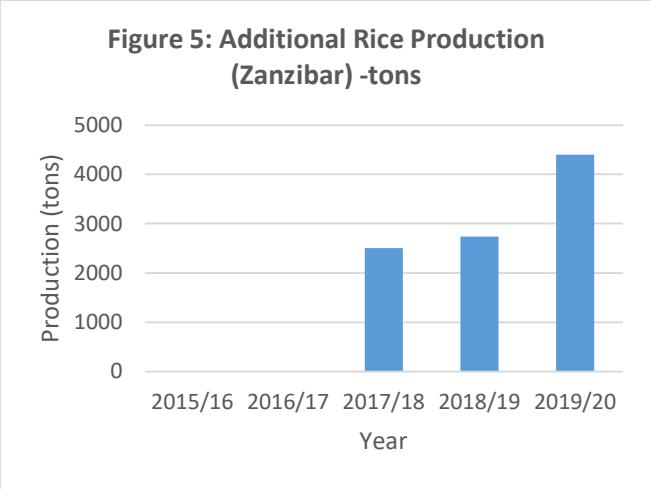
Source: Project Annual Survey 2019/20

Overall, 17,776 farmers in Morogoro (Mainland) and 2,253 farmers in Zanzibar adopted SRI against the target of 3,300 and 1,385 farmers respectively. This compares to only less than 1 percent farmers exposed to SRI at appraisal.

PDO 2: Additional quantity of rice produced in targeted areas.

35. **In Morogoro (Mainland), there was substantive progression on additional rice produced from 36,055 tons in 2016/17 to 61,074 tons in 2018/19 and further to 88,637 tons in 2019/20 (refer to Figure 4 below).** The final achieved rice production exceeded the Project target of 56,500 tons. In the first two years, there was no additional rice production achieved as the Project was being set up, with more focus on establishment of demonstration plots and associated farmer trainings. The high rice production correlated with yields as achieved in Figure 2. Farmers were able to harvest two cropping seasons as opposed to a single season, with additional hectarage utilized due to irrigation rehabilitation and development, leading to resultant rice production increases. As most irrigation schemes were finalized towards the end of the Project, there was scope for increased future production levels than achieved in the final year.





Source: Author analysis from Project Annual Survey Reports

36. **Similar trends were observed for Zanzibar, where rice production increased in all the targeted districts, by approximately three times more over the baseline values.** There had been gradual progression on additional rice produced from 2,503 tons in 2016/17 to 2,739 tons in 2018/19 and further to 4,395 tons in 2019/20 (refer to Figure 5 above). However, the final achieved rice production level was lower than the Project target of 6,000 tons. The relatively lower rice production in Zanzibar was due to heavy floods that affected most districts.

37. **A comparison between beneficiaries and non-beneficiaries (refer to Table 4) further indicated that beneficiaries produced more rice (average 2,105 kg/household) than non-beneficiaries (1,302 kg/households).** In Zanzibar, beneficiaries produced approximately three times more than non-beneficiaries, with the same trend in Morogoro (Mainland). The use of improved inputs and technology provided greater scope for increased adoption. The introduction of input subsidy further promoted technology adoption as the inputs (like seeds and fertilizers). In Zanzibar, improved rice seeds were available, and farmers were buying at a subsidized price. The overall subsidy was at 50 percent of the fertilizer and seed package.

Box 2: Adoption of new rice varieties promoted by the Project

Before-after the Project comparison indicates a high adoption of improved varieties particularly TXD306 (SARO 5) for both beneficiary and non-beneficiary farmers. TXD306 (SARO5) was widely preferred seed variety for its aroma, yield, availability, price and taste. As can be seen in Table 6 below, adoption increased among beneficiaries from 51 percent to 74 percent, with a modest spillover effect among non-beneficiaries as well (from 25 percent to 44 percent). Promotion of improved rice was a key component of the ERPP.

Table 6: Adoption of rice varieties by beneficiary and non-beneficiary farmers, Tanzania Mainland

Improved Varieties (preferred) promoted	Beneficiary				Non-beneficiary			
	Before		After		Before		After	
	n	%	n	%	n	%	n	%
SUPA	214	16	2	0.8	30	14.5	31	13.7
TXD 306, SARO 5	343	51	192	73.6	51	24.6	99	43.6

Source: Project Annual Survey

Similarly, in Zanzibar, most of the beneficiaries (70.6 percent) used SUPA BC and SARO 5 varieties introduced by the Project. For non-beneficiaries, the use of SARO 5 varieties increased from 12 percent to 48 percent due to spillover effect, although non-beneficiaries still used local varieties on a larger extent likely due to inadequate full knowledge on improved varieties, and affordability as they could just recycle the seeds. The use of local varieties dropped among beneficiaries as compared to non-beneficiaries. Most of the farmers sourced improved rice seeds through agro-dealers and were greatly satisfied with the quality.

Overall, the Project contributed to 27,079 farmers adopting new rice seed varieties in Morogoro (Mainland) (against a target of 20,000 farmers), and 4,991 farmers in Zanzibar (against a target of 6,000 farmers).

38. **Based on the finalization of the irrigation rehabilitation and maintenance, the Project is expected to register considerable increases in yield and production, in the coming years.** This is on the basis that it takes approximately 1-2 years after infrastructure works completion to achieve the expected and optimal yield increase. Based on analysis of similar irrigation schemes in Tanzania (Food and Agriculture Organization (FAO) data), the rice yield would increase to approximately 6 tons/ha upon full utilization (from current achieved yields, as in Figure 2, from baseline values of approximately 1.8 tons/ha). Consequently, as additional 1,772.9 ha is fully put into irrigation (with supplemental of 271.2 ha), rice production is expected to increase proportionally as well.

Box 3: Rehabilitation and development of irrigation schemes

ERPP supported rehabilitation and development of new irrigation infrastructure to improve access to irrigation. A total of 9 schemes were supported in Zanzibar, and 5 in Morogoro (Mainland), bringing a total hectarage of 1,772 ha under irrigation (1,579 ha in Morogoro (Mainland) and 194 ha in Zanzibar), surpassing the Project target of 1,640 ha. The increased water availability, water use efficiency led to farmers to cultivate paddy twice a year, as opposed to only one cropping season, before the Project. The irrigation system used involved large canals that would bring water in the dry periods, which involved pumping unit water flowing through gravity in the respective canals.

However, infrastructure works delayed as most of the irrigation schemes were finalized in the final year of the Project, limiting full impacts to be realized in the short term. The delays emanated from inadequate capacity of Government institutions in terms of procurement, design, and supervision of works. With inadequate capacity, efforts to decentralize design and supervision of irrigation works (in line with decentralization policy) led to errors which had to be reworked by engaging private sector entities after MTR (October 10, 2018). There had been further delays by Ministry of Finance to pay the contractors on time after certification of various irrigation works.[15] More benefits in terms of rice production and yield are expected after full utilization of the irrigation schemes. To ensure sustained operations and functionality of irrigation schemes, further public funding for irrigation and maintenance will be needed, as well as enforcing the National Irrigation Act (2013) which requires that Irrigator Organizations (IOs) collect an irrigation fee for operations and maintenance or irrigation schemes. In the short term, the National Irrigation Commission and Ministry of Agriculture (MoA) will have to make post Project follow ups and supervision during operational phase, as institutional structures (e.g. IOs) were not fully operational at Project closure and needed further training and capacity

Figure 6: Koani irrigation scheme rehabilitated

Pumping unit (left), individual plot (right) equipped with hydrant for watering at Koani scheme in Zanzibar (Source: Annual Reports)

The Project supported the creation of 56 IOs which were strengthened to support operations, maintenance, and general use of the irrigation schemes. A total of 2,867 water users were provided with new/improved irrigation and drainage services. On the latter, the achievement was lower than target of 4,403 because some big schemes like Mbogo Komtonga were dropped due to lack of complimentary investments by other sources of funding.

Source: Government Project Progress Reports

[15] Refer Section III for more details

39. **Institutional strengthening of rice seed delivery system:** To ensure effective delivery of rice seed systems, including basic rice seed production, seed certification and quality control, the Project strengthened the capacity of Government institutions. A seed laboratory at Agriculture Seed Agency (ASA) in Morogoro was rehabilitated[16] as well as ZARI-Kizimbani in Zanzibar, including connecting electricity, providing equipment, and furnishings. The rehabilitation and expansion of irrigation structures for seed production on the 400-ha land owned by ASA greatly contributed to increased production of basic and pre-basic rice seeds[17]. The TOSCI and Seed Unit were further strengthened on seed delivery system. Key basic functions supported included registration of seed producers (including contract farmer growers), inspection of seed fields and laboratory testing, training seed producers, inspectors and laboratory technicians on seed inspection, quality control and certification. Farmers were highly satisfied with the quality of rice seed, after good certification was done through the Government institutions supported by the Project.

40. **Additional quantity of rice marketed in targeted areas.** A total of 68,361 tons of additional rice was marketed by the end of the Project, above the Project target of 45,200 tons. Marketing activities were implemented only in Morogoro (Mainland), which was assumed to have market surplus. The Project constructed 6,700 tons capacity warehouses[18] and associated roads which were finalized towards the end of the Project. In view of this, the impact of such infrastructure will be realized after Project closure as direct interventions were mainly on capacity building and farmer mobilization. Specifically, the project trained 210 farmers, 75 extension staff from 40 irrigation schemes on rice pre- and post-harvest management, as well as 140 farmers and 20 extension officers on warehouse management and operations. Farmers were organized in groups in the respective irrigation schemes to manage the warehouses. Consequently, farmers were able to pull their produce together in warehouses, although the extent of participation was still limited. By the end of the Project, limited linkages with buyers were observed, as well as lack of involvement of farmers in using warehouse receipt systems to access finance based on deposited rice in the warehouses as collateral.

41. **Farmers in Morogoro (Mainland)[19] were actively involved in selling paddy (62 percent of beneficiaries).** Farmers were mostly selling paddy at homesteads (69 percent) and private warehouses (21 percent) with brokers/middlemen as main buyers. For farmers actively involved in selling paddy and rice, they preferred selling milled rice at private warehouses who also offered milling services. Such warehouses offered storage for farmers and traders for deferred sales, which was aimed to defer selling when prices were high. The milling sites provided a platform for buyers and farmers to meet and interact. Table 7 below provides further analysis which demonstrated increased gross revenues on rice sales, among Project beneficiaries (almost twice as much).

Table 7: Revenues obtained from rice sales (TZS)

Quantities sold/revenue	Tanzania Mainland	
	Beneficiary	Non-beneficiary
Quantity of rice sold (kg)	2,245.7	919
Unit price of rice (TZS)	1,208.6	1,196
Revenue from rice (TZS)	2,714,153	1,099,336

Source: Annual Project Survey, 2019/20

[16] Refer to Section E for more details.
[17] A total of 58.2 tons of pre-basic seeds, 63.6 tons of basic seeds and 258.8 tons of certified seeds were produced.
[18] 5 warehouses were constructed in the following irrigation schemes with their associated capacities: (1) Kigugu – 1000 tons, (2) Mbogo Komtonga – 1000 tons, (3) Mvumi – 1,300 tons, (4) Msolwa Ujamaa – 1,700 tons and (5) Njage – 1,700 tons.
[19] In Zanzibar, less than 2 percent of beneficiaries were involved in rice sales as production was negligible.

42. **Increased value addition from paddy to milled rice correlated to higher prices and ultimate revenues obtained.** The unit price for paddy in Morogoro (Mainland) among beneficiaries was approximately 532 TZS, while that of polished rice was 1,209 TZS. This indicated significant price difference with value addition (from paddy to polished rice). Farmers preferred storage facilities that also provided milling services, hence able to defer sales when prices were high. This illustrated an opportunity for an innovative approach to strengthen collective storage, value addition, access to finance (e.g. warehouse receipt system) towards creating a competitive and profitable rice subsector.

PDO 3: Direct Project Beneficiaries.

43. **The Project reached 41,485 direct beneficiaries out of the revised target of 30,000 representing achievement rate of 138 percent.** Total beneficiaries for Morogoro (Mainland) were 36,421 and 5,064 for Zanzibar. Good performance was observed on gender, having reached 51 percent women beneficiaries, above the Project target of 50 percent. The total number of beneficiaries was realistic, after revisions made during the restructuring to better reflect the magnitude of Project investments.

44. **The key assumptions under the constructed TOC were greatly met, with some variations.** Farmers were highly interested in adopting the technologies, market friendly subsidies assisted to boost technology adoption, qualified service providers helped to support irrigation/roads/warehouse works as supported by the Project. However, the private sector interest in production of rice certified seeds was limited. As such, most support for rice seed delivery system was strongly public centric. Other assumptions outside Project control like external financing for some irrigations schemes from private sector did not materialize, as also external climate risks continued to affect the rice production (e.g., droughts and flooding).

Justification of Overall Efficacy Rating

45. **Overall, the Project's efficacy is rated as Substantial.** This is on the basis that the Project exceeded its targets for rice yields, production in Mainland, with substantial achievements in Zanzibar. The number of Project beneficiaries have been 38 percent above the project target. The Project contributed to high rates of uptake of GAPs, including use of improved seeds, fertilizers, SRI, and access to water for irrigation, ensuring that farmers grow rice twice per cropping season as opposed to a single cropping season before the Project. As finalization of most irrigation infrastructure works took place towards the end of the Project, there is an expectation that there will be more benefits in terms of yield and production, in the medium- to long-term upon full utilization of the irrigation schemes.

C. EFFICIENCY

Assessment of Efficiency and Rating

46. **An efficiency analysis was undertaken to assess economic and financial returns of the Project.** The Project's development goal was reached, and the Project exceeded its targets on rice yields, production, rice marketed, and beneficiaries (see Table 3). High rates of adoption of improved seeds and technologies promoted by the Project was realized, as the Project supported the rehabilitating irrigation schemes as well as new or supplemental irrigation schemes. These efforts greatly contributed to increasing rice yield and production levels, including marketable surplus. The analysis showed that with SRI packages, the yield increases were over 100 percent with the yields in the most basic case where SRI was applied reaching over 4 tons/ha.

47. **The direct benefits from the Project were achieved through increased production, yield and improved farm-gate prices associated with improved marketing arrangements (marketing aspects for Mainland only).** This combination of benefits contributed to increased rural incomes and improved food security. These benefits resulted from (a) adoption of new technology packages (especially improved seed, fertilizer, water management and weed control) leading to increased production and productivity and (b) improved irrigation systems (rehabilitation and new schemes). The irrigation gains were derived from shifting farmers from informal to formal irrigation systems, rehabilitating or strengthening of formal irrigation infrastructure, and expanding the number of farmers cropping for two seasons per year from initial single season. In the Morogoro (Mainland), additional gains were achieved through (c) the establishment of grain warehouses allowing storage of grain for later sale and facilitating bulk sales of paddy. The improved roads supported by the Project helped to ensure timely accessibility of farm inputs and farm products from the irrigation schemes.

48. T**he delays in the rehabilitation and construction of irrigation infrastructure and grain warehouses[20], which were done in the last two years of the Project, mean that the full benefits will be realized post Project completion as the infrastructure is put into full use**. A conservative projection based on two rice crops per year under irrigation indicate that the rice yields could triple as was found in the FAO Partnership for System of Rice Systems Development in Sub-Saharan Africa" GCP/RAF/489/VEN April 2020 which worked in 10 countries in Africa including Tanzania. The achieved yields also include attribution of irrigation schemes, as most works were on rehabilitation (1,501.7ha) which allowed farmers to benefit from the improved irrigation and drainage, while the supplemental or new schemes (271.2ha) will provide increased scope for future benefits, due to delayed execution.

49. **The Project achieved institutional and social benefits as well.** These benefits included: (a) strengthened seed systems, including quality control and responsiveness to farmer demand; (b) improved links between research, extension, and farmer groups in evaluating new varieties and crop management technologies; (c) testing on the Mainland of improved management arrangements for targeted irrigation schemes; and (d) improved marketing arrangements for crop storage and competitive sale. The technical support backing the introduction of new varieties and crop management practices was biased in favor of women and poorer farmers and the Project surpassed the target of 50 percent women. The social benefits for the Project which focused on food security with complementary gains in rural poverty reduction have been demonstrated by the yield gains, allowing farmers to crop twice and thus have surplus sales. Overall, the Project achieved its goals.

50. **The economic analysis has produced an overall Net Present Value (NPV) of US$9 million at a discount rate of 12 percent yielding with an Economic Internal Rate of Return (EIRR) of 36 percent.** In Morogoro (Mainland), the NPV achieved was US$12 million, with EIRR of 51 percent, while in Zanzibar, the NPV achieved was US$0.5 million with the EIRR of 25 percent (see Table 8). The largest share of benefits is obtained in Morogoro (Mainland) given the larger number of farmers assisted, more hectarage under irrigation and the gains accruing from the warehousing schemes. The rate of return was lower in Zanzibar due to flooding. The indirect benefits associated with spillover gains to a broader range of producers, consumers and marketing agents were not included in the analysis which only includes the direct beneficiaries. As the irrigation systems come into full use, as they were completed in the last 2 years of the Project, the improved yield gains should result in spillover benefits in many parts of the country through the combination of improved irrigation, better crop management and strengthened marketing systems. Input markets will gain from improved demand for seed, fertilizer and herbicides, and product markets are expected to become more competitive.

[20] Refer Section III for full details

The achieved economic analysis results seem consistent with that at Project appraisal, which indicated a NPV of $12.1 million (discounted at 12 percent), and EIRR of 35 percent.

Table 8: Economic Analysis Summary

Region	Net Present Value (NPV) - US$	Economic Internal Rate of Return (EIRR)
Mainland	12 million	51 percent
Zanzibar	0.5 million	25 percent
Total	9 million	36 percent[21]

51. **The Project has confirmed a strong case for public funding.** The case for public funding in stimulating rice production has been demonstrated, not only by the EIRR of 36 percent, which for the first four years of the public funding was mostly attributed to improved seeds and improved agronomic practices as irrigation infrastructure were finalized late. Public funding encouraged the broader testing and adoption of improved crop management technologies such as SRI.

52. **Despite high economic returns to the investment, the Project's efficiency is rated Modest.** The Project offered a direct NPV of US$9 million at a discount rate of 12 percent, and an EIRR of 36 percent. This accounts for the full costs of the irrigation infrastructure as well as the investments in improving crop and market management. However, despite high economic returns, the Project delayed in the execution of irrigation infrastructure and warehouses, which will need further public support for effective operations and maintenance to ensure long term sustainability of irrigation investments.

D. JUSTIFICATION OF OVERALL OUTCOME RATING

53. The overall outcome is rated **Moderately Satisfactory** based on the following reasons:

- **The PDO relevance is rated High** at appraisal and remained so at Project closure.
- **Efficacy is rated Substantial** as the Project achieved most of its outcome targets (confirmed during the end of Project survey).
- **Efficiency is rated Modest.** The financial economic analysis demonstrates significant economic results and satisfactory Project expenditures. However, the rating has been downgraded from Substantial to Modest due to delayed execution of irrigation works, which comprised the bulk of the Project resources.

E. OTHER OUTCOMES AND IMPACTS

Gender

54. **The Project contributed to the well-being of farming communities, including women and youth.** Project participation was equally distributed among female and male farmers. During Project implementation, provision of services to female paddy farmers was emphasized. The number of female direct beneficiaries for Morogoro (Mainland) and Zanzibar was 51 percent which is slightly higher than the Project target of 50 percent.

[21] Based on weighted average, similarly under total NPV.

55. **Women adopted improved technologies promoted by the Project, benefited from irrigation infrastructure works and capacity building.** For instance, 77 percent and 98 percent of the women in Morogoro (Mainland) and Zanzibar respectively adopted improved rice seed varieties promoted by the Project. The Project also achieved 43 percent of women (or 1,238 women) as water users who benefited from new irrigation and drainage services. A total of 99 female farmers (47 percent achievement) were trained on rice pre- and post-harvest management, which improved their rice storage, encouraged commodity bulking and strengthened links with buyers. These market linkages assisted farmers to defer their sales to a time when prices were relatively high, hence achieving increased market value and income.

Institutional Strengthening

56. **Strengthening capacity of rice seed systems contributed to increasing availability of improved rice seeds of various classes.** The Project constructed a seed laboratory at ASA, procured laboratory equipment to both ASA and Kizimbani Seed laboratories and trained ZARI laboratory technicians and seed inspectors. The rehabilitation and expansion of irrigation structures for seed production on the 400-ha land owned by ASA greatly contributed to an increase access to basic and pre-basic rice seeds, which is critical to support seed multiplication of other seed classes. A total of 58.3 tons of pre-basic seeds, 63.6 tons of basic seeds and 258.8 tons of certified rice was produced, as 13 rice varieties were introduced. The Project trained 160 graduate seed growers on seed certification.

Figure 7: Constructed seed laboratory at ASA (left), and Laboratory technicians working (right) - Morogoro

Source: Government Project Progress Reports

57. **The TOSCI and Seed Unit was further strengthened on seed delivery systems**. Key basic functions supported included registration of seed producers (including contract farmer growers), inspection of seed fields and laboratory testing, training seed inspectors and laboratory technicians on seed inspection, quality control and certification. A total of 26 seed inspectors, 6 laboratory technicians and 180 farmers (66 women) were trained on seed quality control. A total of 108 seed dealer shops were inspected, and generally seeds were of good quality.

58. **The Project improved capacity of Government to oversee irrigation works at national and operational levels.** In Morogoro (Mainland), Engineers from MoA, National Irrigation Commission and Local Government Authorities were trained to oversee technical supervision on rehabilitation and construction works at targeted irrigation schemes (Msolwa Ujamaa, Njage, Mvumi, Kigugu, Mbogo Komtonga and Kilangali Seed Farm). At operational level, the Project

created and strengthened 56 water user associations (irrigators organizations), above the target of 13. These played a leading role to support irrigation operations and maintenance.

Mobilizing Private Sector Financing

59. **Increased demand for inputs expanded agro-dealer reach within the Project areas, thereby increasing private sector participation.** The agricultural inputs (fertilizer, herbicides and implements) used in demonstrations of SRI agronomic practices were supplied by private agro-dealers. However, there had been limited involvement of private sector in certified rice seed production, as the seed system was strongly public led, positing a threat to sustainability. More analysis is needed to understand the reasons behind such limited participation.

60. **Partnerships with private sector entities, particularly on creating market linkages, training on warehouse management and operations were explored through the Project.** This was facilitated by Government institutions and private sector including marketing unit of MoA, cereal and other produce board (CPB), Tanzania Warehouse Receipt Regulatory Board (TWRB) and Tanzania Mercantile Exchange (TMX). However, by the end of the Project such linkages were still at infancy as most interventions were on training and bulking of rice in the commodity warehouses.

Poverty Reduction and Shared Prosperity

61. **The Project did not directly measure the impact on poverty, but the increased productivity, production achieved is expected to greatly increase food availability, access, and income for farmers in the short to medium term, thus positively improving food security.** External reviews indicated that before the Project interventions, farmers reported low production hence did not have enough reserves to take them to the next season, experiencing frequent food shortages from January to March. The Project helped to assure enough food reserves and farmers to sell the surplus harvests.

62. **The adoption of improved rice seed varieties, GAPs and other technologies are expected to increase food availability and incomes**. Previous assessments by FAO have shown that for every 1 percent of growth in agricultural output, poverty fell by 0.6 percent. As more farmers adopt improved technologies, food security will improve, which will contribute to poverty reduction in the medium to long term.

63. **The private contractors engaged boosted employment.** The private sector contracted to rehabilitate infrastructure works (irrigation schemes, roads, and warehouses) mostly employed the labor force within the localities, thereby contributing to seasonal employment. Such initiatives boosted household income and stimulated economic activities around the Project areas.

Other Unintended Outcomes and Impacts

64. **The Project generated positive spillovers.** Several non-beneficiaries accessed improved knowledge from demonstrations, Information, Education and Communication (IECs) and promotion of GAPs, which led to corresponding increase on rice production and yield. The Project improve access to certified rice seeds which were sold through various agro-dealer outlets, hence increasing their business while leading to increased rice production and yield trends.

65. **Beneficiary farm households improved their livelihoods and food security.** Significant improvements among beneficiaries on household income, food availability, food accessibility, housing, assets, and better health were confirmed during the end of Project survey (2019/20). This was in contract to non-Project beneficiaries, who demonstrated relatively lower food security and livelihood trends.

III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME

A. KEY FACTORS DURING PREPARATION

66. **The Project design process was consultative, inclusive and aligned with the national policy frameworks.** The Project was fully aligned with the national and subsector strategies[22], which prioritized rice as an important crop to achieve agricultural growth and productivity, improve food and nutrition security and reduce rural poverty.

67. **Lessons from past projects on irrigation, subsidies, technology delivery systems were incorporated in the Project design.** Such lessons were gained from World Bank's growing experience in similar investments, including Sector Wide Approach (SWAp) in the agriculture sector that was created under auspices of initial phase of the Agriculture Sector Development Program (ASDP, P085752). The Project design was based on the review of the national agricultural development policy, its strategies and investment plans. Key focus at Project design had been to build a strong foundation for sustainability which included capacity development, exit strategies of subsidy programme, irrigation capacity, management and maintenance and institutional capacity development. A detailed mapping on donor projects was done, which informed collaborative partnerships.

68. **Marketing aspects were integrated within the Project, albeit only in Morogoro (Mainland), with limited rice value addition focus.** The Project assumed limited rice surplus in Zanzibar, hence only included marketing activities in Morogoro (Mainland). The focus on rice sales was limited to paddy rice, with limited value addition which would translate to increased incomes among rice producers.

69. **The PDO was appropriate and attributable to the Project investments.** It reflected the main gaps observed in terms of low rice production and productivity which hindered rice development in Tanzania. However, the PDO was less ambitious as its indicators were limited to output level and not higher-level outcomes to capture Project results.

70. **The infrastructure project costs were underestimated, coupled with inadequate Government capacity.** The Project was prepared at a time when Government was using its own institutions (i.e. National Irrigation Commission) to

[22] Refer to Paragraph 7 and 8.

design and supervise projects and resulted in some errors on design and estimated budgets. During Project implementation, it became clear that it would be difficult to attract competitive bidders for construction works due to low budgets. Further, local Government level had limited capacity to manage procurement, leading to subsequent cancellation of tenders. The capacity of local Government functions was thus not fully assessed to give comfort to effectively design and supervise the irrigation infrastructure works.

71. **The major risks were identified but underestimated.** The key risks included weak capacity to implement the Project within the Government machinery and ensure that the irrigation systems are managed in a sustainable manner. The mitigation measures focused on capacity building of farmers on adoption of improved technologies and training irrigation organizations on management and maintenance. Due to limited procurement and contract management capacity (national and local Government level), the procurement risk was grossly underestimated. Also, adverse climate change effects (e.g. floods that wiped production gains in Zanzibar) were not fully anticipated, with mitigation actions not? put in place.

B. KEY FACTORS DURING IMPLEMENTATION

72. **There was a start-up delay during the Project implementation period.** The project experienced a slow start in implementation, with the first disbursement taking place 10 months after Project approval in March 2015. Disbursements only peaked up from 2019, meaning slow implementation since Project effectiveness (close to 4 years). Delays were pronounced on irrigation infrastructure works, which comprised the bulk of the Project resources. Low Project performance took time to be rectified, up until after MTR (October 2018) when restructurings were done. This resulted into periods when the Project was rated Moderately Unsatisfactory. Implementation eventually picked up post-MTR when disbursements started to improve significantly (2019 and 2020).

73. **Limited institutional capacity with Government systems hampered implementation.** This led to tender cancellations, contributing to unsatisfactory ratings from 2015 up to 2019. Good traction was observed from 2019 (post MTR) when private contractors were engaged to support design and effective supervision of works. The Project experienced late submission of procurement documents which were also of low quality. Efforts to devolve procurement functions to local Government level resulted in further procurement challenges, leading to cancellation of some procurement of works. Delays were also observed in processing payments to contractors, triggered by late approval of funds by the Ministry of Finance and Planning. The introduction of a new layer of funds approval by Ministry of Finance and Planning which required the Paymaster General to approve funds transfers from the Project Account maintained at the Bank of Tanzania to a commercial bank delayed payment to contractors and execution of several activities particularly when the new layer of approval was introduced. Amidst the above challenges, there were also some delays on change of signatories to various accounts, related to changes in Government leadership and high staff turnover.

74. **Government high level buy in, strong commitment and oversight ensured effective delivery, albeit institutional delays**. The overall Project oversight led by the Permanent Secretary of the MoA helped to improve Project coordination for Morogoro (Mainland) and Zanzibar. The technical steering committee had been active, reporting to the Joint Steering Committee (JSC) which brought together Permanent Secretaries of MAFC and Prime Minister's Office- Regional Administration and Regional Government (PMO-RALG) in Mainland, MANR and President's Office (Regional Administration) for Zanzibar. At implementation level, the arrangement to mainstream Project coordination within Government helped to bring ownership. However, the Government seconded staff were not fully released from other responsibilities within their Ministries in the initial years.

75. **Strong Project management capacity was a catalyst towards effective project delivery.** The seconded staff for the Project Coordination Unit (PCU) had good experience which ensured Project take off, as well as institutionalize the Project's achievements within the overall Ministry's efforts. This was especially the case when the seconded staff were fully released to support the Project. The Project had a robust monitoring and evaluation (M&E) system, where all Project indicators are collected and reported adequately during the supervision missions. With some exceptions, when the M&E Officer was transferred to another unit which affected performance at some point, but this was later corrected.

76. **Increased Project scope required extensive oversight and monitoring arrangements.** The Project was widely spread, with a lot of irrigation sites across Zanzibar and Morogoro (Mainland). For instance, in Morogoro (Mainland), the Project targeted 40 irrigation schemes (in 6 districts), which were also further apart. On management front, this also meant having two Project coordinators, one overseeing Zanzibar and another one for Morogoro (Mainland), who further worked with respective local Governments.

77. **COVID-19 posed some challenges to Project implementation in the last year.** COVID-19 led to limitations in availability of labor in construction sites and construction materials, due to import/border restrictions. Some activities had to be deferred or rescheduled (e.g. residential trainings, field days) following adherence to the Government guidelines to limit number of gatherings and social distance in view of COVID-19 pandemic. The pandemic affected availability of casual workers and skilled labor to work in the construction projects as people were scared to contract the disease.

78. **The Project experienced shortage of water testing chemicals for Zanzibar and cement for Morogoro (Mainland) at some point during construction period.** The shortage of materials was caused by increasing focus on national flagship projects (roads, Nyerere hydroelectric dam etc.) which created cement scarcity leading to delays in accessing the product for timely use in the irrigation infrastructure works. These materials were key for irrigation infrastructure works.

79. **Provision of startup inputs, trainings and exchange visits among farmers spurred adoption of technologies promoted by the Project.** The provision of inputs increased adoption of technologies promoted by the Project, mostly through the input subsidy scheme. The peer learning through trainings and exchange visits provided great motivation to the farmers. The heavy focus on capacity, including training irrigation organizations, had been instrumental to ensure ownership and sustainability of the irrigation investments.

80. **Climate change impacts.** A mix of drought followed by heavy rainfalls caused flooding in some Project areas including Mbogo Komtonga and Tanzania Agriculture Research Institute (TARI) Ifakara (KATRIN) Seed Farm in Morogoro (Mainland). KATRIN Seed Farm was severely destroyed by floods. Heavy rains during dry season (Vuli 2019) affected construction works of Msolwa Ujamaa warehouse. In Zanzibar, heavy rains also affected production of rice in irrigation schemes. Long dry spell and rat infestation affected some demonstration plots negatively in Morogoro (Mainland).

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

A. QUALITY OF MONITORING AND EVALUATION (M&E)

M&E Design

81. **The design of the M&E system was guided by the RF, with its PDO and intermediate results indicators to monitor achievements along the causal chain.** The M&E system had two main components. *Firstly,* it included monitoring of achievement of expected results, through baseline study, mid-term evaluation, end of Project evaluation, with annual surveys to supplement tracking annual progress of key results indicators. *Secondly,* a simple Management Information System (MIS) established in MAFC and the MANR to track implementation progress, including disbursements and procurements.

82. **However, the PDO indicators were less ambitious.** The PDO indicators were limited to measuring production and yield only, and not higher-level results. Some indicators did not fully reflect attribution of the Project, while some were complex to be measured. These design shortfalls were addressed during the first and second Project restructurings where more clarity and revisions on the indicators and their corresponding targets were made. From a technical design point of view, the omission of marketing activities in Zanzibar limited achievement of full impacts from the Project, which is beyond productivity, but to influence results (incomes, food security and poverty). The activities under marketing were not fully captured in the RF to better attribute the Project on increase market value and improved household incomes.

M&E Implementation

83. **The M&E system was established, functional, with baseline study, annual surveys and mid-term evaluation carried out as planned.** Competent staff were in place to lead the M&E functions who cooperated and complemented well for Morogoro (Mainland) and Zanzibar. The data from Morogoro (Mainland) and Zanzibar was consolidated into a single RF, while ensuring consistency in data capturing and reporting. The Project annual surveys helped to update the status on various indicators in the RF and provided good input into the implementation support missions.

84. **After the MTR, the M&E system was strengthened with clarity on methodology and reporting.** The input from the two M&E teams (Morogoro in Mainland and Zanzibar) ensured ownership and use of the RF. The reporting to the Bank was regularly done and the only delays with some of the indicators took place when a mission would come before the Project annual survey data was processed, but these delays were typically short. The implementation support missions were done jointly, which allowed for exchange of experience and learning, particularly with field visits.

85. **The MIS was in place and operational until around MTR in 2018.** Up until then, when the Government/Ministry of Agriculture (MoA) offices, including servers, moved to Dodoma, the MIS operations were disrupted in terms access to the system. As the Agriculture Ministry's Information and Technology (IT) department strived to resolve the issue, the team moved to a manual/excel based system, which was used as a basis for reporting, done in a timely manner.

86. **The final Project annual survey (done internally) was commissioned in December 2020 and results submitted in March 2021, after Project closure.** The survey findings helped to provide overall Project achievements, in line with the RF. A draft Government ICRR was submitted in March 2021. An external end of Project evaluation survey would be

needed to better capture impacts of the Project (i.e. on food security, income), and can best be measured at least after two years after project closure.

87. **One main challenge was to capture "impact assessment" like rice productivity and production gains arising from irrigation infrastructure works, which were delayed and was completed in the final years of the Project.** In view of this, the achieved production and yields (mostly because of improved seeds, GAPs, SRI) are likely to be underestimated as the real impact of the irrigation schemes would take at least 1-2 years after infrastructure works are completed. Thus, the additional 'future' yields and production achieved due to irrigation infrastructure have based on estimated using similar irrigation schemes in Tanzania based on FAO data (Refer to Annex 4)

M&E Utilization

88. **The M&E data and annual survey results were used for decision making.** The templates and reporting formats for the annual surveys were harmonized for Morogoro (Mainland) and Zanzibar, and its results of relatively good quality and informed in decision making. These results informed areas to adjust during implementation, and informed subsequent changes during Project restructurings.

89. **Harmonized data collection, reporting made it easy to consolidate and compare results achieved from Morogoro (Mainland) and Zanzibar, while providing overall Project status and learning.** The results from Project annual surveys and final Project survey[23] helped to inform the Project status, giving full account of indicators in the RF. The Project captured results stories and case studies which helped to confirm results achieved. In addition, an external non-Governmental organization (NGO), ActionAid International, also covered an impact story which assessed the Project supported small scale producers in Tanzania. Several case studies were also developed to show Project impact among its beneficiaries.

Justification of Overall Rating of Quality of M&E

90. **Based on functional M&E system, capacities in place, data quality and timely use of for Project management, decision making and learning, the overall M&E quality is rated as Substantial.** The Project used timely evidence from annual surveys to inform the decision making.

B. ENVIRONMENTAL, SOCIAL, AND FIDUCIARY COMPLIANCE

91. **The Project was classified as Environmental Category B and was compliant with the Environmental and Social Safeguard Policies applicable.** The following safeguards policies were triggered: (i) Environmental Assessment (OP/BP 4.01); (ii) Natural Habitats (OP/BP 4.04), (iii) Pest Management (OP/BP 4.09); and (iv) Involuntary Resettlement (OP/BP 4.12). There were no major safeguard problems anticipated in the Project. Grievance Redress Mechanisms (GRM) were set up, for Mainland and Zanzibar and functional. Overall, Environmental and Social risk was assessed as moderate and the final rating during last mission was Moderately Satisfactory.

92. **Environment**: As per design, the environmental risks were rated low to moderate. The Environmental and Social Management Framework (ESMF) highlighted the need to prepare environmental impact assessments prior to

[23] The final Project survey report was delivered after Project closure, its results have informed this ICRR, also as per final RF (Annex 1).

development of new infrastructure works. The Integrated Pest Management Plan (IPMP) was developed to guide on the use of pesticides and fertilizers to ensure safe agrochemical usage. The IPMP was disseminated, translated into local language (Kiswahili), and served as an important tool towards management of pollution and safeguarding health of farmers.

93. **Each sub-project developed an Environmental and Social Management Plans (ESMPs) and was adhered to in a satisfactory manner**. Safeguards' activities such as water testing in irrigation schemes and safety of farmers were adequately implemented. The Project managed to obtain water use permits and secure discharge permits from responsible authorities. Some delays were observed on purchase of materials for water testing at the discharge points of the irrigation schemes due to COVID-19 pandemic, but finally the water testing was fully conducted for all schemes, with its results confirming that water was suitable for irrigation. All infrastructure works adhered to the ESMPs, including use of Personal and Protective Equipment (PPEs) and occupational health and safety, with timely reporting. The project did not record any incidences regarding Occupational Health and Safety (OHS).

94. **Social:** In view of limited and localized resettlement arising from limited expansion of some irrigation schemes, the Resettlement Policy Framework (RPF) was developed. The Project developed three Resettlement Action Plan (RAPs) for irrigation schemes which resettled farmers (Kilangali Government seed farm in Mainland, Kibondemzungu and Ole schemes in in Zanzibar). By the end of the Project, all resettlement issues were concluded satisfactorily, including farmers allocated land in Kilangali Government seed farm for their production. The GRM was set up and operational, with complaints registers updated, and grievances redressed in all the project impact areas. The Project had a strong citizen engagement, with structures established up to village level.

95. **Financial Management (FM):** The overall FM residual risk rating at appraisal was moderate. This was due to the fact that responsible agencies (MAFC and MANR) were considered to have enough capacity and experience in implementing World Bank-funded projects. However, there was continuous low budget utilization at the beginning of the project due to implementation delays, especially as irrigation infrastructures works, which comprised the bulk of the project budget was delayed. Bureaucratic delays were also observed on effecting changes on new signatory authorities from Government, as well as untimely payment of funds to contractors by the Ministry of Finance and Planning.

96. **FM performance and disbursements improved overtime**. Annual project audit reports, and Interim Financial Reports (IFRs) were submitted on time and all outstanding issues were resolved within the project period. The FM risks were mitigated through training of staff in World Bank FM procedures and adequate adoption of sound FM procedures. FM rating during the last Implementation Status Report (ISR) was Moderately Satisfactory.

97. **Procurement Management**: The overall residual risk at appraisal was rated moderate. The first challenge was limited procurement capacity at local Government leading to cancellations of tenders and later the central Ministry level. Secondly, contract management was another challenge to enable timely monitoring of contracts under implementation, ensuring that works and services are delivered/completed on time and before Project closing date so that the payments are eligible. Some contractors' advance payments were refunded late despite having completed their works.

98. **Some challenges were observed when Government devolved some procurement functions to local Government level, which led to cancellation of some contracts due to limited procurement capacity**. Project Implementation Units (PIUs) had limited capacity to manage large contracts. The World Bank team provided regular procurement and contract management training, with strong supervision support from the World Bank and the Government. Independent

procurement audits and technical support were also provided. The procurement performance rating at final ISR was rated Satisfactory.

C. BANK PERFORMANCE

Quality at Entry

99. **The Bank's performance at identification, preparation, and appraisal of the project is rated Moderately Satisfactory.** The design of the project was aligned with the Government of Tanzania's priorities as enshrined in the NSGRP, Tanzania's 5-year Development Plan, BRN, National Rice Development Strategy and CAADP. It was also aligned with the World Bank Group CPF and World Bank Strategy for Africa. Hence, the project was strategically important and relevant. At preparation, the team involved multiple stakeholders. The team carried out fiduciary capacity assessment for MAFC and MANR and relevant agencies to execute the project, and proper mitigation actions put in place. Fiduciary and environmental and social safeguard assessments were undertaken, and relevant tools developed (e.g. ESMF, RPF, RAPs, IPMP) to guide project implementation. Although the assessments deemed that the client's capacity was adequate, having implemented similar World Bank funded projects, the implementation realities revealed serious gaps, particularly on procurement and entire capacity of Government to effectively design, manage and supervise irrigation contracts. This revealed important shortcomings in the capacity assessment conducted at appraisal.

100. **Although the Project design was consultative and robust, some key aspects of the Project were not sufficiently justified.** *Firstly*, the Project assumed there would be complimentary investment which did not materialize, hence some targets had to be adjusted downwards. *Secondly*, the marketing activities were only considered in Morogoro (Mainland) and not Zanzibar. On the latter, increased productivity is not enough unless it links to marketing to ensure Project impact through increased sales, farmers' incomes, and food security. Thus, the design ought to have included marketing activities at the onset. *Thirdly*, at design, the costing for rehabilitating irrigation schemes was underestimated, and not adequately validated by Government technical teams and was corrected during the first restructuring. *Fourthly,* the Project assumed that client capacity exists based on experience in implementing past World Bank projects and not fully validated this. The approach to mainstream project coordination within Government led to less implementation traction, and the task team should have put in place a PIU as an effective condition to manage the project of such complexity, with validated capacity assessment before implementation.

101. **The design of the ERPP was informed by lessons from past and prevailing World Bank funded and other donor funded projects.** Lessons from World Bank funded projects which included Agricultural Sector Development Project (P085752), Accelerated Food Security Project (P165848) and Participatory Agricultural Development and Empowerment Project (P067103), and other donor projects[24] were incorporated at project design. The project design was also informed by analytical work that informed the development of the GAFSP proposal[25]. The decision to use existing Government structures was appropriate as part of building capacity, although it contributed to some delays towards the start when the assigned officers were not fully available for the project, due to other Government responsibilities, and at some point, Government restructuring affected implementation momentum.

[24] Includes projects by Japanese International Cooperation Agency (JICA), Unites States Aid for International Development (USAID), UK Department for International Development (DFID), Alliance for Green Revolution in Africa (AGRA), Korea EXIM and others.

[25] Refer to paragraph 8 for specific analytical work which informed the Project design.

Quality of Supervision

102. **The Project started at a very slow pace and improved after MTR.** Since Project effectiveness on May 18, 2015, eleven (11) implementation support missions were carried out in a timely manner. The first disbursement took place after 8 months of Project effectiveness. The Project faced slow implementation, where disbursements were lower than 50 percent since mid-June 2019. The first years were associated with change of Task Team Leaders (TTLs), while Government took time to ensure that proper staff were assigned and seconded to lead the Project. The assignment of a TTL based in-country helped to assist the client to catch up with the implementation of the Project.

103. **The task team conducted an MTR that highlighted significant implementation delays and gaps.** The MTR was undertaken in October 2018, at a time when the implementation was very slow, with disbursement at 29 percent. Consequent to this, the task team proactively restructured the project (in November 2019 and April 2020) to ensure that the Project was on track to meet its objectives, while allowing enough period to finalize the delayed infrastructure works. The post MTR period was associated with strong client engagement and hands-on support from the World Bank. Aide-Memoires and ISRs were timely and contained relevant information, including status of disbursements, implementation progress and flagging issues for management action.

104. **In addition to supervision missions, the task team provided support and flexibility in addressing problems, amidst the COVID-19 pandemic.** Communications and consultations with the client were regular, open, and transparent. The World Bank provided extensive hands-on support to the client including areas of FM, procurement, safeguards and M&E. Bank technical specialists provided timely advice to the client. Towards the end of the Project, supervision was affected by the COVID-19 pandemic, which restricted field visits as well as contacts with beneficiaries. Nevertheless, implementation support mission continued to be done through virtual platforms.

Justification of Overall Rating of Bank Performance

105. **The overall Bank performance is Moderately Satisfactory (MS).** This is due to continuously slow Project performance which took longer than necessary to be fixed, within the context of low institutional capacity of the client to lead the project. With lack of detailed capacity assessment during Project preparation, the coordination capacity within Government was so weak, an issue that could have been considered during appraisal to establish a PCU as an effectiveness condition. The Project performance only improved after the MTR. Following the MTR, the task team became very proactive and initiated two restructurings after which led to subsequent improved Project performance. The Bank performance rating is MS for quality at entry, and MS for the quality of supervision. Therefore, the overall Bank performance is rated Moderately Satisfactory.

D. RISK TO DEVELOPMENT OUTCOME

106. **The development outcome of the Project is likely to be achieved based on good results achieved on farmers adopting improved seeds, good agronomic practices, including SRI**. This was achieved from various trainings, promotion of improved technologies and institutional capacity development efforts that the Project supported. These efforts increased awareness among farmers on improved productivity, hence good results on adoption and associated productivity. However, the risk remains on sustaining the investments on irrigation infrastructure which needs operations and maintenance as most works were concluded towards the end of the project. Whereas 50 Irrigator Operators were established and trained, they need further support for them to be properly institutionalized, functional, including having a fund in place a fund to support operations and maintenance of irrigation schemes. Likewise, even though Government has written to all implementing partners to mainstream Project activities in their budget, the realism will depend on availability of competing public resources.

107. **The absence of a seed revolving fund remains a gap to sustain production of breeder and foundation rice seed.** The absence of such a fund (especially for breeder seeds) would mean that Government or donors will have to support production of early generation seeds which cannot be sustainable. Also, the absence of a vibrant private sector on certified rice seed production constrains sustainable seed delivery system.

108. **The COVID-19 outbreak is likely to hold back the attainment of the anticipated development outcomes, at least in the short-term**. The pandemic resulted into increased vulnerability, associated with lower demands for rice, as well as supply shocks through labor. In addition, travel restrictions would likely affect food supply chains, and adversely affect the smallholder farmers.

109. **Climate Change Events:** Tanzania remains vulnerable to climate change shocks. Floods which occurred in 2019/20 are an example, which wiped out most of the rice production gains that would have been realized, especially for Zanzibar. Droughts were also pronounced in some years, which affected rice production and yields.

V. LESSONS AND RECOMMENDATIONS

110. **Small/self-standing grants are complex to manage and supervise if not aligned to a bigger operation.** The small standing Project operations can be complex to supervise and have limited scale in terms of impact. There is more value addition to leverage small grants to bigger operations to increase efficiency and efficacy. This, notwithstanding, the GAFSP self-standing operation helped to propel traction and Bank relevance within the context of limited IDA operations. At the time the ERPP Project was implemented, there had been no other major IDA lending operations in the agriculture sector, as some were closed along the way while some did not move beyond negotiations stage.

111. **Leveraging improved agricultural technology increases the efficacy of an irrigation investment.** The combination of improved seeds and good agronomic practices (including SRIs) created a good foundation for impactful irrigation infrastructure investments. With improved irrigation infrastructure, more benefits (yield and production) are expected to be achieved, and such complementarity (*'software* and *hardware'*) is key for an effective project design. A self-standing irrigation investment would not have added much value without complementarity 'software' investments.

112. **Production and productivity are not sufficient catalysts for creating impact unless marketing and value addition are integrated**. The end of Project review confirmed that increased incomes and revenues apply to farmers with strong

market linkages and value addition. Deepening market activities like warehouses helps farmers to improve storage and defer sales to when prices are high, while mobilizing farmers in groups and linking them to off takers provides an opportunity for bargaining prices. This contrasts with farmers (especially in Zanzibar) who were selling rice at farm gate, not organized and fetching lower prices.

113. **A long-term approach to irrigation development is key to ensure developmental impact.** Development of irrigation infrastructure and long-term viability of IOs need adequate time, and more than 5 years, to achieve developmental impact. In view of this, sustained efforts are still needed to institutionalize IOs, sustain operations and maintenance, link farmers to markets, and create a sustainable seed system. Situating irrigation investments within the culture of farmers is key to ensure ownership and sustainability.

ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS

A. RESULTS INDICATORS

A.1 PDO Indicators

Objective/Outcome: To increase the productivity and production of rice among smallholders in targeted areas of Moro&ZNZ

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Average yields of targeted farmers growing paddy - Mainland	Metric ton	1.80 01-Dec-2014	3.50 12-Mar-2015	5.00 24-Nov-2019	5.70 31-Jan-2021

Comments (achievements against targets):
Adoption of SRI and use of improved seed greatly contributed to increase in yield

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Average yields of targeted farmers growing paddy - Zanzibar	Metric ton	1.80 01-Dec-2014	5.50 12-Mar-2015	5.50	4.90 31-Jan-2021

Comments (achievements against targets):

Average productivity for 20 irrigation schemes. Heavy floods resulted in slightly lower yields for 2019/2020

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Additional quantity of rice produced in targeted areas - Mainland	Metric ton	0.00 01-Dec-2014	56500.00 12-Mar-2015	56,500.00	88,637.00 31-Jan-2021

Comments (achievements against targets):

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Additional quantity of rice produced in targeted areas - Zanzibar	Metric ton	0.00 01-Dec-2014	9660.00 12-Mar-2015	6,000.00 09-May-2020	4,395.00 31-Jan-2021

Comments (achievements against targets):
Floods affected rice production in the final year 2019/20

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Additional quantity of rice	Metric ton	0.00	45200.00	45,200.00	68,361.00

marketed in targeted areas - Mainland		01-Dec-2014	12-Mar-2015		31-Jan-2021

Comments (achievements against targets):
Increased rice production and marketing efforts contributed to additional rice marketed in Mainland

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Direct project beneficiaries	Number	0.00 01-Dec-2014	33069.00 12-Mar-2015	30,000.00 09-May-2020	41,485.00 31-Jan-2021
Female beneficiaries	Percentage	0.00	50.00	50.00	51.00

Comments (achievements against targets):

A.2 Intermediate Results Indicators

Component: Sustainable seed systems

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of farmers adopting	Number	0.00	23600.00	20,000.00	27,079.00

new rice seed varieties promoted by the project - Mainland		01-Dec-2014	12-Mar-2015	09-May-2020	31-Jan-2021

Comments (achievements against targets):

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of farmers adopting new rice seed varieties promoted by the project - Zanzibar	Number	0.00 01-Dec-2014	8400.00 12-Mar-2015	6,000.00 09-May-2020	4,991.00 31-Jan-2021

Comments (achievements against targets):

Component: Improving crop productivity through better irrigation and crop management

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of farmers adopting SRI management techniques promoted by the project- Mainland	Number	0.00 01-Dec-2014	3300.00 12-Mar-2015	3,300.00	17,776.00 31-Jan-2021

Comments (achievements against targets):

There has been increase demand and uptake of SRI techniques among farmers in the irrigation schemes

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of farmers adopting SRI management techniques promoted by the project - Zanzibar	Number	0.00 01-Dec-2014	1385.00 12-Mar-2015	1,385.00	2,253.00 31-Jan-2021

Comments (achievements against targets):

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Area provided with irrigation and drainage services (ha)	Hectare(Ha)	0.00 01-Dec-2014	2201.00 12-Mar-2015	1,640.00 09-May-2020	1,772.90 31-Jan-2021
Area provided with irrigation and drainage services - New (ha)	Hectare(Ha)	0.00 01-Dec-2014	1907.00 12-Mar-2015	271.20 09-May-2020	271.20 31-Jan-2021
Area provided with irrigation and drainage services - Improved (ha)	Hectare(Ha)	0.00 01-Dec-2014	294.00 12-Mar-2015	1,369.00 09-May-2020	1,501.70 31-Jan-2021

Comments (achievements against targets):
Due to limited budgets to cater for new irrigation hectarage, increased focus was made towards rehabilitation of the schemes, hence increased targets under improved, and decreased target under new schemes.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Water users provided with new/improved irrigation and drainage services (number)	Number	0.00 06-Feb-2014	4403.00 12-Mar-2015	4,403.00	2,867.00 31-Jan-2021
Water users provided with irrigation and drainage services - female (number)	Number	0.00 01-Dec-2014	1252.00 12-Mar-2015	1,252.00	1,238.00 31-Jan-2021

Comments (achievements against targets):
Target of 4,403 is the target in Project Appraisal Document (PAD) at the beginning of the project but later Mbogo Komtonga which has total number of 2,259 farmers was dropped but the target remain the same.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Operational water user associations created and/or strengthened (number)	Number	0.00 01-Dec-2014	13.00 12-Mar-2015	13.00	56.00 31-Jan-2021

Comments (achievements against targets):

Component: Project management and coordination

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Annual M&E reports completed	Yes/No	No 01-Dec-2014	Y 12-Mar-2015	Yes	Yes 31-Jan-2021

Comments (achievements against targets):

B. KEY OUTPUTS BY COMPONENT

Objective/Outcome	
Outcome Indicators	1. Average yield of targeted farmers growing paddy in targeted areas (Mainland, Zanzibar). 2. Additional quantity of rice produced in targeted areas (Mainland, Zanzibar). 3. Additional quantity of rice marketed in targeted areas (Mainland). 4. Direct project beneficiaries.
Intermediate Results Indicators	1. Number of farmers adopting new rice seed varieties promoted by the project (Mainland, Zanzibar). 2. Number of farmers adopting SRI management techniques promoted by the project (Mainland, Zanzibar). 3. Area provided with irrigation and drainage services (Mainland, Zanzibar). 4. Water users provided with new/improved irrigation and drainage services (Mainland, Zanzibar). 5. Operational water user associations created and/or strengthened (Morogoro in Mainland and Zanzibar).
Key Outputs by Component (linked to the achievement of the Objective/Outcome 1)	Component 1 - Construction of Seed Laboratory Building at ASA, including furnishings, equipment for the laboratory, installation of 3 phase electricity and renovation of germination chamber. - Multiplication of early generation seeds – 58.3 tons of pre-basic seeds produced (2.6 tons Zanzibar, 55.7 tons Morogoro (Mainland)), 63.6 tons of basic seeds produced (5.6 tons in Zanzibar and 58 tons in Morogoro- Mainland) - 258.8 tons of certified seeds produced by contracted growers (236 tons in Morogoro- Mainland, 22.8 tons in Zanzibar) - 13 rice varieties introduced and promoted to farmers ((TXD 85, TXD 88, TXD 306, SUPA BC, SARO 5, Supa, Komboka and Tai, NERICA 1, NERICA 2, NERICA 4, NERICA 7, and WAB450-12-2BLB-DV4)). Of promoted varieties, 2 have been mostly preferred by farmers (TXD 306 and SUPA BC). - 160 graduate seed growers trained on certified seed production (Zanzibar), 18 authorized seed inspectors in Morogoro region trained on seed quality control and inspections - 32 on-farm demonstration plots conducted involving 960 farmers (Zanzibar) - 5000 leaflet, 2,000 books, 500 fact sheets and 8 banners produced, distributed to farmers for rice seeds promotion.

	- 55.7 ton of pre-basic rice seed and 294 tons of basic rice seeds were produced by TARI Ifakara (KATRIN) in Mainland and 2.6 ton of pre-basic seed were produced by the project in collaboration with ZARI in Zanzibar. - 1,942 tons of purified seed were obtained for TXD 306, TXD 88, Komboka, Tai, Supa, NERICA 1, NERICA 2, NERICA 4, NERICA 7 and WAB 450-12-2-BL1-DV4 done by TARI Ifakara, Mainland. - 26 seed inspectors (18 from Mainland and 8 from Zanzibar), and 6 lab technicians trained on seed quality control (by TOSCI) - 108 seed dealer shops were inspected (Mvomero (18), Kilosa (18), Kilombero (33), Ulanga (5) Malinyi (9), Ifakara Town (24) and Gairo (12). - 11 (7 males and 4 females) from ASA Kilangali, Idete Prison Farm and TARI (Ifakara and Dakawa) trained by TOSCI on seed production aspects and seed quality and certification. 20 (11 men and 9 female) smallholder Quality Declared Seeds (QDS) producers trained by TSOCI on seed production and quality control. In Zanzibar, 160 (103 male and 57 female) graduated seed growers trained on production of certified seed grade. - In Zanzibar, installation of 3 phase electricity and renovation of germination chamber. Seed Lab equipment procured and delivered to ZARI. Component 2 - In Morogoro (Mainland), irrigation schemes rehabilitated, as follows: (1) Mvumi irrigation scheme (300ha) – irrigation rehabilitation works and access road (99 percent completed); (2) Njage irrigation scheme (325ha) - irrigation rehabilitation works and access road (99 percent completed); (3) Msolwa Ujamma irrigation scheme (300ha) rehabilitated works - 99 percent completed; (4) Kigugu irrigation scheme rehabilitated (200ha) rehabilitation works at 99 percent; and (5) Kilangali Seed Farm (400ha) – irrigation rehabilitation and expansion works - 95 percent completed. - In Zanzibar, rehabilitation of 9 irrigation schemes (Mtwango, Koani, Bandamaji, Mchangani, Dobi, Kibondemzungu, Ole and Kwalempona) all completed, bringing to 193.9 ha under irrigation, benefiting 1679 farmers (841 female). - Installation of electricity and transformer in seven (7) schemes: Kibondemzungu, Koani, Bandamaji, Mchangani, Machigini, Dobi and Ole (Zanzibar). - Drilling of 6 boreholes and pump installation at Koani, Kibondemzungu, Bandamaji, Ole, Dobi and Machigini schemes (Zanzibar).

	- 264 people trained on irrigation operations and maintenance (111 in Mainland and 153 in Zanzibar) comprising of technical staff, extension officers and farmers. - 10 engineers trained (3 females) on Engineering design Software to10 Engineers (7 male and 3 female); and 20 irrigation technicians trained on the use of Total Station, GPS and Topographical map production using Auto CAD Civil 3D (Zanzibar). - 1,772.9 ha provided with irrigation and drainage services (1,501.7ha under rehabilitation and 271.2ha under new irrigation schemes) - 148 extension officers, irrigation technicians trained on Good Agricultural Practices including SRI (108 in Mainland, 40 in Zanzibar) - 7,141 SRI demonstrations mounted (6,720 in Mainland, 421 in Zanzibar) - 27,212 farmers trained on SRI (22,290 in Mainland, and 4,922 in Zanzibar) - 20,029 farmers adopting SRI – 17,776 in Mainland and 2,253 in Zanzibar. 4,922 farmers (3092 female) trained on SRI (Zanzibar) - Local study tours: 300 lead farmers, 30 extension officers (Mainland); and 196 farmers, 40 extension workers (Zanzibar). - Subsidized inputs procured: In Mainland - 735.1 tons of Fertilizer (UREA and DAP), 36.1 tons of Seeds TXD 306, 476 liters of Herbicides, 153 pieces of line markers and 255 pieces of push weeders procured and distributed to farmers. In Zanzibar, 859 ton of fertilizers (626 tons UREA and 233 tons DAP), 22.8 tons of rice seeds (SUPA BC). - Farmer Field Days to 280 (142 Women and 138 Men) farmers from 10 best performing irrigation schemes in 6 LGAs was conducted at Msolwa Ujamaa, Ilonga and Kigugu Irrigation Schemes. - 32,070 farmers adopting improved rice varieties – 27,079 in Mainland, and 4,991 in Zanzibar - 2,867 water users provided with new or improved irrigation and drainage services - 56 operational Water User Associations (WUAs) created and strengthened - 34 in Mainland and 22 in Zanzibar. Component 3 - Construction of 5 warehouses, all completed and connected to electricity grid, as follows: (1) Mvumi in Kilosa DC (1,300 MT), (2) Njage in Kilombero DC (1,700 MT), (3) Msolwa Ujamaa in Kilombero DC (1,700MT), (4) Kigugu in Mvomera DC (1,000MT) and (5) Mbogo in Mvomera DC (1,000 MT). - 210 farmers and 75 extension staff trained on rice pre- and post-harvest management.

	- 140 farmers and 20 extension staff trained on warehouse management and operations. - Study to help farmers better understand rice markets was conducted and recommended Warehouse Receipt System (WRS).

ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION

A. TASK TEAM MEMBERS

Name	Role
Preparation	
Abel Lufafa	Task Team Leader
Helen Z. Shahriari	Social Specialist
Jane A. N. Kibbassa	Social Specialist
Supervision/ICR	
Emma Isinika Modamba, Pierre Olivier Colleye	Task Team Leader(s)
Raymond Joseph Mbishi, Winter M. Chinamale	Procurement Specialist(s)
Vida Ndilanha Nkya	Financial Management Specialist
Gisbert Joseph Kinyero	Procurement Team
Joseph Oryokot	Team Member
Faith-Lucy Matumbo	Procurement Team
Srilatha Shankar	Team Member
Grace Anselmo Mayala	Procurement Team
Valens Mwumvaneza	Team Member
Saidu Dani Goje	Team Member
Anjani Kumar	Procurement Team
Hayalsew Yilma	Team Member
Samuel Lule Demsash	Team Member
Naima Abdallah Besta	Social Specialist
Paulina Proches Shayo	Procurement Team
Deusdedit Samuel Kibassa	Environmental Specialist

B. STAFF TIME AND COST

Stage of Project Cycle	Staff Time and Cost	
	No. of staff weeks	US$ (including travel and consultant costs)
Preparation		
FY13	9.150	88,695.08
FY14	23.915	235,343.93
FY15	16.825	128,023.92
FY16	2.400	23,943.37
FY17	3.750	34,175.50
FY18	12.190	128,296.70
FY19	2.925	27,657.02
FY20	3.775	41,519.49
Total	**74.93**	**707,655.01**
Supervision/ICR		
FY16	3.300	21,722.93
FY17	4.600	85,311.87
FY18	23.666	131,993.96
FY19	15.225	115,704.99
FY20	3.977	40,728.18
Total	**50.77**	**395,461.93**

ANNEX 3. PROJECT COST BY COMPONENT

Components	Amount at Approval (US$M)	Actual at Project Closing (US$M)	Percentage of Approval
Sustainable seed systems	2.44	1.64	67
Improving crop productivity through better irrigation and crop management	14.51	11.79	81
Innovative marketing strategies	2.37	2.61	110
Project management and coordination	3.58	4.36	122
Total	**22.90**	**20.40**	**89**

ANNEX 4. EFFICIENCY ANALYSIS

1. This Annex presents the efficiency analysis at implementation completion of the ERPP. The present analysis uses a mix of methods: an economic and financial analysis (EFA) built on a cost-benefit approach to estimate the net additional benefits attributable to the Project's main outcomes and a cost analysis to assess the efficient use of resources.

2. The ERPP was designed to increase rice production and productivity in the Morogoro (Mainland) and Zanzibar. The duration of the Project was five years. A GAFSP grant of US$22.9 million was used to finance the Project. Improvements were to be made based on improved crop husbandry, including improved seeds and better crop harvesting. Irrigation infrastructure was to be either rehabilitated or developed and, in the Morogoro (Mainland), some warehouses were built for storage purposes.

I. Methodology and Assumptions

3. The ex-post EFA has been performed with a focus on productive activities (related to investment sub-projects both in production and processing) supported by the Project. The main sources of information for the ex-post EFA were obtained from literature reviews of project progress documents, the final impact analysis report provided by the Project Team, reviews of rice production literature and actual prices and costs provided by the FAO Tanzania office.

4. A very conservative approach has been taken to assessing the benefits of the irrigation and warehousing infrastructure post project, thus most of the benefits during the Project have been derived from increased crop husbandry and improved seed. This has been done as the irrigation infrastructure and warehousing were delivered within the last two years of the Project.

5. The analysis is based on an incremental approach, that is, on a comparison of the situation without Project or reference situation (ex-ante situation) as benchmark with the situation that prevailed at Project closure (ex-post situation) to estimate the benefits generated by the Project. The data for the yields, area cultivated, and person benefitting was provided by the progress reports and final impact analysis.

6. The financial prices used in the analysis are those collected by the FAO in Tanzania. Economic prices have been calculated from wholesale prices net of taxes and duties and they account for about 82 percent of financial prices. The ex-ante analysis evaluated the productivity gains associated with the adoption of improved irrigation systems and gains resulting from the adoption of improved seed, fertilizer, better weed control and better water management in a technology package broadly characterized as SRI. These were calculated for both Morogoro (Mainland) and Zanzibar. In Morogoro (Mainland), the analysis additionally measured the expected gains resulting from the construction of grain warehouses that would allow farmers to sell paddy in bulk and later in the season when prices tended to be higher.

II. Ex-post Financial Analysis at Farm Level

7. **Improved Farm Models.** The farm level financial analysis is based on eight improved model enterprises representative of the Project's improved crop husbandry practices and seed in Zanzibar. The analysis is based on improved crop husbandry practices, improved seed and warehousing on the Morogoro (Mainland), which allowed for storage and thus sale of the rice when the prices improved. The assumption conservatively estimated that the farmers would not all have adopted the mix of SRI packages and thus allowed for a phased in approach. The eight models evaluated the 'without Project/baseline situation' in which farmers had yields of 1.2 tons/ha under informal irrigation/rainfed situation. The situation in which SRI packages were applied was subject to the following conditions:

1. A comparison with Project situation in which a subsidy was applied within the first three years of the analysis versus a situation where no subsidy was applied in both the Morogoro (Mainland) and Zanzibar.

2. Rehabilitated schemes in which a subsidy was applied within the first three years versus a situation where no subsidy was applied in Zanzibar.

3. Rehabilitated schemes with a warehouse in which a subsidy was applied within the first three years versus a situation with no subsidy in the Morogoro (Mainland).

4. Newly developed irrigation schemes with a warehouse in which a subsidy was applied within the first three years of the analysis versus a situation where no subsidy was applied on the Morogoro (Mainland).

5. Newly developed irrigation schemes in which a subsidy was applied within the first three years of the analysis versus a situation where no subsidy was applied in both the Morogoro (Mainland) and Zanzibar.

6. Second season rice in the rehabilitated schemes in Mainland and Zanzibar.

7. Second season rice in the newly developed schemes in Zanzibar.

8. **Analysis of Results.** The analysis showed that with SRI packages the yield increases were over 100 percent with the yields in the most basic case where SRI was applied reaching over 4 tons per hectare. The summary Table 9 below demonstrate the net incremental benefits in US$ in the different scenarios.

Table 9: Net Incremental Benefits in the With Project Situation - Zanzibar

Type of Intervention - Zanzibar	Incremental net benefit in US$
(A) Formal irrigated SRI only with subsidy & no warehouse (broader farm population)	70.72
(B) SRI only without subsidy & no warehouse (broader farm population & second season rice)	59.58
(C) Rehabilitated irrigated SRI with subsidy & no warehouse	70.72
(D) Rehabilitated irrigated SRI without subsidy & no warehouse	59.15
(E) New formal irrigation with SRI with subsidy & no warehouse	90.53
(F) New formal irrigation with SRI no subsidy with no warehouse	78.96
(G) Second season rice in rehabilitated scheme	59.58
(H) Second season rice in new scheme	108.26

Table 10: Net Incremental Benefits in the With Project Situation – Morogoro (Mainland)

Type of Intervention – Morogoro (Mainland)	Incremental net benefit in US$
(A) Formal irrigated SRI only with subsidy & no warehouse (broader farm population)	62.82
(B) SRI only without subsidy & no warehouse (broader farm population & second season rice)	-4.07
(C) Rehabilitated irrigated SRI with subsidy & warehouse	157.74
(D) Rehabilitated irrigated SRI without subsidy & with warehouse	78.16
(E) New formal irrigation with SRI with subsidy & warehouse	183.59
(F) New formal irrigation with SRI no subsidy with warehouse	104.00
(G) Second season rice in rehabilitated scheme	79.60
(H) Second season rice in new scheme	124.91

Project Benefits

9. The direct benefits from the Project were achieved in Zanzibar and substantially increased production, improved productivity, and improved farm-gate prices associated with improved marketing arrangements in the Morogoro (Mainland). This combination of benefits contributed to increased rural incomes and improved food security. These benefits resulted from (a) adoption of new technology packages (especially improved seed, fertilizer, water management and weed control) leading to increased production and productivity and (b) improved irrigation

systems. The irrigation gains were derived from shifting farmers from informal to formal irrigation systems, rehabilitating or strengthening of formal irrigation infrastructure, and expanding the number of farmers cropping for two seasons per year. In Morogoro (Mainland) additional gains were achieved through (c) the establishment of grain warehouses allowing storage of grain for later sale and facilitating bulk sales of paddy. These marketing improvements increased the farm-gate prices for paddy.

10. The delays in the rehabilitation and construction of irrigation infrastructure and grain warehouses, which were done in the last two years of the Project, mean that the full benefits will only be realized post Project completion as the infrastructure is put into use. In the short term, farmers were still using the improved water as the rehabilitation work was in progress, while full benefit from supplemental or new schemes will lead to future benefits. Technical support backing the introduction of new varieties and crop management practices was biased in favor of women and poorer farmers and the Project surpassed the target of 50 percent women included within the Project.

11. Major institutional benefits reached included: (a) strengthened seed systems including quality control and responsiveness to farmer demand; (b) improved links between research, extension and farmer groups in evaluating new varieties and crop management technologies; (c) testing on the mainland of improved management arrangements for targeted irrigation schemes; and (d) improved marketing arrangements for crop storage and competitive sale. The social benefits of the Project which focused on food security with complementary gains in rural poverty reduction have been demonstrated by the yield gains, allowing farmers to crop twice and thus have surplus sales. Overall, the Project achieved its goals as summarized in table 3.

III. Ex-post Economic Analysis

Methodology and Assumptions

12. The Project economic analysis for the country as a whole was conducted on the basis of (i) a 12 percent discount rate equal to the opportunity cost of capital for Tanzania, and (ii) a 20-year timeframe corresponding to the life of the irrigation and other large facilities rehabilitated. On the cost side, the analysis was performed based on (i) net of taxes, and (ii) Project investments in component 2: Improving Crop Productivity and component 3: Innovative Marketing Strategies (warehousing only included in the Morogoro (Mainland)), which were the direct investments associated with improving the performance of farmers.

13. The indirect benefits associated with spillover gains to a broader range of producers, consumers and marketing agents were not included in the analysis, which only included the direct beneficiaries. As the irrigation systems came into full use, as they were completed in the last 2 years of the Project, the improved yield gains should result in increased spillover benefits in many parts of the country through the combination of improved irrigation, better crop management and strengthened marketing systems.

Internal Rate of Return (IRR) and Net Present Value (NPV)

14. The economic analysis has produced a NPV of US$ 9 million at a discount rate of 12 percent, and an Economic Internal Rate of Return (EIRR) of 36 percent. The largest share of benefits is obtained on the Morogoro (Mainland) given the larger number of farmers assisted, increased irrigation hectarage and the gains accruing from the warehousing scheme. The rate of return was lower in Zanzibar due to flooding, with no involvement on marketing activities.

15. The indirect benefits associated with spillover gains to a broader range of producers, consumers and marketing agents were not included in the analysis which only includes the direct beneficiaries. As the irrigation systems come into full use, as they were completed in the last 2 years of the Project, the improved yield gains should result in spillover benefits in many parts of the country through the combination of improved irrigation, better crop management and strengthened marketing systems. Input markets will gain from improved demand for seed, fertilizer and herbicides, and product markets are expected to become more competitive.

Table 11: Economic Analysis Summary

	Net Present Value (US$)	Economic Internal Rate of Return
Tanzania Morogoro in Mainland	12 million	51 percent
Zanzibar	0.5 million	25 percent
Total	9 million	36 percent

Sensitivity Analysis

16. To assess the risks associated with the Project investments a sensitivity analysis was performed which assessed the impact of the Project benefits decreasing by 10 and 25 percent respectively. The Project demonstrated that even if the Project benefits decreased by 25 percent, the Project would yield a 21.6 percent IRR and a benefit to cost ratio of US$1.31

Table 12: Sensitivity Analysis

Scenarios	NPV (US$)	B/C	IRR
Baseline - full adoption of SRI and warehousing	9,147,112.34	1.74	36.11
Farmgate price declines 10 percent	7,776,961.17	1.57	31.62
Farmgate price declines 25 percent	4,197,215.68	1.31	21.55

Case for Public Funding

17. The case for public funding in stimulating rice production has been demonstrated, not only by the EIRR of 36 percent, which for the first four years of the public funding was solely based on improved seeds and improved agronomic practices. Public funding encouraged the broader testing and adoption of improved crop management technologies such as SRI.

Project Efficiency

18. As suggested by the ICRR guidelines, the present efficiency analysis goes beyond the economic and financial analysis and provides some indications on the use of project resources. The available data provided by the Project team indicates that 91.9 percent of project funds were expended with the least expenditures being made in component 3 innovative marketing arrangements at 80 percent, while component 1 sustainable seed systems and component 2 Improving crop productivity through better irrigation and crop management were both over 95 percent and 92 percent respectively and the project management and coordination at 100 percent. The only delays pronounced included infrastructure works (particularly rehabilitation and development of new irrigations schemes and warehouses), which comprised the bulk of the Project resources.

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

Comments from Borrower (Government):

The Government (client) provided editorial comments to the draft ICRR which have all been incorporated in the final ICRR. It also prepared the Government ICRR report, which greatly informed this Bank ICRR.

Comments from GAFSP Secretariat:

The GAFSP secretariat participated in the Quality Enhancement Review (QER) Meeting, and provided no further additional written comments, and confirmed that the draft ICRR report provided good assessment of the project.

ANNEX 6. SUPPORTING DOCUMENTS – PROJECT PHOTOS

Mainland - Rehabilitation/Construction of Irrigation Infrastructures and Warehouses

Resting shed and toilets at Mvumi Irrigation Scheme, Kilosa

Division gates at Mvumi irrigation scheme, Kilosa

Main Canal 1 at Kilangali Seed Farm, Kilosa

Canals, access road, toilets and resting shed at Njage irrigation scheme, Mlimba

Mbogo Komtonga warehouse, Mvomero

Paddy storage at Mvumi warehouse, Kilosa

Zanzibar – Irrigation Structures/GAPs


Farmers receiving training on O&M at Kwalempona Scheme (left), and hydrant discharging water in farmers field at Kaone Scheme (right)

Pump and pressure vessel houses at Ole Scheme

ERPP Subsidy Program – distribution of fertilizers to farmers at Cheju scheme


SRI Technology increased paddy harvests at Mchangani scheme (left); Farmers training on weeding using push weeders at Kibokwa scheme (right)