United Republic of Tanzania

FY2022 Ex-Post Evaluation Report of Technical Cooperation Project

"Project for Supporting Rice Industry Development in Tanzania"

External Evaluator: Sawa Hosokawa, International Development Center of Japan Inc.

0. Summary

This project aimed to increase rice yield in the project target area through the implementation of (i) training on irrigated rice cultivation technology, (ii) training on rainfed rice cultivation technology, and (iii) subject-matter training[1] on the rice industry value chain by enabling participating farmers to use the rice cultivation technologies introduced in the training. Furthermore, the project aimed to increase rice production in the target area through continuous practice of rice cultivation technologies by farmers participating in the training and practice of the technologies by neighboring farmers through farmer-to-farmer extension, and to increase rice production on a national level through the implementation of rice cultivation technology training in rice production areas other than the target area.

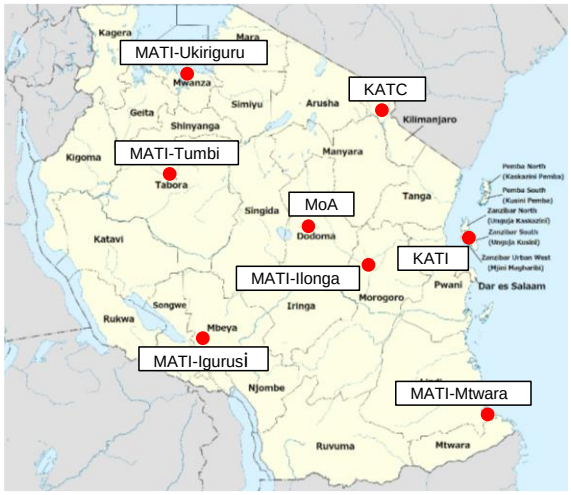
The increase in national rice production aimed for this project was consistent with Tanzania's development policy and needs at the time of planning and completion of the project. Furthermore, the project was consistent with Japan's ODA policy for Tanzania and was implemented as technical cooperation to improve productivity through the adoption of appropriate rice farming technologies by farmers under JICA's cooperation program, the *Rice Production Capacity Enhancement Program*. The project was also implemented under the international framework of the Coalition for African Rice Development (CARD),[2] an international initiative aimed at doubling rice production. Therefore, the relevance and coherence of the project are high. The effectiveness and impacts of the project are very high, as the implementation of the project led to an increase in rice yield through the utilization of rice cultivation technologies by farmers in the target area, and the increase in rice production at the national level has been confirmed, with the effects of the project having been more than planned. Although the project cost and period were slightly higher than planned, there were no problems with the outputs produced to the inputs, and the efficiency of the project is high. The sustainability of the project is moderately low because, although the effects of the project itself have been sustained, the project has not been expanded to include the rice cultivation technology training in other rice production areas after the completion of the project, and there are major financial issues to be addressed.

In light of the above, this project is evaluated to be satisfactory.

[1] Subject-matter training here is not a type of training program conducted by JICA mainly in Japan, but refers to training conducted in Tanzania specially under this project on the following topics: (i) Irrigation scheme management, (ii) Gender, (iii) Marketing, (iv) Post-harvest technology, and (v) Agricultural machinery.

[2] An international initiative launched by JICA in collaboration with the international NGO Alliance for a Green Revolution in Africa (AGRA) at the Fourth Tokyo International Conference on African Development (TICAD IV) in 2008.

1. Project Description



Project Locations
(Source: Prepared by external evaluator based on web-free map)

Demonstration plots used for rice cultivation technology training
(Rice plants are planted at equal spacing)
(Source: External evaluator)

1.1 Background

As part of its support for the agricultural sector in Tanzania, Japan has been cooperating in irrigated rice cultivation technology in Kilimanjaro Region since 1970s. As a result, the functions of the Kilimanjaro Agricultural Training Centre were strengthened, and a cultivation system and training methods were established to improve rice productivity in farmers' fields. In 2007-2012, the Technical Cooperation in Supporting Service Delivery Systems of Irrigated Agriculture (also known as TANRICE1) was implemented in collaboration with five Ministry of Agriculture Training Institutes in charge of each area to disseminate rice cultivation technologies nationwide by utilizing this training method. Under TANRICE1, training was conducted in about 40 irrigation schemes to improve rice productivity, and the results were confirmed at the farmer field level.

To achieve the goals of the *National Rice Development Strategy*, it was necessary to continue to promote technology dissemination through training, especially in irrigated rice cultivation. In particular, to implement more efficient and effective training nationwide, the following issues were to be addressed: (i) further capacity building of Tanzanian implementing agencies, (ii) further involvement of local administrative agencies such as district agriculture officers and agricultural extension officers, and (iii) strengthening the rice industry value chain, including not only production but also post-harvest processing and marketing. In addition, from the perspective of poverty reduction, it was necessary to address rainfed upland rice cultivation and rainfed lowland rice cultivation, and this project (also known as TANRICE2) had been implemented since 2012 as the successor to TANRICE1.[3]

[3] Since June 2023, the Project for Strengthening Capacities of Stakeholders of Rice Industry Development (also known as TANRICE3) has been implemented as the successor to this project.

1.2 Project Outline

Overall Goal		Rice production is increased in the rice production areas across the country.
Project Purpose		Rice farming technologies are adopted by farmers in the priority rice production areas.
Output(s)	Output 1	Training approach for disseminating the appropriate irrigated rice cultivation technologies (standard training) is strengthened nationwide.
	Output 2	Training approach for disseminating the appropriate rainfed rice cultivation technologies is developed.
	Output 3	The subject-matter training courses on the value chain of rice industry are strengthened.
Total cost (Japanese Side)		1,068 million yen
Period of Cooperation		November 2012 - December 2019 (Extended period: December 2018 - December 2019)
Target Area		Priority rice production areas across the country
Implementing Agency		- Agricultural Training, Extension Services and Research Division, Ministry of Agriculture (MoA)[4] - Kilimanjaro Agricultural Training Centre (KATC) - Ministry of Agriculture Training Institute (MATI) at Igurusi (MATI-Igurusi), MATI-Ilonga, MATI-Mtwara, MATI-Tumbi, MATI-Ukiriguru (5 MATIs in total) - Kizimbani Agricultural Training Institute (KATI)[5]
Other Relevant Agencies/ Organizations		- President's Office, Regional Administration and Local Government (PO-RALG) - Ministry of Agriculture, Irrigation, Natural Resources and Livestock (MAINL), Revolutionary Government of Zanzibar - Local Government Authorities (LGAs) in the target area[6]
Organization in Japan		Ministry of Agriculture, Forestry and Fisheries
Related Projects		<Technical Cooperation> - Technical Cooperation in Supporting Service Delivery Systems of Irrigated Agriculture (2007-2012) - Project for Strengthening Capacities of Stakeholders of Rice Industry Development (2023-2028, planned) <Other Development Partners> - World Bank, Agricultural Sector Development Project (Financing from the Japan Policy and Human Resources Development (PHRD) Fund)[7] (2011)

[4] The division was reorganized in 2022 and changed to the Agricultural Training and Research Division.
[5] KATC and each MATI are under MoA in Tanzania mainland, while KATI is under the Ministry of Agriculture in Zanzibar. KATI became an affiliate of the School of Agriculture (SoA), State University of Zanzibar after the completion of the project.
[6] Each agricultural training institute (KATC, MATI, and KATI) is a training institute for agricultural extension officers, who belong to LGAs under PO-RALG in Tanzania mainland or MAINL in Zanzibar.
[7] The World Bank's programmatic trust fund, fully funded by the Japanese government, is designed to help government agencies in developing countries enhance their skills, know-how, and expertise to address key development challenges.

1.3 Outline of the Terminal Evaluation

1.3.1 Achievement Status of Project Purpose at the Terminal Evaluation

In the terminal evaluation conducted in July 2018, the project purpose was determined to be on track to be achieved. Two quantitative indicators were set as indicators for the project purpose, and Indicator 1, "adoption of straight row transplanting/direct planting[8] method by more than 15,000 farmers," met its target as of the terminal evaluation. On the other hand, for Indicator 2, "adoption of other important technologies contributing to the improvement of rice farming by more than 2,400 farmers," it was not specified which other important technologies to improve rice farming, and the corresponding quantitative data were not available. Although quantitative data based on one interpretation of 'other important technologies' was collected in the terminal evaluation, the evaluation team determined that it was not appropriate to judge whether the indicator was achieved or not based on the results of the quantitative data collected.

1.3.2 Achievement Status of Overall Goal at the Terminal Evaluation
(Including other impacts.)

At the time of the terminal evaluation, the indicator for the overall goal of "annual national rice production of 2.5 million tons or more" had already been achieved, and it was judged that the overall goal had been achieved; however, the necessity of separately investigating the contribution of this project in achieving the overall goal was pointed out.

1.3.3 Recommendations from the Terminal Evaluation

The following four recommendations were made in the terminal evaluation.

(1) (Recommendation for the project to be implemented by the end of the project) To strengthen public relations to actively disseminate the results of the project to the outside.
(2) (Recommendation for MoA) To make efforts to raise training funds to continue to conduct each of the rice farming promotion training programs introduced in the project.
(3) (Recommendation for MATIs) To take steps to obtain funding for each rice farming promotion training program.
(4) (Recommendation for MATIs) To further improve the accounting reporting of training expenses, based on the use of external funds in the implementation of training.

2. Outline of the Evaluation Study

2.1 External Evaluator

Sawa Hosokawa, International Development Center of Japan Inc.

[8] Planting seeds or seedlings in straight rows with equal spacing.

2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted with the following schedule.

Duration of the Study: October, 2022 – November, 2023

Duration of the Field Study: November 29, 2022 – December 24, 2022, May 15, 2023 – May 21, 2023

3. Results of the Evaluation (Overall Rating: B[9])

3.1 Relevance/Coherence (Rating: ③[10])

3.1.1 Relevance (Rating: ③)

3.1.1.1 Consistency with the Development Plan of Tanzania

At the time of planning the project, Tanzania's National Development Plan, the *First National Five Year Development Plan* (FYDP) (2011/12-2015/16),[11] stated that while the agricultural sector was responsible for approximately 70% of the working population, it generated only 20% of GDP and that growth in the sector would have a significant impact on the country's overall growth, and was positioned as one of the keys to poverty reduction. FYDP set a target of increasing the growth rate of the agricultural sector to 6.0% by 2015, and to achieve the modernization and commercialization of agriculture, priority was to be given to the development and rehabilitation of irrigation facilities and the acquisition of knowledge and technology for agribusiness. In the second FYDP (2016/17-2020/21) at the completion of the project, the agricultural sector was still positioned as the core of Tanzania's industrialization and livelihood improvement of the people, with eight priority crops in the crop subsector, including rice, and the goal was to continue to increase the growth rate of the sector to 6.0% by 2020 through promotion of irrigation development, promotion of research and development, improvement of agricultural extension services, improvement of land use planning, and promotion of market development.

Furthermore, the *Agricultural Sector Development Program* (ASDP) (formulated in March 2006), which was the sector development plan at the time of planning, aimed to improve agricultural productivity, profitability, and farmers' income through the utilization of farmers' knowledge and skills and by ensuring access to markets, and as an agricultural sector strategy, efforts to increase food production toward self-sufficiency in staple food production, including rice, were considered important for food security. ASDP Phase II (formulated in November 2017) at the completion of the project emphasized crop value addition, to transform the agricultural sector to higher productivity, commercialization, and increased income for small-scale farmers for improved livelihoods, food security, and

[9] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[10] ④: Very High, ③: High, ②: Moderately Low, ①: Low

[11] Tanzania's fiscal year runs from July to June.

nutrition.

In addition, Tanzania has been selected as a CARD-supported country, and a *National Rice Development Strategy* (NRDS), to be developed in each target country, was formulated in 2009. Tanzania's NRDS set the goals of doubling rice production (paddy basis) from 899,000 tons in 2008 to 1,963,000 tons in 2018, increasing yield from 1.3 ton/ha to 2.8 ton/ha, and increasing the proportion of rice cultivation area from rainfed lowland cultivation to irrigated and rainfed upland cultivation. On the other hand, rainfed rice accounted for 70% of the country's total rice cultivation area, and it was considered important to promote the shift to irrigation from the perspective of national food security, as well as to improve the productivity of rainfed rice cultivation from the perspective of food security for individual farmers. NRDS Phase II (formulated in 2019) at the completion of the project continues the policy on increasing rice production and sets the following numerical targets for increasing production in 2025 and 2030.

Table 1 Targets for Increased Rice Production in NRDS II

	2018/19	2025	2030
Area under cultivation (million ha)	1.1	1.43	2.2
Output (milled rice) (ton/ha)	2	3	4
Yield paddy before milling (ton/ha)	3.08	4.3	6.15
Post-harvest losses (%)	30	20	10
Harvest (milled rice) (million tons)	2.2	4.29	8.8

Source: *National Rice Development Strategy Phase II (NRDS II) 2019-2030*, Ministry of Agriculture, July 2019

3.1.1.2 Consistency with the Development Needs of Tanzania

At the time of planning the project, rice was the second largest grain production in Tanzania after maize, but consumption had increased significantly from 10 kg/person (1980) to 30 kg/person (2010), and domestic production could not keep up with the increase in consumption, so more than 100,000 tons, or 7% to 8% of domestic consumption, was imported from overseas.[12] In addition, rice was a cash crop in Tanzania with a high potential for increased production from a technological perspective, and increasing rice production was a priority for the Tanzanian government, which was aiming to commercialize agriculture. Furthermore, Tanzania was the largest rice producer in East Africa and was therefore an important country in terms of food security in the region.

At the time of project completion, while rice production in Tanzania was increasing steadily and NRDS's goal of doubling rice production by 2018 had been achieved, consumption was also increasing at 38.5 kg/person (2016) due to population growth (4% annual increase) and urban residents' increasing desire to eat rice,[13] and the need for

[12] Source: Ex-Ante Evaluation Paper, 2012
[13] Source: *Final Report on CARD Terminal Review*, JICA, March 2018

increased rice production remained high. In addition, demand for rice continued to increase in Africa due to population growth and the spread of rice eating, and CARD Phase 2 was launched at TICAD 7 in 2019 with the goal of "further doubling rice production by 2030 (from 28 to 56 million tons). In addition to the efforts made by each country, a *Regional Rice Development Strategy* has been formulated for each African Regional Economic Community to solve common problems in each region, and rice development is being promoted. Tanzania plays an important role in meeting the needs of rice demand in the region because of its high potential for increasing rice production.

3.1.1.3 Appropriateness of the Project Plan and Approach

One of the lessons learned from TANRICE1, which preceded this project, was the need to ensure consistency with ASDP and the *District Agricultural Development Plan* (DADP). It was necessary to have more LGAs conduct training through the provision of information from each agricultural training institute to LGAs' officers by the timing of the annual DADP formulation, and enhanced explanation of the project contents. As a result, it was planned that in addition to farmers, district agriculture officers and agricultural extension officers would also participate in the rice cultivation technology training conducted under the project.

Furthermore, since the effectiveness of gender training was confirmed in TANRICE1, it was deemed necessary to continue gender training in this project, and gender training was set as one of the topics for subject-matter training. In addition, the guiding principle for gender-related efforts in NRDS was the need to promote the use of appropriate technology and farm equipment to reduce the heavy workload of rice cultivation, as women have an excessive workload due to farming and household chores and have less access to farm equipment than men. The project was planned to promote women's access to appropriate technology by setting an indicator that the participation rate of women in rice cultivation technology training should be 45% or higher, and the activities were planned to address the reduction of women's workload in rice farming by setting gender training as one of the topics for subject-matter training, in line with the NRDS guidelines.

3.1.2 Coherence (Rating: ③)

3.1.2.1 Consistency with Japan's ODA Policy

In the *Country Assistance Policy for the United Republic of Tanzania* (formulated in June 2012) at the time of planning, one of the priority areas was "economic growth for poverty reduction" and the policy for efforts in this area included prioritizing support for ASDP and, in particular, for increased rice production.

Furthermore, in the *Rolling Plan for the United Republic of Tanzania* (formulated in April 2012) at the time of planning, under the cooperation program *Rice Production Capacity*

Enhancement Program, it was stated that Japan would promote CARD, especially to achieve the goal of doubling rice production (approximately 2 million tons by 2018) set by NRDS and that Japan would provide support in line with the framework of ASDP, focusing on promoting irrigation development, training and capacity building of irrigation engineers, and promoting and expanding irrigated rice cultivation and upland rice cultivation, which are areas where Tanzania has great potential.

3.1.2.2 Internal Coherence

Under the above-mentioned cooperation program *Rice Production Capacity Enhancement Program*, JICA planned to cooperate to double rice production under NRDS through both (i) development of irrigation facilities through financial support to the ASDP Basket Fund and the District/National Irrigation Development Fund and technical cooperation such as the Project for Capacity Development for the Promotion of Irrigation Scheme Development under DADP, and (ii) technical cooperation to improve productivity through adoption of appropriate rice farming technologies by farmers. This project was implemented as a technical cooperation project to support the second part of the cooperation program as a follow-up to TANRICE1.

In addition, as part of technical exchange under CARD, officials from JICA's technical cooperation projects for rice cultivation promotion in neighboring countries[14] and CARD officials from Uganda, Rwanda, and Egypt visited Tanzania to learn about the project's rice cultivation promotion support case studies. In addition, project staff participated in a training in Egypt as a third-country training program. The exchange of opinions and field visits during the technical exchange and the third-country training with these neighboring countries also helped to strengthen the capacity of the personnel of each agricultural training institute, which is the implementing agency of this project.[15]

3.1.2.3 External Coherence

In the Tanzanian agricultural sector, financial support for the ASDP Basket Fund was provided by five major development partners in the agricultural sector (World Bank, African Development Bank, International Fund for Agricultural Development, and Ireland), including Japan (JICA) under ASDP, with World Bank contributing funds through PHRD. In TANRICE1, LGAs (48.5%) and the central government (9.7%) together covered 58.2% of the training expenses by utilizing the DADP budget financed by the ASDP Basket Fund, and

[14] Rice-based and Market-oriented Agriculture Promotion Project in Kenya, Project on Enhancing Gender Responsive Extension Services in Kenya, Project for Supporting the Improvement of Rice Farming in Burundi, Project for Improvement of Techniques for Increasing Rice Cultivation Productivity in Nante, Maganja da Costa District, Zambezia Province in Mozambique, The Project for Functional Enhancement of the National Rice Research and Training Center (EthioRice) in Ethiopia

[15] Source: Materials provided by JICA

it was planned that this project would also utilize the DADP budget to share training costs between the Tanzanian and Japanese sides. However, at the time of planning the project, allocations from the ASDP Basket Fund to the DADP budget were on a downward trend, and after 2012/13, immediately after the start of the project, there were virtually no allocations to the DADP budget, which limited the cost-sharing of training costs in this project.[16]

In Tanzania, several donors and NGOs are implementing rice cultivation promotion projects, and one of the projects implemented at the same time and in the same area as this project was the Global Agriculture and Food Security Program's[17] Expanding Rice Production Project (ERPP) (2012-2020, supervised by World Bank). ERPP targeted irrigated rice production areas in Morogoro Region and Zanzibar and implemented activities such as ensuring sustainable seed systems, increasing productivity through improved management of irrigation schemes and crop management, adopting innovative marketing strategies, promoting bulk purchasing of inputs, and coordinating sales through a warehouse program. ERPP also supported the System of Rice Intensification, which reduced water use by up to 50% in rice production and promoted improved water use efficiency in irrigated rice production.

Although there was no specific collaboration between this project and ERPP, such as joint training, farmers in some irrigation schemes in Morogoro and Zanzibar participated in the rice cultivation technology training provided by both projects. According to MATI-Ilonga, which has jurisdiction over Morogoro Region, there were some discrepancies between the technical content of the rice cultivation technology training in TANRICE (including 1 and 2) and the rice farming technology instruction in ERPP, causing confusion among the farmers who received training under both projects. For example, while 30 cm x 10 cm is recommended for seedling transplanting spacing in TANRICE, 25 cm x 25 cm is recommended in ERPP, and 21 to 28 days is recommended for seedling growing in TANRICE, while 8 to 14 days is recommended in ERPP, among other differences. Although several rice promotion programs provide training on rice cultivation technologies, information sharing and exchanges of opinions among the programs take place at donor meetings, but the content of the training provided by each program is not coordinated, and it is expected that there are other examples of differences in training content.

On the other hand, as mentioned above, this project was implemented as a project of the international initiative CARD, which was consistent with the international framework. Tanzania is the largest rice producer in East Africa, and the increase in rice production through both TANRICE1 and 2's enhancement of irrigated rice cultivation contributed to

[16] The ASDP Basket Fund was terminated as part of the transition to ASDP Phase II.
[17] A multilateral financing platform launched by the G20 in the wake of the global response to the 2007-2008 food price crisis and organized to build resilient and sustainable agriculture and food systems in the poorest countries and improve global food and nutrition security.

achieving CARD's goal of doubling rice production (from 14 million to 28 million tons). Furthermore, as a result of many years of KATC-based technical assistance, including TANRICE1 and 2, KATC has accumulated know-how on rice promotion, and KATC is now functioning as a base for the CARD Regional Training with Uganda and Cameroon in CARD Phase 2.[18]

The project's goal of increasing Tanzania's national rice production by increasing rice yield through the use of rice cultivation technologies is consistent with Tanzania's development policy and needs at the time of planning and completion of the project.

Furthermore, this project was implemented as technical cooperation for improving productivity through the adoption of appropriate rice cultivation technologies by farmers under JICA's cooperation program, *Rice Production Capacity Enhancement Program*, which is consistent with Japan's ODA policy for Tanzania. In addition, this project was implemented in cooperation with CARD, an international initiative that aims to double rice production, and the increase in rice production in Tanzania aimed for by this project contributed to achieving CARD's goal of doubling rice production, which is also consistent with the international framework. Therefore, its relevance and coherence are high.

3.2 Effectiveness and Impacts[19] (Rating: ④)

3.2.1 Effectiveness

3.2.1.1 Project Output

The target areas of the project are irrigated rice cultivation areas, rainfed upland rice cultivation areas, and rainfed lowland rice cultivation areas among the rice production areas under the jurisdiction of each agricultural training institute (KATC, 5 MATIs, and KATI).

In TANRICE1, an irrigated rice cultivation training course was developed and conducted for 5,255 small-scale rice farmers in 44 irrigation schemes. Under Output 1 of the project, the Standard Training (ST) introduced in TANRICE1 was conducted in other irrigation schemes, and a Modified Standard Training (MST) was developed to reduce the cost of ST. Three types of MST (pilot training) were conducted in the 2013/14 and 2014/15 crop seasons (generally from September to August), and based on the results of these trainings, the content of MST was finalized and conducted beginning in the 2015/16 crop season. The training contents of ST, pilot MST, and MST are shown in Table 2 below.

[18] Source: Interview with JICA Tanzania office

[19] When providing the sub-rating, Effectiveness and Impacts are to be considered together.

Table 2　Contents of ST, Pilot MST, and MST of Irrigated Rice Cultivation Technology Training

	ST	Pilot MST			MST
		Type 1	Type 2	Type 3	
No of irrigation schemes	1	1	2	1	2
No of key farmers (KF) and intermediate farmers (IF) Note 1	16 KF 80 IF	16 KF 80 IF	10 KF 50 IF	10 KF 50 IF	8 KF 40 IF
No of technologies	All (44)	All (44)	Selected (Under 44)	Selected (Under 44)	Selected (Under 44)
Training days	36 days	20 days	20 days	14 days	16 days
Training cost per irrigation scheme (million TZS) Note 3	30 (approx. 1.5 million JPY)	15 (approx. 0.75 million JPY)	8-10 (approx. 0.4-0.5 million JPY)	6-8 (approx. 0.3-0.4 million JPY)	15 (approx. 0.75 million JPY)
Training for Agriculture Extension Officers			3 days	3 days	4 days
No of training component Note 2	7	5	3	3	4
1. Baseline survey	4 days	4 days	4 days	4 days	3 days
2. Residential training Note 1	12 days		12 days		5 days
3. 1st Infield training Note 1	4 days	4 days		6 days	5 days
4. 2nd Infield training	4 days	4 days			
5. 3rd Infield training	4 days	4 days			
6. 1st Monitoring	4 days	4 days	4 days	4 days	3 days
7. 2nd Monitoring	4 days				
Follow-up by training tutors			1	1	1

Source: Prepared by external evaluator based on *The Project for Supporting Rice Industry Development in Tanzania (TANRICE2) Final Report,* JICA, December 2019

Note 1: Farmers who participate in residential training conducted at each agricultural training institute are called key farmers, farmers who participate in infield training in each irrigation scheme are called intermediate farmers, and other farmers are called neighboring farmers.

Note 2: The training component refers to each training menu, including baseline survey, residential training, infield training, and monitoring.

Note 3: Tanzanian Shilling (TZS) and Japanese Yen (JPY) are converted at 1 TZS = 0.05 JPY (the exchange rate commonly used for this project).

By the completion of the project, ST was conducted in 27 irrigation schemes and MST in 63 irrigation schemes (including 9 schemes where pilot MST was conducted), for a total of 90 irrigation schemes. The number of key and intermediate farmers who participated in both trainings was 5,078, and out of a total of 22,708 farmers including neighboring farmers, the average percentage of farmers who adopted the rice cultivation technologies introduced in the training (Bund making, Levelling, Straight row transplanting/direct planting) was 65.3%, achieving the target value of 50% or more.

Under Output 2, two new rainfed rice cultivation technology training courses for upland and lowland areas were developed, and based on the selection of target areas for both training, rainfed upland rice cultivation technology training (hereinafter referred to as "NERICA training") and rainfed lowland rice cultivation technology training (hereinafter referred to as "lowland training") were conducted starting in the 2013/14 crop season and 2015/16 crop season, respectively. The content of both trainings was based on MST described above and arranged for rainfed upland or lowland. By the end of the project, the NERICA training was conducted in 47 areas, with 749 key and intermediate farmers participating, and the lowland training was conducted in 30 areas, with 7,445 key and intermediate farmers participating. Of the total 8,194 farmers who participated in both trainings, an average of 44.0% adopted

the rice cultivation technologies introduced in the trainings (Bund making, Levelling, Straight row transplanting/direct planting, Fertilizer application, Use of improved varieties), achieving the target value of 25% or more.

Under Output 3, training courses on (i) Irrigation scheme management, (ii) Gender, (iii) Marketing, (iv) Post-harvest technology, and (v) Agricultural machinery were conducted mainly to strengthen the organization of Water Users' Associations (WUA) in irrigation schemes and improve farmers' farming practices, respectively. The respective courses were targeted at WUAs in irrigation schemes, and each course targeted different irrigation schemes, many of which were different from the target irrigation schemes for Output 1. In particular, the agricultural machinery training targeted irrigation schemes with access to machinery and thus focused on schemes different from the schemes targeted by Output 1. In addition to the irrigation schemes, the gender training covered the rainfed lowland rice cultivation areas in Zanzibar, which were among the target areas of Output 2. By the completion of the project, a total of 193 training courses were conducted in 97 irrigation schemes and 3 rainfed lowland rice cultivation areas: (i) 61 on Irrigation scheme management, (ii) 38 on Gender, (iii) 34 on Marketing, (iv) 4 on Post-harvest technology, and (v) 56 on Agricultural machinery.[20]

3.2.1.2 Achievement of Project Purpose

Two quantitative indicators were set as indicators for the project purpose: the first indicator, "adoption of straight row transplanting/direct planting method by more than 15,000 farmers," was set as a measure of the effect generated by achieving Output 1 and Output 2, and the second indicator, "adoption of other important technologies contributing to the improvement of rice farming by more than 2,400 farmers," was set as a measure of the effect generated by achieving Output 3.

However, in light of the project purpose of "adoption of rice farming technologies by farmers in the priority rice production areas" and the overall goal of "increase in rice production in the rice production areas across the country," the achievement of the first indicator alone, "adoption of straight row transplanting/direct planting method," does not indicate a causal relationship as to whether the adoption of the technology leads to an increase in rice production, which is the overall goal. Therefore, it is necessary to set an indicator to confirm the change in unit yield before and after the training as a measure of whether the adoption of the technology has led to an increase in rice yield. Furthermore, for the second indicator, "adoption of other important technologies contributing to the

[20] The post-harvest technology course was changed to agricultural machinery course at the time of the mid-term review for this project, in light of some overlap with the content of the marketing course and the growing local need for agricultural machinery utilization.

improvement of rice farming," it was not possible to obtain the relevant quantitative data because it was not specified which technologies were being referred to. Therefore, as an alternative indicator to the second indicator, it is necessary to set a qualitative indicator to confirm the changes that have occurred as a result of participation in subject-matter training.

Based on the above, the following indicators were set to judge the achievement of project purpose in this ex-post evaluation: (i) the first indicator, (ii) an additional indicator for the first indicator, "Average unit yield of rice increases in the target areas for Output 1 and Output 2," and (iii) an alternative indicator for the second indicator, "changes resulting from participation in each course of the subject-matter training." The results of these three indicators were used to determine the level of achievement. The results of the three indicators are shown in Table 3 below.

Table 3 Achievement of Project Purpose

<table>
<tr><th>Project Purpose</th><th>Indicator</th><th>Actual</th></tr>
<tr><td rowspan="3">Rice farming technologies are adopted by farmers in the priority rice production areas.</td><td>The straight row transplanting or direct planting method is adopted by at least 15,000 farmers in the priority rice production areas in 2018. Note 1</td><td>The number of farmers (including key, intermediate, and other farmers) who adopted straight row transplanting/direct planting by the completion of the project totaled 26,468 as follows.
<table><tr><th>Rice cultivation areas</th><th>Number of farmers adopted</th></tr><tr><td>Irrigated</td><td>18,900</td></tr><tr><td>Rainfed upland</td><td>1,227</td></tr><tr><td>Rainfed lowland</td><td>6,341</td></tr><tr><td>Total</td><td>26,468</td></tr></table></td></tr>
<tr><td><Additional indicator>
Average unit yield of rice increases in the target areas for Output 1 and Output 2.</td><td>The average unit yield of rice at baseline and endline surveys in the irrigated, rainfed upland, and rainfed lowland rice cultivation in the target areas increased for all rice cultivation types as follows.
<table><tr><th>Rice cultivation type</th><th>Baseline</th><th>Endline</th></tr><tr><td>Irrigated</td><td>3.2 ton/ha</td><td>4.6 ton/ha</td></tr><tr><td>Rainfed upland</td><td>0.5 ton/ha</td><td>1.2 ton/ha</td></tr><tr><td>Rainfed lowland</td><td>1.7 ton/ha</td><td>2.1 ton/ha</td></tr></table></td></tr>
<tr><td>Other important technologies contributing to the improvement of rice farming are adopted by at least 2,400 farmers.

<Alternative indicator>
Changes resulting from participation in each course of the subject-matter training</td><td>- Irrigation scheme management: The number of active members in WUAs, the number of farmers paying fees to WUAs, and the number of farmers participating in maintenance activities in WUAs increased, and the operation of irrigation facilities was improved.
- Gender: Several examples of benefits were reported such as reduced labor costs, improved efficiency and quality of work, and increased cooperation between husband and wife and family members in each rice farming task. Note 2
- Marketing: Several examples of positive effects were reported such that the marketing training led to collective marketing in several irrigation schemes, the importance of warehouses for storing rice was recognized and used to stagger the timing of harvested rice sales, the bookkeeping training led to the recording of rice production and sales volumes, and the ability to negotiate with buyers when selling rice was improved.</td></tr>
</table>

		- Agricultural machinery: In a few cases, farmer groups that owned agricultural machinery provided by PHRD and 2KR were not able to use the machinery because they did not know how to use it. The training provided these farmer groups with the opportunity to learn how to operate the machinery and to make full use of it.

Source: *The Project for Supporting Rice Industry Development in Tanzania (TANRICE2) Final Report,* JICA, December 2019 and Results of qualitative survey
Note 1: Since the original project period was through December 2018, the indicator is set to the number of farmers adopted through 2018; however, since the project period was extended, the actual numbers are calculated through the completion of the project.
Note 2: For more specific details on changes by gender training, see the section "3.2.2.2 Other Positive and Negative Impacts" to be mentioned below.

As shown in Table 3, the first indicator was achieved because 26,468 farmers adopted straight row transplanting/direct planting, far exceeding the target of more than 15,000 farmers by the completion of the project. Furthermore, the average unit yield of rice increased after the training in the target areas of irrigated rice cultivation, rainfed upland rice cultivation, and rainfed lowland rice cultivation, so the additional indicator was also achieved. In addition, the subject-matter training contributed to the improvement of rice farming in the target irrigation schemes by improving the management of WUAs, reducing labor costs, and increasing the efficiency and quality of work by having couples work together on rice cultivation, improving rice sales, and effectively utilizing agricultural machinery, etc., and the alternative indicator was also achieved. Thus, the project achieved its purpose more than planned.

3.2.2 Impacts

3.2.2.1 Achievement of Overall Goal

The result of the indicator set for the overall goal is shown in Table 4 below.

Table 4 Achievement of Overall Goal

Overall Goal	Indicator	Actual
Rice production is increased in the rice production areas across the country.	The annual paddy production exceeds 2.5 million tons per year across the country by 2021.	- The national rice production (paddy basis) in Tanzania from 2009 to 2020 is shown in Table 5. Looking at the production trend from 2009 to 2020, there were large increases and decreases in production from 2009 to 2014, but production has been increasing steadily every year since 2015. The production in 2018 was 3,414,815 tons, achieving the target of more than 2.5 million tons. The production in 2019 was 3,474,766 tons and in 2020 is 3,038,000 tons (estimated value), maintaining the target of more than 2.5 million tons. - Also as shown in Table 5, the trends in harvested area and unit yield of rice throughout Tanzania from 2009 to 2020 are generally in line with the trends in production, indicating that the increase in production is not only due to the increase in harvested area but also to the increase in unit yield.

Source: FAOSTAT (Accessed in May 2023)

Table 5 National Rice Production (paddy basis), Harvested Area, and Unit Yield in Tanzania (2009-2020)

	2009	2010	2011	2012	2013	2014
Production (ton)	1,334,800	2,650,120	2,248,320	1,800,551	2,194,750	1,681,000
Harvested area (ha)	805,630	1,136,290	1,119,324	799,361	928,273	957,218
Unit yield (ton/ha)	1.7	2.3	2.0	2.3	2.4	1.8
	2015	2016	2017	2018	2019	2020
Production (ton)	1,937,000	2,229,000	2,451,707	3,414,815	3,474,766	3,038,000
Harvested area (ha)	1,154,467	1,039,205	1,097,283	1,032,902	1,052,547	1,038,343
Unit yield (ton/ha)	1.7	2.1	2.2	3.3	3.3	2.9

Source: FAOSTAT (Accessed in May 2023)
Note: Data for 2020 are estimates.

As shown in Table 5, the indicator for the overall goal has been achieved since 2018, with annual national rice production reaching more than 2.5 million tons. The project has achieved its overall goal.

Then, to analyze the contribution of the project in achieving the overall goal, a qualitative survey was conducted in this ex-post evaluation to confirm; after the completion of the project, (i) whether rice production has increased through the continuous practice of rice cultivation technologies by farmers in the target areas, and (ii) whether rice cultivation technologies have spread to neighboring farmers other than the key and intermediate farmers that participated in the training. In the qualitative survey, interviews were conducted in Kilimanjaro Region, Morogoro Region, and Zanzibar (Unguja Island), among the target areas, with 30 farmers who participated in each training conducted under the project and 10 neighboring farmers who did not participate in the training, totaling 40 farmers. A breakdown of the target sites and farmers for the qualitative survey is shown in the table at the end of this report, and a summary of the survey results is as follows.[21]

Results of the Qualitative Survey

Implementation status of rice cultivation technologies by farmers participating in the training after the project completion

- Regarding the status of implementation of each rice cultivation technology (5 technologies of Straight row transplanting/direct planting, Bund making, Levelling, Fertilizer application, Use of improved varieties) after the project completion, the overall practice rate is high, with irrigated rice cultivation being practiced more frequently than rainfed rice cultivation.
- In irrigated rice cultivation, 13 out of 16 farmers participating in the training continue to practice all 5 technologies, and 3 farmers are practicing all 4 technologies except fertilizer application. The 3 farmers who do not apply fertilizers are all in Zanzibar, and although they began selling rice after participating in the training, they still cannot afford to buy fertilizers due to the rising cost of fertilizers.
- In rainfed rice cultivation, the practice rates of straight row transplanting/direct planting and

[21] As a limitation of the evaluation in the qualitative survey, it should be noted that the information collected in the survey, such as the state of practice of each rice cultivation technology, production volume, and unit yield, was based on farmers' verbal responses and not on visual confirmation or actual measurement data, and thus is not accurate data. Furthermore, as a limitation in the selection of sites for the survey, the target site for rainfed lowland rice cultivation areas was only in Zanzibar because rainfed lowland rice cultivation areas in the mainland is located far from each agricultural training institute.

levelling are high, with 15 out of 17 farmers participating in the training practicing straight row transplanting/direct planting and 17 out of 17 practicing levelling (however, many farmers had been practicing levelling before the training). The practice rates of the other 3 technologies are lower than that of the 2 technologies because bund making was not part of the training content in the NERICA training, and because of the challenges in obtaining fertilizers and seeds for fertilizer application and use of improved varieties. The reason for the problem of obtaining fertilizers and seeds is that irrigated rice farmers can afford to purchase fertilizers and seeds each time because they have income from rice sales, but rainfed rice farmers often cannot afford to purchase fertilizers and use the previous year's seed rice instead of purchasing seeds.

- Several farmers indicated that the reason for not applying fertilizers to both irrigated and rainfed rice cultivation was that their land was fertile and there was no need to apply fertilizers, but the agricultural extension officers indicated that the lack of fertilizer application caused poor rice growth.
- All 4 farmers participating in the NERICA training in Zanzibar are not currently producing NERICA rice, but only growing rainfed lowland rice; the farmers in North District A are growing rice in separate lowland plots because their upland plots were converted to residential land in 2021; and the farmers in North District B are not producing NERICA rice because after growing NERICA varieties introduced by the training they participated in 2018, the government no longer distributes the same varieties and the lack of rainfall at the required time has affected the harvest, resulting in almost no seed rice of the NERICA varieties. These farmers have been practicing some of the rice cultivation technologies introduced by the training, such as straight row planting, in rainfed lowland areas, but they have not disseminated these technologies to neighboring farmers. Rainfed rice cultivation is easily affected by weather conditions, and the yield is not stable even when NERICA varieties are used.
- 6 out of 9 NERICA training participants in Morogoro are also no longer growing NERICA varieties. These farmers are growing another certified variety (SUPA Kyera) because the introduced NERICA variety can no longer be harvested due to weather conditions and damage from birds and animals, and because the NERICA variety is not popular in the market and is not selling well. In Kolela Village, Mvomero District, the NERICA variety is grown only in demo plots, and no farmers have voluntarily grown this variety. However, there are a certain number of farmers who have increased their yield and production by applying rice cultivation technologies, even if they do not grow NERICA varieties.

Change in rice production after the project completion

- Regarding changes in rice yield and production, all of the irrigated rice farmers (16 out of 16) have increased both yield and production after participating in the training. The unit yield was as high as 4-5 tons/ha even before the training and increased to more than 6 tons/ha after the training, and the increase is still being maintained. In rainfed rice cultivation, most of the farmers who participated in the training increased both yield and production in the year immediately after their participation, but the increase is not constant and varies from year to year. Rainfed rice cultivation, whether in upland or lowland areas, is greatly affected by the weather of the year, and is not stable, with production increasing in some years due to the implementation of rice cultivation technologies, while in other years production is lower than before participation in the training due to crop failure caused by drought.
- All farmers in the qualitative survey also produce crops other than rice (maize, beans, horticultural crops, etc.), and none of them are dedicated rice farmers. For farmers in irrigated rice cultivation areas, rice is a cash crop, and the more rice they produce, the more income they earn, so many of them have expanded their rice plots since they participated in the training to increase their production. On the other hand, for farmers in rainfed rice cultivation areas, rice is mainly for their consumption, so the benefits of increasing production are not as great as for irrigated rice farmers. In some cases, rainfed rice farmers have reduced their rice plots by half since participating in the training and are growing other crops instead, due to the increased yield and work required to implement the rice cultivation technologies.

Dissemination from key and intermediate farmers to neighboring farmers

- In irrigated rice cultivation areas, WUAs and affiliated farmers' groups are organized, and since each farmer's plot is located in the same irrigation scheme, there are opportunities to observe other farmers' plots. It was confirmed that the mechanism of disseminating rice cultivation

technologies from key farmers to intermediate farmers and then to other farmers functions, and that technologies are also disseminated to non-participating farmers through farmer-to-farmer extension.

- Since farmers in rainfed rice cultivation areas are not organized, as part of the training program, 4 key farmers introduced rice cultivation technologies to 2 intermediate farmers each, forming a group of 25 to 30 neighboring farmers in each village, where key farmers, intermediate farmers, and agricultural extension officers disseminated rice cultivation technologies to other farmers. Thus, although the technologies were disseminated from key and intermediate farmers to neighboring farmers when the training was implemented, there is no systematic dissemination of technologies from these core and intermediate farmers to other farmers after the project completion, and opportunities to observe other farmers' plots are limited due to the dispersed location of each farmer's plot, limiting the status of farmer-to-farmer extension.
- Among the non-participating farmers, all of the farmers in the 4 irrigation schemes visited are practicing all 5 rice cultivation technologies, but less than half of them are practicing them in rainfed rice cultivation areas. However, in some irrigation schemes, although extension from key farmers to intermediate farmers in demo plots was conducted, extension from intermediate farmers to neighboring farmers was not followed up. Conversely, in some rainfed rice cultivation areas where agricultural extension officers are active, follow-up training by extension officers was conducted. According to the observations of extension officers and key farmers, the dissemination rate of rice cultivation technologies in irrigated areas is about 70%, while in rainfed areas it is 20-30%.

Other Situations

- In Mlali Village of Mvomero District, Morogoro, where both the irrigated rice cultivation technology training and the NERICA training were conducted, several farmers practice both irrigated and rainfed rice cultivation, and each farmer has little awareness of the clear distinction between the two. Furthermore, in the case of rainfed rice cultivation, farmers were less aware of the clear distinction between upland and lowland, and some farmers perceived their plots as upland in the lowland training area, and vice versa. In most cases, rainfed rice farmers seem to perceive that they are cultivating upland rice when NERICA varieties are grown and that they are cultivating lowland rice when NERICA varieties are not grown.
- The first year, when the rice cultivation technology training was conducted in this project, was 2014, and at the time of the ex-post evaluation, nearly 10 years had passed since the year of training conducted in some target areas. In several cases, the farmers targeted in the qualitative survey had different cultivation plots at the time of participation in the training and at the time of the ex-post evaluation (e.g., relocation due to conversion of farmland, moving, or expansion of plots). In general, in irrigated rice cultivation areas, although the aging of irrigation facilities was pointed out as an issue, there are no significant changes in the rice farming environment after the project completion, and there are few differences in the effects of the project among farmers in the same irrigated area. On the other hand, in rainfed rice cultivation areas, there are several cases where changes occurred in the rice farming environment, such as cases where the target farmers' plots were changed after the project completion, cases where the crops were almost destroyed due to damage by birds and animals, and cases where the rice production was severely damaged due to a drought. It is difficult to average the effects of rainfed rice cultivation in the area because of the large differences among farmers due to area differences and individual farmers' circumstances even within the same area.

As shown in the results of the above qualitative survey, regarding (i) whether rice production has increased through the continuous practice of rice cultivation technologies by farmers in the target areas after the completion of the project, all farmers (16 out of 16) who participated in the irrigated rice cultivation technology training have increased their unit yield after participating in the training, and some farmers also have increased the area of their plots, and their production has continued to increase every year up to the time of the ex-post evaluation. Although 7 out of 13 farmers participating in the NERICA training and

2 out of 4 farmers participating in the lowland training have increased in both unit yield and production, the production by farmers in rainfed rice cultivation areas varies from year to year, with some years production increased and other years decreased from the time of training participation to the time of the ex-post evaluation, due to crop failure caused by drought, plot conversion, reduction in plot area, and decreased harvest due to damage from birds and animals, and is not constant.

Regarding (ii) whether rice cultivation technologies have spread to neighboring farmers other than the key and intermediate farmers who participated in the training after the completion of the project, neighboring farmers who did not participate in the training also practice rice cultivation technologies in the irrigated rice cultivation areas, confirming farmer-to-farmer extension, while in the rainfed rice cultivation areas, rice cultivation technologies are not as disseminated as in the irrigated areas.

Therefore, as the contribution of the project in achieving the overall goal, farmers have continued to practice rice cultivation technologies in the irrigated rice cultivation areas after the completion of the project, and rice production has increased significantly, contributing to a certain extent to the increase in rice production in the country as a whole. On the other hand, in the rainfed rice cultivation areas, although the rate of farmers practicing rice cultivation technologies other than fertilizer application and introduction of improved varieties is high, and an increase in unit yield is confirmed, the production is not stable due to conditions of weather and the surrounding environment, thus contributing only limitedly to the overall increase in rice production for the country. However, a total of 22,708 farmers, including neighboring farmers, participated in the irrigated rice cultivation technology training under the project, and a total of 8,194 farmers participated in the rainfed rice cultivation technology training, 73% of which were farmers in the irrigated rice cultivation areas. Therefore, the contribution of this project to the achievement of the overall goal is high. Furthermore, while the irrigated rice cultivation technology training was also conducted in TANRICE1 and the training content was established in this project, the rainfed rice cultivation technology training was introduced from this project, and was not envisioned that the training content was established in this project. Therefore, in the rainfed rice cultivation areas, the objective was to increase rice yield through the implementation of training in this project, and it was not assumed that the training would have the impact of increasing rice production.

3.2.2.2 Other Positive and Negative Impacts

1) Impacts on the Environment

This project was judged to have minimal undesirable effects on the environment based on the *JICA Guidelines for Environmental and Social Considerations* (formulated in April

2010) and classified as Category C.

2) Resettlement and Land Acquisition

No resettlement or land acquisition has occurred in this project.

3) Gender Equality, Marginalized People, Social Systems and Norms, Human Well-being and Human Rights

The following examples of gender-related changes resulting from the project were reported.[22]

- The project has led to a reduction in labor costs and an improvement in the efficiency and quality of the rice cultivation process by having each task performed jointly by husband and wife and among family members.
- Family budgeting has enabled them to plan rice production more efficiently and use the income generated from rice production.
- Husbands began to cooperate with their wives in household chores such as cooking, fetching water, and collecting firewood.
- By keeping a household account book, families began to plan their expenditures and savings. In addition, families began to discuss how to use the income from rice sales, which increased the transparency of family finances and reduced conflicts over financial issues among family members.
- Women were selected for leadership positions in local farmer organizations.

No particular differences were found between male and female respondents in the qualitative survey regarding the status of implementation of each rice cultivation technology and the onset and continuation of effects, such as changes in rice yield and production, after participation in the training. The differences in the onset and continuation of effects observed among training participants were not due to differences between men and women, but rather to differences between irrigated and rainfed rice cultivation, and differences in the cultivation environment among areas in rainfed rice cultivation. However, female-headed households tended to own smaller plots than male-headed households, and therefore also tended to produce less rice.

As mentioned above, the project has produced effects such as reducing women's workload in rice cultivation and reflecting women's opinions in household economies, and it was confirmed that women who participated in the rice cultivation technology training have practiced and continued to practice the technologies to the same extent as men and that the project has produced effects in increasing rice yield and production. Thus, the project's target

[22] Source: Results of qualitative survey and *The Project for Supporting Rice Industry Development in Tanzania (TANRICE2) Final Report,* JICA, December 2019

of 45% or more participation rate of women in the training promoted women's access to rice cultivation technologies, which also led to women's economic empowerment and contributed to gender equality and women's empowerment.

4) Unintended Positive/Negative Impacts

Farmers in the irrigated rice cultivation areas produce rice as a cash crop, and all farmers targeted by the qualitative survey increased their production after participating in the training and their income from rice sales. All 4 irrigation schemes in the qualitative survey had two cropping seasons, and most of the farmers produced more than one ton of rice per year, and some farmers sold all the rice they harvested instead of consuming it on their own. Irrigated rice farmers in Zanzibar increased their production and began earning income from rice sales after participating in the training, while irrigated rice farmers in Kilimanjaro and Morogoro Regions, who had been selling rice before participating in the training, increased both sales volume and income due to increased production. Many farmers have increased their rice plots since they participated in the training by purchasing new land for rice cultivation or converting plots used for other crops to rice cultivation, using the income from rice sales as a source of income, and they have more than doubled their rice production from before the training, due in part to the increase in yield resulting from the application of rice cultivation technologies. In addition, farmers outside of Zanzibar do not use their seed rice, but purchase seed each time from agricultural training institutes, seed companies, seed producers, etc. Rice is sold by private buyers from central and neighboring cities in the districts, and in the case of Kilimanjaro Region, from Kenya.

On the other hand, farmers in the rainfed rice cultivation areas grow rice in an area of almost 0.1 ha to less than 1 ha, and few farmers sell rice (5 out of 14) because it is mainly for their consumption, and many of them still purchase rice. However, cases were identified of among farmers who increased their rice production after participating in the training, (i) farmers who increased the amount of rice sold, (ii) farmers who started selling rice, and (iii) farmers who decreased their rice purchases, and these farmers contributed to a certain amount of income growth by increasing household disposable income, and may also have contributed to food security at the household level.

This project has achieved the project purpose of adopting rice farming technologies by farmers in the priority rice production areas and the overall goal of increasing rice production in the rice production areas across the country more than planned. Therefore, effectiveness and impacts of the project are very high.

3.3 Efficiency (Rating: ③)

3.3.1 Inputs

Inputs	Plan	Actual
(1) Experts	Chief Advisor, Coordinator, Rice Cultivation Technology, Rice Cultivation Extension/Monitoring, Water Management/Farmers' Organization, Marketing/Post-harvest Processing, Irrigation Scheme Management, Gender Mainstream, Agricultural Machinery, etc.	8 Long-Term 22 Short-Term
(2) Trainees received	Approx. 3 persons per year	57 persons (42 in training in Japan, 15 in third countries training)
(3) Equipment	Materials and equipment required for project activities	Agricultural machinery (tillers, etc.), vehicles, office equipment, etc.
(4) Local operational cost	-	332,483,387 yen
Japanese Side Total Project Cost	961 million yen	1,068 million yen
Tanzanian Side Total Project Cost	Irrigated rice cultivation technology training costs	81,332,430 TZS (Approx. 4 million yen, irrigated rice cultivation technology training costs)

3.3.1.1 Elements of Inputs

The performance of each input (experts dispatched, trainees received, and equipment provided) was generally in line with the plan, and there were no problems with the outputs produced to the inputs provided.

3.3.1.2 Project Cost

The actual project cost was 1,068 million yen compared to the plan of 961 million yen (111% of the plan), slightly exceeding the plan (over 100% and under 125%). One of the reasons for the higher-than-planned project cost was the extension of the project period, which led to an extension of the dispatch period of some experts.

Furthermore, in TANRICE1, the Japanese and Tanzanian sides shared the cost of the training, with the Tanzanian side bearing 58.2% of the training cost, so it was planned to share the cost of the irrigated rice cultivation technology training with the Tanzanian side in this project as well. The actual training costs incurred in this project totaled 1,563,588,900 TZS (approximately 78 million yen), of which 81,332,430 TZS (approximately 4 million yen) was borne by the Tanzanian side. Cost sharing was 94.8% on the Japanese side and 5.2% on the Tanzanian side, a much lower share on the Tanzanian side compared to

TANRICE1. Thus, the project cost exceeded the plan because the Tanzanian side's share of training costs was lower than planned, and the local operational cost was higher than planned due to the increased burden on the Japanese side.

3.3.1.3 Project Period

The actual project period was 85 months compared to the planned 72 months (118% of the plan), slightly exceeding the plan (over 100% and under 125%). The reason for the extension of the project period is that the component of rice cultivation technology training includes monitoring and follow-up by training tutors 1 to 2 years after the infield training, and it was determined in the terminal evaluation that monitoring and follow-up for farmers trained in the 2017/18 and 2018/19 crop seasons needed to be carried out. Therefore, the project period was extended by extending the duration of the dispatch of the rice cultivation technology and rice cultivation extension experts in charge of monitoring and follow-up, and other than both experts, the chief advisor, project coordinator, and other experts were not assigned for the extended period.

The Japanese and Tanzanian inputs were generally as planned, except for the local cost burden (training implementation costs) on the Tanzanian side. Although both the project cost and period were slightly higher than planned, all three outputs were achieved by the end of the project, and there were no problems in the achievement of outputs. Therefore, efficiency of the project is high.

3.4 Sustainability (Rating: ②)

The overall goal of this project is to increase rice production on a national level by increasing rice production through continuous practice of rice cultivation technologies by farmers in the target areas and by providing rice cultivation technology training in rice production areas outside the target areas. Therefore, the sustainability of the project will be reviewed in terms of the technical aspect, i.e., whether the farmers continue to practice rice cultivation technologies after the completion of the project, and in terms of policy and system, institutional/organizational aspect, and financial aspect, i.e., whether the rice cultivation technology training is conducted outside the target areas after the completion of the project for areal expansion.

3.4.1 Policy and System

The national development plan at the time of the ex-post evaluation, the third FYDP (2021/22-2025/26) focuses on the agricultural sector to improve agricultural production and enhance storage capacity through the introduction of modern crop management systems, and

to make agriculture more productive and sustainable by: (i) expanding sustainable water and land use management through integrated land use planning and improved irrigation systems; (ii) transforming and commercializing sectors that improve climate-smart agriculture; (iii) using science, technology, innovation, and R&D to improve productivity and quality of crop production; and (iv) increasing the number of extension officers and better access to extension services. ASDP II and NRDS II have not been changed since the project was completed. In the first and second FYDPs, the target of raising the agricultural sector growth rate to 6.0% by 2015 and 2020 respectively was set but was not achieved. However, in 2022, the current president proposed the *Agenda 10/30*, which promotes an initiative to raise the sector growth rate to 10% by 2030, and rice is positioned as one of the priority crops that will contribute to achieving the 10% target.

At the time of the ex-post evaluation, MoA is in the process of rehabilitating facilities and constructing accommodations for each MATI and is implementing a nationwide motorcycle grant for extension officers as a measure to strengthen agricultural extension activities.

Therefore, there has been no change in the Tanzanian government's policy for rice promotion since the project's completion, and the sustainability of the project in terms of policy and system is high.

3.4.2 Institutional/Organizational Aspect

As the implementation system for each training course conducted under the project (irrigated rice cultivation technology training, NERICA training, lowland training, and subject-matter training courses), tutors from each agricultural training institute (KATC, 5 MATIs, and KATI) served as training instructors and key and intermediate farmers in the target areas participated in the training. In addition, district agriculture officers and agricultural extension officers in the target areas also participated in each training, and the extension officers assisted the tutors in monitoring and follow-up of each training. Since each agricultural training institute is a training institute for agricultural extension officers, each training conducted under the project was not the normal business of each training institute. After the completion of the project, each training institute was to conduct each training upon request from LGAs (MAINL in Zanzibar) in its area of jurisdiction, and the training costs were to be covered by each LGA and MAINL.

While the responsible body of MoA was changed from the Agricultural Training, Extension Services and Research Division at the completion of the project to the Agricultural Training and Research Division due to the reorganization in 2022, and the extension service was transferred to the Crops Division, the implementation system of each training after the project completion is the same as during the project implementation.

As for the actual implementation of each training after the completion of the project at

each agricultural training institute (KATC, 5 MATIs) and SoA, only 4 training courses on irrigated and rainfed rice cultivation technology were conducted at MATI-Ilonga. In MATI-Ilonga irrigated and rainfed rice cultivation technology training was conducted once each in September, October, and December 2022, funded by an NGO called Campaign for Female Education (CAMFED) Tanzania. The training participants were 230 young female farmers from Morogoro, Tanga, and Iringa Regions, and they chose either irrigated or rainfed rice cultivation according to their preference and received about 10 days of residential training and infield training in demonstration plots at MATI-Ilonga. In addition, 80 women farmers participated in a rice cultivation technology training funded by World Vision in 2020. After these trainings, there has been no specific monitoring by MATI-Ilonga and targeted LGAs.

According to KATC and MATIs other than MATI-Ilonga, the main reason for not conducting the training after the project completion is that no budget has been allocated for the training implementation in either case. There has been no change in the training implementation system at each training institute, many of the tutors remain assigned to each institute, there are no particular technical challenges in conducting the training, and as long as the budget is available, the training can be continued.

Although KATI was reorganized under SoA after the project completion, KATI tutors continue to be assigned as SoA tutors, and there is no change in the training implementation system. In SoA, as in KATC and each MATI, the main reason for not conducting the training after the project completion is that there is no budget allocated for the training implementation. There are no particular technical challenges in conducting the training, and as long as the budget is available, the training can be continued.

Monitoring and follow-up by agricultural extension officers to farmers in the target areas are conducted as part of the regular monitoring by extension officers, which includes providing technical guidance and information sharing on rice cultivation, such as introducing quality seeds and encouraging fertilizer application. However, in the areas visited in the qualitative survey, many of the extension officers who participated in the training during the project implementation have been transferred or resigned, and many of the current extension officers were not participating in the training at the time of the ex-post evaluation. In the areas where the extension officers who participated in the training are still in place at the time of the ex-post evaluation, they are also contributing to the dissemination of rice cultivation technologies to neighboring farmers through farmer-to-farmer extension.

3.4.3 Technical Aspect

According to the results of the qualitative survey conducted in this ex-post evaluation, regarding the status of implementation of each rice cultivation technology (Straight row transplanting/direct planting, Bund making, Levelling, Fertilizer application, Use of

improved varieties) after the completion of the project, the overall practice rate is high, and the rate is higher for irrigated rice cultivation than rainfed rice cultivation. In irrigated rice cultivation, 13 of 16 farmers participating in the training continue to practice all 5 technologies, while the remaining 3 farmers practice all 4 technologies except fertilizer application. In rainfed rice cultivation, the practice rates of straight row transplanting/direct planting and levelling are high, with 15 out of 17 farmers participating in the training practicing straight row transplanting/direct planting and 17 out of 17 practicing levelling (however, many of the farmers had been practicing levelling before the training). The practice rates of other technologies are lower than that of the 2 technologies since bund making was not included in the training content in the NERICA training and there are challenges of obtaining fertilizers and seeds for fertilizer application and use of improved varieties. Furthermore, farmer-to-farmer extension is functioning, especially in irrigated rice cultivation areas, and in the 4 irrigation schemes covered by the qualitative survey, non-participating farmers were practicing all rice cultivation technologies. These farmers learned and applied the technologies through information sharing from farmers who participated in the training and observation of neighboring farmers' plots.

Thus, the rice cultivation technologies introduced in the training were disseminated from the key and intermediate farmers who participated in the training to neighboring farmers. According to interviews with the target farmers, the fact that these rice cultivation technologies were applicable to the farmers led to the promotion of farmer-to-farmer extension and a high adoption rate of technologies. For example, as shown in Table 2, the content of each rice cultivation technology training consists of multiple components that include residential and infield technical instructions as well as baseline survey, monitoring, and follow-up and is structured so that a series of training components are implemented throughout multiple cropping seasons. The post-training adoption rate of rice cultivation technologies introduced in the training is more firmly established than planned, and the practice rate of the training contents and the adoption rate of rice cultivation technologies are improved by conducting a set of training components, including monitoring and follow-up after the technical guidance.

Furthermore, according to interviews with experts, the introduction of subject-matter training contributed to embedding the contents of rice cultivation technology training among participants by taking a multifaceted approach that not only improved rice cultivation technologies but also strengthened other aspects of rice promotion, such as irrigation scheme management, gender, marketing, post-harvest technology, and agricultural machinery.

According to the questionnaire responses by KATC, MATIs, and SoA, many of the tutors who are training instructors in each training continue to be assigned to the same institute after the completion of the project, and there are no particular technical problems in the

implementation of each training, and as long as the budget can be raised, it is possible to continue the training.

3.4.4 Financial Aspect

Among the irrigated rice cultivation technology training, rainfed rice cultivation technology training, and subject-matter training conducted under this project, rainfed rice cultivation technology training and subject-matter training were newly introduced under this project; therefore, it was planned that the training costs for the two trainings would be borne by the Japanese side, while the irrigated rice cultivation technology training was to be conducted through cost sharing with the Tanzanian side (LGAs and MoA), in addition to reducing its training cost by introducing MST. Although the introduction of MST lowered the overall training cost by 35.7%, the cost-sharing was 94.8% for the Japanese side and 5.2% for the Tanzanian side (4.1% for LGAs and 1.1% for MoA), which means that the Tanzanian side's share of training costs was much lower than in TANRICE1. The main reason is that since 2012/13, there has been virtually no budget allocation from the ASDP Basket Fund to the DADP budget.

Furthermore, as mentioned above, there is no record of each training being conducted other than MATI-Ilonga after the completion of the project. The annual budgets of the Agricultural Training and Research Division of MoA and MAINL, and the annual budgets and expenditures of each agricultural training institute and SoA are shown in Tables 6, 7, and 8 below. All institutes indicated no budget allocation for each training at each agricultural training institute and SoA. The budget for the Agricultural Training and Research Division of MoA is increasing steadily; however, this increase is primarily due to increased seed research and seed production facilities at the Tanzania Agricultural Research Institute.

Table 6 Annual Budget of Agricultural Training and Research Division, MoA

Unit: TZS

Budget item	2019/20	2020/21	2021/22	2022/23
Other charges	1,204,005,880	3,246,932,490	3,426,932,490	10,680,261,000
Development budget	8,940,048,000	24,293,500,000	34,995,500,000	

Source: Questionnaire response by Agricultural Training and Research Division, MoA

Table 7 Annual Budget of MAINL

Unit: TZS

Budget item	2019/20	2020/21	2021/22
Total budget	88,173,299,661	129,862,460,000	53,704,753,000
Training budget	57,040,000	24,900,000	33,540,000

Source: Questionnaire response by MAINL

Table 8 Annual Budgets and Expenditures of Agricultural Training Institutes and SoA

Unit: TZS

Institute	Item	2019/20	2020/21	2021/22	2022/23
KATC	Budget	263,000,000	263,000,000	360,000,000	NA
	Expenditure	131,500,000	131,500,000	216,000,000	
MATI-Igurusi	Budget	43,000,000	55,000,000	55,000,000	78,000,000
	Expenditure	NA	23,794,800	23,841,000	
MATI-Ilonga	Budget	1,243,000,000	1,560,000,000	1,560,000,000	1,363,251,895
	Expenditure	983,000,000	901,000,000	1,076,000,000	
MATI-Mtwara	Budget	1,800,000,000	3,100,000,000	2,300,000,000	2,134,669,200
	Expenditure	600,000,000	2,100,000,000	800,000,000	
MATI-Tumbi	Budget	417,988,746	220,568,908	219,218,350	760,122,600
	Expenditure	223,699,441	91,653,436.00	111,470,350	
MATI-Ukiriguru	Budget	2,396,361,842	2,497,460,497	2,323,450,397	2,155,236,648
	Expenditure	538,768	558,758	645,896	
SoA	Budget	598,560,130	444,682,760	596,400,320	481,973,320
	Expenditure	538,704,117	377,980,346	357,840,192	

Source: Questionnaire response by each institute

Note: Budget refers to the amount budgeted in the application, and expenditure refers to the amount allocated in the budget, with responses based on estimated and actual amounts depending on the institute. Reasons for the large variation in budgets and expenditures from institute to institute and from year to year include the fact that each institute varies in size (number of staff) and that some years include large-scale expenses such as facility renovations.

The institutes providing the training under this project are the agricultural training institutes under MoA, and each agricultural training institute is a training institute for agricultural extension officers and does not usually provide training for ordinary farmers, and budgets for farmer training are not usually allocated. Each training institute is supposed to conduct farmer training at the request of LGAs within its jurisdiction, and the cost of the training is to be borne by the respective LGAs. As mentioned in "3.3. Efficiency," the share of training costs borne by each LGA during the project implementation was limited, but even after the project completion, no training was provided at the expense of each LGA. Since each training institute does not expect LGAs to cover the training cost, they are submitting application proposals to conduct the training to obtain funds from other donors and NGOs. However, this does not mean that there is no communication between each training institute and each LGA, and there is communication as needed between the officers of each training institute and the district agriculture officers and agricultural extension officers in each LGA.

In Zanzibar, unlike on the mainland, agricultural extension officers do not belong to LGAs but to MAINL, and all training budgets are allocated from MAINL, not LGAs. However, as shown in Table 7, the training budget in the overall MAINL budget is very limited, and no rice cultivation technology training is provided at MAINL expense.

Therefore, after the completion of the project, the budget for the implementation of each training has not been allocated by MoA, the respective LGAs, and MAINL to the respective agricultural training institutes and SoA, which poses a major challenge to financial sustainability.

3.4.5 Environmental and Social Aspect

According to each agricultural training institute, several responses indicated that the project's rice cultivation technology training is environmentally friendly because it encourages the application of organic fertilizers.

3.4.6 Preventative Measures to Risks

As mentioned above, each agricultural training institute submits application proposals to other donors and NGOs to obtain training funds, but other than MATI-Ilonga, there is no record of each training being conducted at the expense of other organizations after the project was completed.

Some major issues have been observed in terms of the financial aspect and they are not expected to be resolved. Therefore, sustainability of the project effects is moderately low.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project aimed to increase rice yield in the project target area through the implementation of (i) training on irrigated rice cultivation technology, (ii) training on rainfed rice cultivation technology, and (iii) subject-matter training on the rice industry value chain by enabling participating farmers to use the rice cultivation technologies introduced in the training. Furthermore, the project aimed to increase rice production in the target area through continuous practice of rice cultivation technologies by farmers participating in the training and practice of the technologies by neighboring farmers through farmer-to-farmer extension, and to increase rice production on a national level through the implementation of rice cultivation technology training in rice production areas other than the target area.

The increase in national rice production aimed for this project was consistent with Tanzania's development policy and needs at the time of planning and completion of the project. Furthermore, the project was consistent with Japan's ODA policy for Tanzania and was implemented as technical cooperation to improve productivity through the adoption of appropriate rice farming technologies by farmers under JICA's cooperation program, the *Rice Production Capacity Enhancement Program*. The project was also implemented under the international framework of CARD, an international initiative aimed at doubling rice production. Therefore, the relevance and coherence of the project are high. The effectiveness and impacts of the project are very high, as the implementation of the project led to an increase in rice yield through the utilization of rice cultivation technologies by farmers in the target area, and the increase in rice production at the national level has been confirmed, with the effects of the project having been more than planned. Although the project cost and

period were slightly higher than planned, there were no problems with the outputs produced to the inputs, and the efficiency of the project is high. The sustainability of the project is moderately low because, although the effects of the project itself have been sustained, the project has not been expanded to include rice cultivation technology training in other rice production areas after the completion of the project, and there are major financial issues to be addressed.

In light of the above, this project is evaluated to be satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

(1) Although the training provided by each training institute under this project is provided by agricultural training institutes, the budget for farmer training is not normally allocated in each training institute, and each training institute conducts farmer training upon request from LGAs, and the training costs are borne by each LGA. In this project, it was planned that the irrigated rice cultivation technology training would be conducted through cost-sharing of implementation expenses between the Tanzanian and Japanese sides, but the Tanzanian side's burden was limited. Furthermore, since the completion of the project, neither MoA, MAINL, nor LGAs have allocated budgets to the training institutes for the implementation of the training, and any of the training has not been conducted by the Tanzanian government budget. Under the successor project, TANRICE3, the rainfed rice cultivation area will be the main target area, and TANRICE3 plans to cover the implementation costs of the rainfed rice cultivation technology training. The Agricultural Training and Research Division of MoA, MAINL, and agriculture offices of the respective LGAs should ensure that the training budget is allocated for the irrigated rice cultivation technology training so that the Tanzanian side can independently bear the costs. In practice, however, it is difficult for each agency to secure training budgets from the central government and the respective LGAs, so MoA and MAINL need to actively encourage external agencies to raise training funds from other development partners. Alternatively, it is suggested that another funding mechanism be considered in the implementation of the training. For example, it is proposed that farmers, MoA, and each LGA share the training costs as follows: (i) irrigated rice farmers, many of whom have income from rice sales, should be charged a fee for a portion of the training costs, which would be collected from participating farmers; (ii) daily subsistence allowance (DSA) costs for the agricultural training institute tutors to conduct the training should be covered by the Agricultural Training and Research Division, MoA; and (iii) monitoring and follow-up of the training should be conducted by agricultural extension officers, with LGAs bearing the costs of

conducting them. On the other hand, in Zanzibar, the agricultural extension officers belong to MAINL, not to LGAs, and MAINL needs to bear DSA and monitoring costs for SoA tutors and agricultural extension officers, so MAINL should approach other development partners for funding or the Zanzibar government for a budget allocation.

(2) MATI Ilonga reported that there are some discrepancies in the content of training on rice cultivation technologies in TANRICE (including 1 and 2) and ERPP, confusing farmers who participated in training under both projects. Although several rice promotion projects provide training related to rice cultivation technology, there are other examples of differences in the content of each training program, because although information is shared and opinions are exchanged at inter-donor meetings and other forums, the content of the training provided by each program is not coordinated. Therefore, it is suggested for each agricultural training institute and SoA that when updating the training materials in TANRICE3, the task groups composed of tutors from each agricultural training institute and SoA in charge of each training program should summarize the differences between the rice cultivation technologies recommended by TANRICE and those recommended by other rice cultivation programs, including ERPP, and why they are different, and discuss which technology is preferable to use under which cultivation conditions, and add explanations in the training materials.

4.2.2 Recommendations to JICA

(1) In this ex-post evaluation, it was confirmed that the training in the irrigated rice cultivation area significantly increased rice production and contributed to the increase in rice production at the national level, while the training in the rainfed rice cultivation area increased unit yield, but production was not stable due to weather and surrounding environment conditions, and the contribution to the increase in rice production for the entire country was limited. In TANRICE3, rainfed rice cultivation areas will be the main target area, and the rainfed rice cultivation technology training introduced in this project is planned to be strengthened. On the other hand, since irrigated rice cultivation has a greater impact on rice production than rainfed rice cultivation, it would be more efficient to conduct the training in more irrigated areas in TANRICE3, if increasing national rice production remains the overall goal of TANRICE3. Therefore, it is necessary to carefully consider the areas where the training is to be conducted based on what TANRICE3 is specifically designed to achieve. In particular, a loan project for irrigation infrastructure development by the Exim Bank of Korea is underway in Zanzibar, but the project is only for the development of irrigation facilities and does not plan to provide technical training, and there is a high need to provide technical training to the target farmers. In addition, irrigated rice farmers in Zanzibar tend to own smaller plots and earn less income from

rice sales than those on the mainland, making it difficult for farmers themselves to bear the cost of participating in rice cultivation technology training, and MAINL needs to bear all the training costs including monitoring costs of agricultural extension officers. Therefore, particularly in Zanzibar, while encouraging MAINL to cover the training costs, it is suggested that consideration be given to continuing to target irrigated rice areas as the primary areas for the training implementation in TANRICE3.

(2) As mentioned above, this ex-post evaluation confirmed that the rice cultivation technology training conducted under the project was effective in increasing rice yield and production. While there is room for improvement in the content of the rainfed rice cultivation technology training, it is expected that the content will be strengthened in TANRICE3. Thus, through the implementation of TANRICE 1, 2, and 3, KATC and other agricultural training institutes have accumulated know-how in implementing packaged training in rice cultivation technology, and in CARD Phase 2, KATC, together with Uganda and Cameroon, is the base for the CARD Reginal Training. Therefore, JICA should develop packaged rice cultivation technology training programs in African countries under CARD Phase 2 to effectively utilize the training programs introduced and improved in TANRICE 1, 2, and 3.

4.3 Lessons Learned

<u>The necessity of positioning the partner country's budget-bearing organizations as the implementing agencies and obtaining their budgetary commitments</u>

The training provided by each training institute under this project is provided by the respective agricultural training institutes, but the budget for farmer training is not normally allocated in the budget of each training institute. In this project, the irrigated rice cultivation technology training was planned to be conducted through cost-sharing of implementation expenses between the Tanzanian and Japanese sides, but the Tanzanian side's burden was limited, and there is no record of training being conducted with each LGA bearing the costs after the project completion. A major reason for the low-cost burden for each LGA is that the DADP budget, which is financed by the ASDP Basket Fund, was eliminated after the start of the project. In addition, this was partly because no formal commitment by LGAs to pay for the training was obtained, as neither LGAs nor PO-RALG that governs LGAs were originally positioned as implementing agencies for the project. Before the start of the project, LGAs targeted by the project were not identified, and since LGAs targeted by the project covered more than 40 districts, it is not realistic to position all the targeted LGAs as implementing agencies. Therefore, at the time of planning, it was necessary to position PO-RALG, which oversees all LGAs, as the implementing agency and to obtain a commitment by LGAs through PO-RALG to pay for the training.

In light of the above, to secure the commitment of the partner country to allocate the budget, it is necessary to position not only the agency that will conduct the project activities but also the agency that will bear the budget for project activities as the implementing agency at the time of planning the project and to encourage the budget-bearing agency to allocate the budget as the implementing agency during the implementation of the project.

5. Non-Score Criteria

5.1 Performance

5.1.1 Objective Perspective

None

5.2 Additionality

None

(End)

Status of Achievement of Outputs

Output	Indicators	Results
Output 1 Training approach for disseminating the appropriate irrigated rice cultivation technologies (standard training) is strengthened nationwide.	**<Indicator 1-1>** The standard training course or modified standard training course will be conducted in at least 80 priority irrigation schemes by 2018.	**<Achieved>** ST was conducted in 27 irrigation schemes and MST in 63 irrigation schemes (including 9 schemes where pilot MST was conducted), for a total of 90 irrigation schemes.
	<Indicator 1-2> At least 50% of key farmers and intermediate farmers in selected irrigation schemes evaluate that their paddy production technologies are improved.	**<Achieved>** As objective data on "farmers' evaluation of the improvement of their rice production technologies," the percentage of farmers (including neighboring farmers) who adopted or practiced the technologies (bund making, levelling, and straight row transplanting) after participating in ST or MST was collected. The results showed that 59.4% of the farmers adopted or practiced bund making, 62.2% adopted levelling, and 74.2% adopted straight row transplanting, with an average of 65.3%.
	<Indicator 1-3> Extension materials for extension officers and farmers are developed.	**<Achieved>** Six types of extension materials for agricultural extension officers and farmers related to ST and MST were developed and revised as appropriate throughout the training implementation.
	<Indicator 1-4> At least 45% of participants of the training (key and intermediate farmers) are women.	**<Achieved>** A total of 5,078 key and intermediate farmers participated in ST and MST, of which 2,511 were female participants, for a female participation rate of 49.4%. The total number of participants including neighboring farmers was 22,708, of which 10,755 were women, for a participation rate of 47.4%.
Output 2 Training approach for disseminating the appropriate rainfed rice cultivation technologies is developed.	**<Indicator 2-1>** Effective technologies of rainfed lowland rice cultivation are confirmed.	**<Achieved>** The following rainfed rice cultivation technologies were identified: (i) Bund making, (ii) Levelling, (iii) Straight row transplanting, (iv) Straight row direct planting, (v) Fertilizer application, and (vi) Use of improved varieties. At each agricultural training institute, a rainfed upland rice cultivation technology training course (NERICA training) and a rainfed lowland rice cultivation technology training course (lowland training) were developed to introduce these rice cultivation technologies.
	<Indicator 2-2> At least 25% of key farmers and intermediate farmers of rainfed upland and rainfed lowland rice cultivation courses evaluate that their paddy production technologies are improved after 2 cropping seasons.	**<Achieved>** Of the farmers who participated in the NERICA training or the lowland training (including neighboring farmers), the percentages of farmers who adopted and practiced the above rice cultivation technologies after participating in the training were: (i) Bund making (60.1%), (ii) Levelling (64.9%), (iii) Straight row transplanting (22.9%), (iv) Straight row direct planting (26.4%), (v) Fertilizer application (29.5%), (vi) Use of improved varieties (18.4%), and the average was 44.0%.
	<Indicator 2-3> Extension materials for extension officers and farmers are developed.	**<Achieved>** Ten types of extension materials for agricultural extension officers and farmers on the NERICA training and the lowland training were developed and revised as needed throughout the training implementation.
	<Indicator 2-4> At least 45% of participants of the training (key and intermediate farmers) are women.	**<Achieved>** A total of 8,194 key and intermediate farmers participated in the NERICA training and the lowland training (749 in NERICA and 7,445 in lowland), of which 4,011 were women (360 in NERICA and 3,651 in lowland), for a female participation rate of 49.0%.
Output 3 The subject-matter training courses on the value chain of rice industry are strengthened.	**<Indicator 3-1>** Subject-matter training courses are identified.	**<Achieved>** Based on local needs, the following courses were identified: (i) Irrigation scheme management, (ii) Gender, (iii) Marketing, (iv) Post-harvest technology, and (v) Agricultural machinery. Irrigation scheme management and Gender were also implemented in TANRICE1, while the remaining courses were newly introduced in this project.
	<Indicator 3-2> At least 120 subject-matter training courses are conducted.	**<Achieved>** A total of 193 courses were conducted for the subject-matter training courses, of which (i) 61 on Irrigation scheme management, (ii) 38 on Gender, (iii) 34 on Marketing, (iv) 4 on Post-harvest technology, and (v) 56 on Agricultural machinery.

	<Indicator 3-3> Teaching materials, pamphlets, etc. for respective subject-matter training courses are prepared and utilized.	**<Achieved>** Teaching materials, pamphlets, etc. for each of the subject-matter training courses were prepared by the task groups in charge of each course and utilized in the training.

Source: *The Project for Supporting Rice Industry Development in Tanzania (TANRICE2) Final Report*, JICA, December 2019

Target Sites and Farmers for Qualitative Survey

Area	Site	Training Participated	Target Farmers
Kilimanjaro Region	Mtambo irrigation scheme, Hai District (Irrigated rice cultivation area)	Irrigated rice cultivation technology training	■ Farmers participating in the training (2 males and 2 females) ■ Non-participating farmer (1 male)
	Mawala irrigation scheme, Moshi District (Irrigated rice cultivation area)	Irrigated rice cultivation technology training	■ Farmers participating in the training (2 males and 2 females) ■ Non-participating farmers (2 males)
Morogoro Region	Mlali irrigation scheme, Mlali, Mvomero District (Irrigated rice cultivation area, Rainfed upland rice cultivation area)	Irrigated rice cultivation technology training, NERICA training, Gender training	■ Farmers participating in the training (2 males and 2 females) ■ Non-participating farmer (1 female)
	Melela, Mvomero District (Rainfed upland rice cultivation area)	NERICA training	■ Farmers participating in the training (1 male and 2 females) ■ Non-participating farmers (1 female)
	Kolela, Morogoro Rural District (Rainfed upland rice cultivation area)	NERICA training	■ Farmers participating in the training (2 males and 1 female) ■ Non-participating farmer (1 female)
Zanzibar	Bumbwisudi irrigation scheme, West Unguja District (Irrigated rice cultivation area)	Irrigated rice cultivation technology training, Irrigation scheme management training, Gender training, Post-harvest technology training	■ Farmers participating in the training (2 males, 2 females) ■ Non-participating farmer (1 male)
	Chutama, North District A (Rainfed upland rice cultivation area)	NERICA training	■ Farmers participating in the training (1 male, 1 female)
	Kwagube, North District B (Rainfed upland rice cultivation area)	NERICA training	■ Farmers participating in the training (1 male, 1 female) ■ Non-participating farmer (1 female)
	Muyuni, South Unguja District (Rainfed lowland rice cultivation area)	Lowland training, Gender training	■ Farmers participating in the training (1 male, 1 female) ■ Non-participating farmer (1 female)
	Mchangani, Central Unguja District (Rainfed lowland rice cultivation area)	Lowland training	■ Farmers participating in the training (1 male, 1 female) ■ Non-participating farmer (1 female)
Total number of farmers interviewed	■ 30 farmers participating in the training (16 for the irrigated rice cultivation technology training, 4 for the lowland training, and 13 for the NERICA training, of which 3 farmers from Mlali, Mvomero District, Morogoro participated in both irrigated rice cultivation technology and NERICA training) ■ 10 non-participating farmers		