

Republic of Uganda

FY2016 Ex-Post Evaluation of Technical Cooperation Project

“Technical Assistance Support to Sustainable Irrigated Agriculture Development Project  
in Eastern Uganda”

External Evaluator: Isao Dojun, Chuo Kaihatsu Corporation

## **0. Summary**

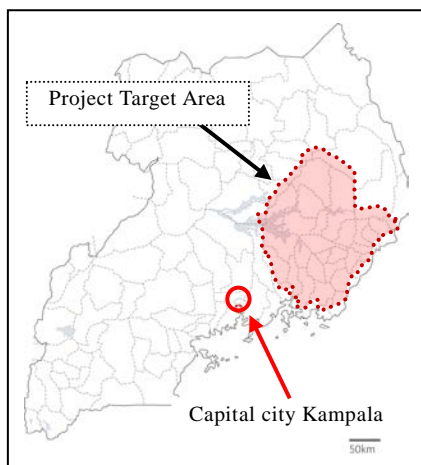
The Project has been conducted by the Ministry of Agriculture, Animal Industry and Fisheries (hereinafter referred to as “MAAIF”) as the implementing agency and has been targeted at agricultural officers and smallholders in 22 districts of Eastern Region of Uganda with the aim to increase the productivity and production of rice of smallholder farmers through training and extension of irrigated rice cultivation techniques.

Specifically, the agricultural officers from the 22 districts received training on techniques of irrigated agriculture, usage of appropriate agricultural machinery, marketing and organizing farmers’ groups and so on. By enhancing the capability of agricultural officers necessary for training and extending the irrigated rice cultivation techniques and also strengthening the extension system, the Project supported the training of irrigated rice cultivation techniques by trained agricultural officers to smallholder farmers.

The Project, aims to increase rice production and productivity, holds a high relevance as it is consistent with the Ugandan development policies and development needs at the times of planning and project completion and also the Japan’s ODA policy at the time of planning. The Project Purpose has been achieved, while the Overall Goal is predicted to have been achieved, however it cannot be fully confirmed quantitatively and qualitatively. Therefore, the effectiveness and impact are evaluated as fair. Since the Project cost is within the plan and the Project period is as planned, the efficiency of the Project is high. As an organizational issue, there is a need to reinforce the stationing of agricultural officers. As a technical issue, there is a need to implement training on irrigated rice cultivation for the newly recruited agricultural officers, and as financial aspect, there is a need to increase the budget especially for extension activities. In other words, there are partial problems in organizational, technical and financial aspects; therefore, the sustainability of the effects manifested by the Project is evaluated as fair.

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

## 1. Project Description



Project Location (Eastern Region)



Irrigated Rice Cultivation  
(Project Site in Nakaloke Sub-country, Mbale District)

### 1.1 Background

Agriculture is a key industry of Uganda. It contributes to about 20% of GDP, 48% of export earnings and employs about 73% of the labor force. The Government of Uganda (hereinafter referred to as “GoU”) has been implementing poverty reduction policies based on the *Poverty Eradication Action Plan* (hereinafter referred to as “PEAP”<sup>1</sup>)(revised versions 2004/5-2007/8). It is especially considered that the agricultural is an essential sector for attaining two subjects (economic management, and production/competitiveness/income) among five important subjects<sup>2</sup> described in the PEAP. GoU also prepared *Plan for Modernisation of Agriculture* (PMA<sup>3</sup>) as a sector program, which aims to shift over the commercial farming.

There are many wetlands, and paddy rice cultivation is popular in the Eastern Region. However, most of small-scale farmers practice extensive paddy rice cultivation (using floodplain and depending on rainwater), and they do not adopt well the basic rice cultivation techniques such as appropriate land preparation, selection of rice seeds, line planting<sup>4</sup>, weeding, and harvest at appropriate timing etc. There were many irrigation and drainage schemes where operation and maintenance of facilities in the scheme were not appropriately carried out and there were many places where rehabilitation was necessary. Then, difficulties on securing stable irrigation water and irrigation water management during cropping season were the main obstacles for stable or increased rice production.

In this circumstance, GoU requested the Government of Japan (hereinafter

<sup>1</sup> The first edition was established in 1997.

<sup>2</sup> 1) economic management, 2) production/competitiveness/incomes, 3) human resources development, 4) security, conflict resolution and disaster management, 5) governance

<sup>3</sup> Issued in 2000

<sup>4</sup> The method in which the young rice plant is planted in one line in paddy field.

referred to as “GoJ”) to conduct a study necessary for developing irrigated agriculture which targets paddy rice cultivation in the Eastern Region of Uganda. Thereafter, Japan International Cooperation Agency (hereinafter referred to as “JICA”) supported implementation of the “Study on Poverty Eradication through Sustainable Irrigation Project in Eastern Uganda” from November 2003 to March 2007. During this study, a verification study on simple paddy rice cultivation techniques which are adaptable on conditions in the Eastern Region (where paddy rice cultivation is widely practiced) and paddy rice production skills were transferred to the Ugandan counterpart personnel.

After the completion of the study, GoU evaluated the results of the study and GoU requested to GoJ implementation of a technical cooperation project for improving irrigated rice cultivation techniques and extension system in the 22 districts in the Eastern Region. This three-year technical cooperation project started June 2008 and ended in June 2011.

#### 1.2 Project Outline

Overall Goal		Rice production is increased in the districts in the Eastern Region of Uganda
Project Purpose		Production and productivity of rice are increased through introduction of sustainable irrigated agriculture techniques in the Project Sites <sup>5</sup> .
Output(s)	Output 1	Capacities necessary to provide training and extension on irrigated rice production techniques to the smallholders are developed among the District Agricultural Officers (DAOs) in the target area.
	Output 2	Irrigated rice cultivation techniques are promoted among smallholders in the Project Sites.
Total cost (Japanese Side)		328 million yen
Period of Cooperation		June 2008 – June 2011
Implementing Agency		Ministry of Agriculture, Animal Industry and Fisheries
Other Relevant Agencies/		1) National Agricultural Research Organization (NARO), 2) National Crops Resources Research Institute (NaCRRI)

<sup>5</sup> These are sites where training and demonstration plots are prepared for irrigated rice cultivation. This is where the training for farmers was conducted. During the Project period, a total of 59 Project Sites were set up in 21 districts out of 22 in the Eastern Region. (Partly the upland sites and wetland verification sites are included.) In one (1) district (Amuria District), the district environmental officer worried that if the paddy rice cultivation spreads farmers may exploit wetlands illegally and did not approve of establishing the Site, so the Project Site was not set up.

Organizations	3) National Agricultural Advisory Services (NAADS) 4) District agricultural offices and offices of sub-county in the Eastern Region
Supporting Agency/ Organization in Japan	None
Related Projects	[Technical Cooperation] - Study on Poverty Eradication through Sustainable Irrigation Project in Eastern Uganda (2003-2007) - NERICA Rice Promotion Project in Uganda (2008-2011) - Promotion of Rice Development Project (2011-2018) - Project on Irrigation Scheme Development in Central and Eastern Uganda (2014-2017) [Grant Aid] - The Project for Construction of Rice Research and Training Centre (March 2009)

### 1.3 Outline of the Terminal Evaluation

#### 1.3.1 Achievement Status of Project Purpose at the Terminal Evaluation

While the national average rice yield per unit area in Uganda was 2.4 t/ha in 2008, the achievement in the Project Sites was 1.5 times as much, that is, 3.6 t/ha (2009 or 2010<sup>6</sup>) reaching the target value. Not only the increase of yield per unit, but also the expansion of the area under rice cultivation (approx. 63.5 ha) by the farmers who received training, and the increase of production area by promoting the techniques to other farmers (112 ha) have been reported. Also, preparation of the final version of Group Training program<sup>7</sup> was completed and the Field Training program<sup>8</sup> was also in the finalizing stage. From the above, it was evaluated that there was a high probability for the Project Purpose to be achieved.

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

The example cases of extension among farmers had already been reported, including the presence of agricultural officers who have acquired the irrigated rice

<sup>6</sup> Since the training period using training/demonstration plots differed among Project Sites, it is mentioned as the year 2009 or 2010.

<sup>7</sup> A four-day training course with a program on irrigated rice cultivation mainly targeted at agricultural officers and key-farmers was undertaken. The venue of training was NaCRRI.

<sup>8</sup> The training program for farmers which uses training/demonstration plots at the Project Sites. A total of four times (about half a day each) according to the growth stages (plot preparation, rice nursery and seeding, transplanting, and harvesting) were carried out.

cultivation techniques in almost all of the districts in the Eastern Region, and the fact that the farmers who have participated in the Project were offering technical instruction to other farmers. Therefore, an increase of rice production after the cooperation period had been predicted. Also, 260 promising water sources were identified as a result of investigating a little over 400 water sources in 14 districts out of 22 districts. From this, it was evaluated that the achievement of the Overall Goal was strongly expected even after the period of cooperation if the stakeholders continue to make efforts for further expansion of the outcomes of the Project.

Other impacts were also seen such as income increase and improvement of the livelihood of farmers due to the increase of rice production (rebuilding their houses, earning education fees for children and medical expenses for families and buying bicycles, motorbikes and other durable consumer goods) and some organizational activities by farmers (joint work of irrigated rice cultivation and product sales by mutual aid).

### 1.3.3 Recommendations from the Terminal Evaluation

#### (1) Items to be completed before the end of the Project

A workshop is to be held for the agricultural officers and farmers who have participated in the activities to share their experiences. An investigation of the yield of the rice harvested at the Project Sites after the Terminal evaluation is to be carried out. Overall wrap-up of the outputs of the Project would take place.

#### (2) Items to be implemented after the end of the Project

- a. Efforts for continuing the training and exhibition activities targeted at farmers (Sufficient budgetary measure for rice cultivating technique instruction and extension activities)
- b. Promotion of consultation by related organizations on the productive usage of wetlands (The future maintenance and management of wetlands and their sustainable usage are to be discussed further among related organizations including working-level personnel.)

## **2. Outline of the Evaluation Study**

### 2.1 External Evaluator

Isao Dojun, Chuo Kaihatsu Corporation

### 2.2 Duration of Evaluation Study

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

Duration of the Study: September 2016 – January 2018

Duration of the Field Study: January 15, 2017 – March 3, 2017 and May 1, 2017 – May 14, 2017

### 2.3 Constraints during the Evaluation Study

In order to evaluate the achievement of the Overall Goal with numerical data, rice production data in each district is necessary. There are statistical data of at the national annual rice production level; however, data at the district level does not exist. (The production data by district are collected only at the time of agricultural census. The most recent census was conducted in 2008, and before that, in 1990.) Also, according to the hearing surveys from rice-related officials at MAAIF and rice cultivation researchers at NaCRRI, the credibility of the national annual rice production data was not regarded as high. Therefore, it was difficult to judge and evaluate based on reliable rice production data.

## 3. Results of the Evaluation (Overall Rating: B<sup>9</sup>)

### 3.1 Relevance (Rating: ③<sup>10</sup>)

#### 3.1.1 Consistency with the Development Plan of Uganda

At the time of the planning, PEAP (revised versions 2004/5-2007/8) had presented national strategies for agricultural modernisation and employment creation and also the poverty eradication action plan. In the PMA based on PEAP, the rice cultivation was identified as an effective means to improve the income and the living standards of poor farmers and to better secure food security. At the time of project completion, agriculture was recognized as one of the most important sectors in the *National Development Plan (2010-2014)*. Furthermore, the *Development Strategy and Investment Plan (DSIP: 2010/11-2014/15)* placed high importance on rice production increase and productivity improvement, reinforcement of extension capability and extension system. Also, the *Uganda National Rice Development Strategy 2009-2018* (hereinafter referred to as “UNRDS”) had held up the target of increasing the rice production by 3.8 times in ten (10) years. Therefore, the Project holds a high consistency with the national development policies and agriculture-related policies at the time of planning and project completion.

#### 3.1.2 Consistency with the Development Needs of Uganda

At the time of planning, rice was starting to establish itself as the staple food in Uganda. As it had higher market value compared to maize and other crops, there was high motivation towards rice cultivation among farmers. In the Eastern Region of Uganda, there was the need for utilizing the water resource and promoting the irrigated rice

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<sup>9</sup> A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

<sup>10</sup> ③: High, ②: Fair, ①: Low

cultivation which enables stable and high yield. The terminal evaluation report<sup>11</sup> stated that the increasing demand of rice has led to the rising importance of rice as food crop not only as cash crop and also that the irrigated paddy rice cultivation techniques introduced by the Project was low-cost so that it could be easily applied by farmers. Therefore, the contents of the Project were an appropriate response to the needs of targeted areas and the rice crop farmers who are to benefit. In summary, it can be evaluated that the Project was consistent with the Ugandan development needs at the time of planning and completion.

### 3.1.3 Consistency with Japan's ODA Policy

At the time of planning, the basic policy of the Japanese Official Development Assistance (hereinafter referred to as "ODA") for Uganda (Ministry of Foreign Affairs Country-wise Data Book, 2008 version) had identified agricultural development (promotion of rice and increasing added value of agricultural products) as one of the priority areas. Also, one of the goals held up at the fourth Tokyo International Conference on African Development (TICAD IV: 2008) was to "promote rice production with the aim to double it in African countries in the coming decade, through a systematic crop management method and capacity development to adopt new methods such as expanding the use of New Rice for Africa (hereinafter referred to as "NERICA")". Here, we can see the consistency with the Project.

Furthermore, JICA launched the Coalition for African Rice Development (hereinafter referred to as "CARD") with other donors in 2008. With the aim of doubling the African rice production from 14 million tons to 28 million tons by 2018, JICA has been supporting to shape the national rice promotion strategies of CARD participants (23 countries, Uganda is one of them) and aiding to increase rice production according to the strategy of each country. Therefore, the Project shows high consistency with Japan's development aid policies at the time of planning.

This project was highly relevant to the development plan and development needs of Uganda, as well as Japan's ODA policy. Therefore, its relevance is high.

## 3.2 Effectiveness and Impact<sup>12</sup> (Rating: ②)

### 3.2.1 Effectiveness

#### 3.2.1.1 Project Output

##### (1) Status of Achievement of Output 1

Output 1 is to have the "Capacities necessary to provide training and extension on irrigated rice production techniques to the smallholders are developed among the District Agricultural Officers (DAOs) in the target area", for which two indicators have

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<sup>11</sup> The terminal evaluation was conducted in April 2011, two months before the Project completion (June 2011). Therefore, information obtained at the terminal evaluation can be regarded as situation at the Project completion.

<sup>12</sup> Sub-rating for Effectiveness is to be put with consideration of Impact

been set up.

As shown in Table 1, both indicators have been achieved at the time of project completion. In other words, the training program on irrigated rice cultivation techniques for agricultural officers has been developed, the agricultural officers in the target area received the training, and later, they actually implemented the extension activities to farmers. Through these, it can be judged that the capacities of agricultural officers on training and extension on irrigated rice production have been enhanced, thus Output 1 has been achieved.

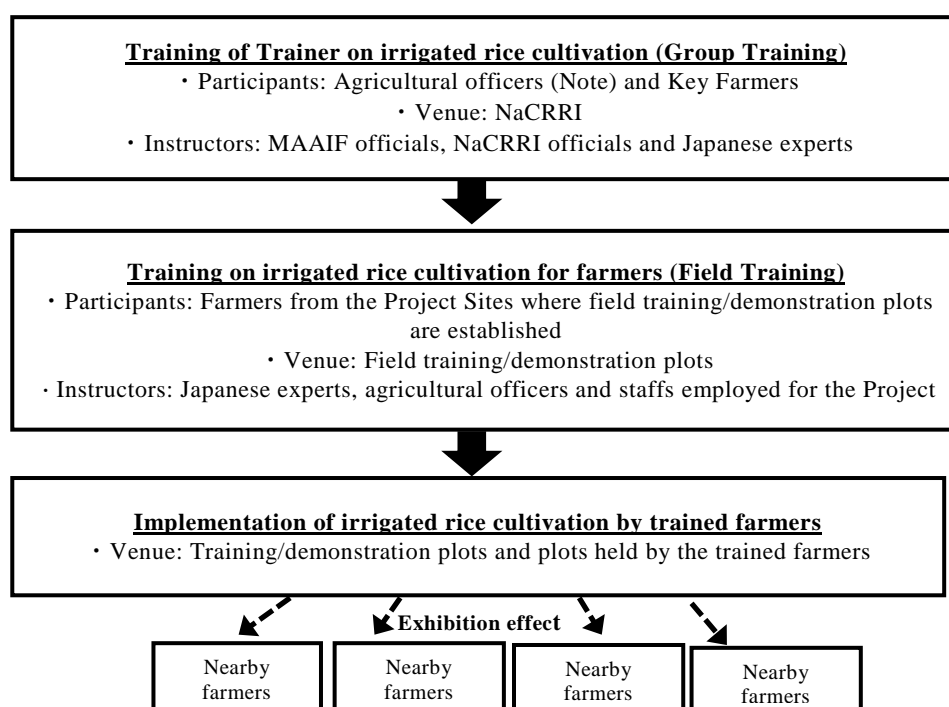
For reference, Figure 1 shows the flow of dissemination of irrigated rice cultivation techniques in the Project.

Table 1: Status of Achievement of Indicators for Output 1

Output	Indicators (Target)	Achievement at the Time of Project Completion	Status of Achievement
Capacities necessary to provide training and extension on irrigated rice production techniques to the smallholders are developed among the District Agricultural Officers (DAOs) in the target area.	1-1 Training program on irrigated rice cultivation techniques for DAOs is developed	Group training program for agricultural officers and key farmers had been already finalized at the time of terminal evaluation.	Achieved
	1-2 More than 60% of the trained DAOs disseminate the irrigated rice cultivation techniques to the smallholders in the target area.	Group training for agricultural officers and key farmers have been implemented 22 times in total with a gross total of 319 participants (189 agricultural officers/ agricultural officers, 112 key farmers and 18 others). According to the questionnaire implemented during the Project period, 48 agricultural officers (98 %) out of 49 valid respondents are engaged in instruction of irrigated rice cultivation techniques to the farmers in respective area. The ratio exceeded the target indicator (60%). Furthermore, 18 agricultural officers (37 %) out of 49 established training/demonstration plots just like in the Project Sites and have instructed to farmers.	Achieved

Sources: Terminal evaluation report and documents provided by JICA





Note: Agricultural officers are placed at district agriculture offices or sub-county offices. They belong to NAADS or MAAIF.

Figure 1: The extension flow of irrigated rice cultivation techniques in the Project

## (2) Status of Achievement of Output 2

Output 2 is to have “Irrigated rice cultivation techniques are promoted among smallholders in the Project Sites”, for which two indicators have been set up. As shown in Table 2, the two indicators have been achieved at the time of Project completion. Field trainings for farmers have been implemented at a total of 59 Project Sites in 21 among 22 districts in the Eastern Region. The cumulative total of 817 farmers, which considerably exceeded the target number of 440, received the training by the completion of the Project, 66% of which actually applied irrigated rice cultivation techniques. Establishing the Project Sites (training and demonstration plots) and extending the irrigated rice cultivation in a pilot plot way have achieved a major effect. Therefore, it is confirmed that Output 2 has been achieved.

Table 2: Status of Achievement of Indicators for Output 2

Output	Indicators (Target)	Achievement at the Time of Project Completion	Status of Achievement
Irrigated rice cultivation techniques are promoted among smallholders in the Project	2-1 More than 440 smallholders participate in the Field Training.	Field training for irrigated rice cultivation (partly including upland sites and wetland verification sites) has been conducted at a total of 59 Project Sites in 21 districts among 22 in the Eastern Region. The gross total number of participants is 817, exceeding the target number of 440.	Achieved

Sites	2-2 At least 220 smallholders apply the irrigated rice cultivation techniques.	<p>Out of a gross total of 817 farmers who have received the training, 540 farmers (66%) have already been applying irrigated rice cultivation techniques. Therefore, the number of farmers that apply the irrigated rice cultivation techniques has surpassed the target number.</p> <p>The terminal evaluation report states that the farmers at the Project Sites appreciated the effects of the techniques trained in the Project and were eager to apply the techniques. Also, from the interviews with farmers made at the terminal evaluation, it is reported that farmers highly evaluated the effects of new techniques such as less seed requirements, reduction of weeding labor, and increase of yields.</p> <p>The trainings of irrigated rice cultivation techniques for smallholders were conducted at training/demonstration plots, 4 times in total during one cropping season, according to the growth stages. Specifically, these four periods are: 1) land preparation, 2) rice nursery and seeding, 3) transplanting and 4) harvesting. The training was not planned to study all cultivating techniques from plot preparation to post-harvest treatment in one training, but rather to learn by actually implementing the techniques at important periods of rice cultivating cycles and thereby learn techniques. Also, it was easy to confirm the effects of training by the growth situation and yields of rice. These points contributed to the establishment of techniques among farmers.</p>	Achieved
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Sources: Terminal evaluation report and documents provided by JICA

### 3.2.1.2 Achievement of Project Purpose

The Project purpose is to see that “production and productivity of rice are increased through introduction of sustainable irrigated agriculture techniques in the Project Sites.” As preparation of the field training program for smallholders was completed and the sustainable irrigated rice cultivation techniques were introduced through training, there were 1.5 times more yields (3.6 t/ha) in the Project sites compared to the average yield in 2008 (The rice productivity increased.) Also, as the trained agricultural officers extended the techniques to farmers, the target area saw the extension of techniques (The production increased.)

As shown in Table 3, all indicators have been achieved by time of Project

completion. It is confirmed that the Project purpose to increase rice productivity and production through introduction of sustainable irrigated agriculture techniques has been achieved.

Table 3: Achievement of Project Purpose

Project Purpose	Indicator	Achievement at the Time of Project Completion	Status of Achievement
Production and productivity of rice are increased through introduction of sustainable irrigated agriculture techniques in the Project Sites.	1. Rice yield per unit area is increased at least to 1.5 times more in the Project sites compared to baseline figure in the UNRDS in 2008.	Rice yield per unit area in the UNRDS in 2008 was 2.4t/ha on average. Yield surveys were carried out during the Project period. Specifically, the data from 30 out of 54 Project Sites (at the time of the terminal evaluation) were derived. The data of yield per unit area ranged from 0.5 t/ha to 7.6 t/ha and it was 3.6 t/ha on average. The performance yield per unit area of the Project sites (3.6 t/ha) is 1.5 times more than the average of 2.4 t/ha in 2008. Therefore, the indicator 1 has been accomplished.	Achieved
	2. More than 110 ha of farmlands are planted with rice with application of the techniques introduced by the Project in the areas covered by the trained district agricultural officers (DAOs).	The area in which the techniques introduced by the Project have been applied is 109 ha in the areas around the Project sites. According to the investigation targeted at agricultural officers, the cultivation techniques have been applied to approximately 112 ha of farmlands outside the areas of Project sites. Therefore, the indicator 2 has been achieved.	Achieved
	3. Training programs on rice cultivation techniques suitable to specific local conditions for smallholders are identified.	The field training program which is the training program for smallholders has been finalized by the time of project completion. Therefore, the indicator 3 has been achieved.	Achieved

Sources: Terminal evaluation report and documents provided by JICA

### 3.2.2 Impact

#### 3.2.2.1 Achievement of Overall Goal

As the smallholders in the Project sites of the Project acquired and implemented appropriate irrigated rice cultivation techniques, their rice productivity and production increased. The rice cultivation areas of the farmers who received training expanded; at the same time, the irrigated rice cultivation techniques were extended to the farmers in the vicinity so that new farmers started to grow rice. After the Project completion, the “Promotion of Rice Development Project” (hereinafter referred to as “PRiDe Project”) started, in which the training for agricultural officers and that for farmers were implemented nationwide. The training were conducted in approximately half of the

districts in the Eastern Region, which have contributed to the increase of irrigated rice cultivation and upland rice cultivation farmers and growth of rice production in the region. Since there is no statistical data for rice production by district and it is difficult, at the time of ex-post evaluation, to confirm how much the rice production has increased in the Project target area (Eastern Region), the level of achievement was verified by beneficiary survey<sup>13</sup>, interview surveys and national rice production statistics. It has been acknowledged from the information confirmed qualitatively that the rice production in the Eastern Region has increased; however, there is no sufficient proof whether the target value has been achieved. Therefore, the achievement level of Overall Goal is evaluated as fair.

Table 4: Achievement of Overall Goal

Overall Goal	Indicator	Actual
Rice production is increased in the Districts in the Eastern Region of Uganda.	Rice production in the Districts in the target area is increased 1.5 times more compared to the time of commencement of the Project by the year 2014.	There is no statistical data on rice production by districts. From the results of the beneficiary survey, the rice production before receiving the training was 0.98 tons per farmer/household, which almost doubled to 1.83 tons per farmer/household after the training (in average). (The farmers who have not received training showed production of 1.08 tons per farmer/household, which slightly surpassed that of the participating farmers before receiving the training.) Also, judging from the results of hearings from agricultural officers <sup>14</sup> and rice millers' staff members <sup>15</sup> (See Tables 5 and 6), it is certain that the number of rice farmers and the production of rice are increasing in the Eastern Region as a general trend. It is confirmed that the number of rice millers has steadily increased during the last 5 years (See Table 7). However, since the information from the officers at the district agricultural offices and rice milling staff members are not in accordance with any records or data, there is no way to assert that the production has increased by more than 1.5 times. In addition, as for the Ugandan national rice production data, it was 177,857 tons at the time of the start of the Project and 237,000 ton in 2014, which is 1.3 times more, but not reaching 1.5 times.

<sup>13</sup> Ten districts out of 22 in the Eastern Region were randomly selected (by using the random formula of Excel software) for the beneficiary survey. One Project Site was chosen for each district to conduct questionnaire survey from 12 farmers. In 1 Project Site, however, the number of farmers did not reach 12, so the questionnaire survey was conducted in a Project Site in another district. Therefore, the number of districts surveyed was 11. Questionnaire surveys were targeted at irrigated rice cultivating farmers in the vicinity of the Project Site location. (The information on irrigated rice farmers was obtained from influential people in the area where the Project Site is located, after then, hearings were made from those farmers who could be interviewed on the day of survey, including both farmers who have received training and those that did not.) 175 farmers were surveyed and the valid respondents are 175, too. 135 farmers (77 %) were those who had received the Project's training and 40 (23 %) were those who had not received the training. 125 farmers (71 %) were male and 50 (29 %) were female. The 11 districts surveyed were Budaka, Butaleja, Iganga, Kumi, Manafwa, Mayuge, Mbale, Namutumba, Pallisa, Sironko and Tororo.

<sup>14</sup> Hearings were conducted at 10 district agricultural offices out of 11 districts where the beneficiary survey was carried out. Hearings were conducted to 1 or 2 officer(s) at each district (17 officers in total).

<sup>15</sup> Hearings were conducted at rice millers located in 8 districts (one location in each district) out of 11 districts where the beneficiary survey was carried out.

Table 5: Results of Hearings from District Agricultural Offices on the Changes in Rice Cultivation Areas and the Number of Rice Farmers

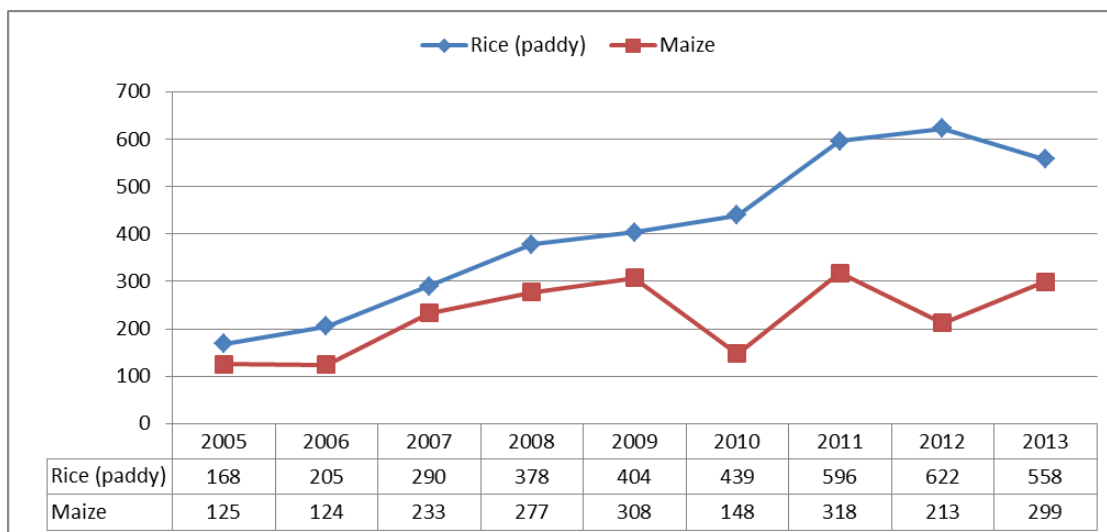
	District	Rice cultivation areas	Number of rice farmers
1	Mayuge	[Prominently increased] - The rice cultivation areas in the district are prominently increasing. - Rice cultivation is found in most of the wetlands.	[Increased] - Even if there is an influence of climate change, harvest is possible to some degrees. So, many farmers are growing rice utilizing the wetlands.
2	Iganga	[Increased] - The rice cultivation area has increased due to the following two reasons: 1. Rice is a crop with a market and stable price (See Figure 2), thus an important source of income for the family budget compared to other crops (maize and sweet potato). 2. The staple food so far had been maize, sweet potato and cassava, but since they are influenced by climate changes (drought), the importance of rice as a staple food is increasing. - After this JICA Project was completed, the rice cultivation area increased prominently. At present, rice is cultivated in most of the wetlands.	[Increased: about 200 %] - The number of farmers who apply irrigated rice cultivation is increasing. It is estimated to have doubled approximately. Many farmers are going into the wetlands and cultivating rice. - Rice can be cultivated in wetlands and even if there is an influence of climate change, harvest is possible to some degrees. Therefore, farmers are willing to apply irrigated rice cultivation.
3	Namutumba	[Increased: approx. 10 to 30%] - There are many places suitable for irrigated rice cultivation, and the cultivation area is increasing. In comparison to 2008/09, an increase of 10 to 30% is estimated. Rice is one of the most important crops in the district, and its productivity is prominently increasing.	[Increased: approx. 10%] - Rice farmers should have increased by approx. 10%. Although there is no accurate data, rice farmers are estimated to be approx. 10,000 households.
4	Butaleja	[Increased: approx. 50%] - The rice cultivation area in the district increased by approx. 50%. - Most of the wetlands were developed for rice cultivation. About 50% of the wetlands were used for rice cultivation at the time of training in the Project; at present, all areas of wetlands are used for rice cultivation.	[Increased: approx. 40%] - Irrigated rice cultivation farmers have increased by approx. 40%.
5	Budaka	[Increased: approx. 40%] - In all areas of the district, the irrigated rice cultivation areas are increasing. The rice cultivation area is estimated to have increased by approx. 40%. However, since the wetlands have been utilized to the maximum with rice cultivation, there is a problem in getting more usable farmlands for expanding the cultivation area. From now on, there is a need to increase the productivity (yield) in the	[Increased: approx. 50%] - Since the fertile soils in wetlands are better than those in uplands, the irrigated rice cultivation farmers are increasing. The rice farmers have increased by approx. 50%. There are some farmers who rent the farmland in wetlands far away from their house and conduct rice cultivation.

		existing rice farmlands. - For the upland rice, the problem of parasitic plant has emerged. Therefore, there is a shift from upland rice to paddy rice.	
6	Tororo	[Increased] - The rice cultivation area in the district has increased. Before the Project was implemented, there were not many wetlands with rice cultivation. At present, rice cultivation is implemented in most of the wetlands.	[Increased: approx. 30%] - The number of irrigated rice cultivation farmers (households) has increased by about 30%. Farmers are focusing on rice cultivation which can be a constant source of income, and are going into the wetlands. Rice is an important crop for income and food. - On the other hand, the number of upland rice farmers has not risen very much due to climate risk.
7	Mbale	[Increased: approx. 50%] - The rice cultivation area in the district has increased (approx. 50%). Most of the increase is in wetlands (Most wetlands were developed for rice cultivation). Upland rice farmers are affected by drought.	[Increased: approx. 40%] - The number of irrigated rice cultivation farmers (households) has increased (approx. 40%). - In this district, the rice is one of the important crops. The farmers in the area of high altitude are coming to the wetland to cultivate rice. The reasons for the increase of rice farmers are the price stability of rice and the existence of a market compared to other crops.
8	Manafwa	[Not increased very much] - The upland rice cultivation area is decreasing because the yield of upland rice is low. On the other hand, the area of irrigated rice cultivation is still limited.	[Not increased very much] - The farmers are highly interested in rice cultivation. However, as there are little wetlands, increase in the number of farmers is limited.
9	Sironko	[Increased] - Most of the wetlands in the district have been developed for rice cultivation and rice is grown. Some farmers are looking for wetland in other districts in order to conduct irrigated rice cultivation.	[Increased] - Because of its high profitability, many farmers are engaged in rice cultivation. There are farmers who rent the land to cultivate rice.
10	Kumi	[Had increased] - The rice cultivation area had increased until the drought damaged the rice last year.	[Increased] Many farmers are cultivating rice as a cash crop.

Source: Result of the hearing survey from the staffs at the district agricultural offices (at the time of ex-post evaluation)

(Note: This information was achieved by visiting each district agricultural office and asking one or two staffs about the recent trend (of approx. past 5 years). The information on increase rate is according to the respondents' subjective information, and not based on records.

(Unit: US Dollars/ton)



Source: Data from *Technical Note: analysis of price incentives for Rice in Uganda for the time of 2005-2015*, FAO and *Technical Note: analysis of price incentives for Maize in Uganda for the time of 2005-2015*, FAO have been used to draw this graph.

Figure 2: The change in prices of rice and maize at farm-yard level

Table 6: Result of the Hearing Survey from Rice Millers on Changes of Rice Production and the Number of Rice Farmers

	District	Rice production	Number of rice farmers
1	Mayuge	Increased: approx. 50%	Increased: approx. 20%
2	Iganga	Increased: approx. 10%	Increased
3	Butaleja	Increased	Increased
4	Budaka	Increased	Increased
5	Tororo	Increased	Increased
6	Mbale	Increased	Increased
7	Sironko	Increased	Increased
8	Kumi	Increased	Increased

Source: Result of the hearing survey from the rice millers (at the time of ex-post evaluation)

(Note: This information was achieved by asking rice millers' staff members about the trend of recent years. The information on increase rate is according to the respondents' subjective information, and not based on records.)

There were 22 districts in the Eastern Region at the time of the start of the Project; however, the number has increased to 32 at the time of ex-post evaluation, according to the division of districts due to population growth. Table 7 summarizes the result of hearing surveys conducted at 8 rice millers in 8 districts. Five (5) out of 8 have been established after project completion (from 2012 on). Also, 7 out of 8 have responded that privately managed rice mills are increasing in recent years. Generally speaking, rice mills increase when the rice brought into the rice millers shows such an increase that the

capacity at the existing rice mills cannot handle the milling (in other words, when the waiting time for rice milling becomes longer). According to the hearings from rice millers, the reasons for the increase in the number of rice mills are the increase of rice cultivating farmers and the growth of rice production<sup>16</sup>. Although these hearings do not provide quantitative data of how much the rice farmers and rice production has increased, it sufficiently suggests that there is a possibility of prominent increase in rice production.

Table 7: Changes in the Number of Rice Millers in Recent Years

	District	Location of the rice miller (private) where a hearing was conducted	Year of start-up and number of employees *1	Number of rice mills in the vicinity of the rice mill where a hearing was conducted *2	Change in the number of rice mills in recent years (Number in parenthesis is the increased number of rice mills from 2012 and on, after project completion)*3
1	Mayuge	Town Council	<b>2012</b> (19)	3	Increased (1)
2	Iganga	Town Council	<b>2012</b> (13)	3	Increased (1)
3	Butaleja	Town Council	2010 (4)	8	Increased from 2 to 8 in the past 5 years (6)
4	Budaka	Kamonkoli S/C	<b>2014</b> (9)	6	Increased from 2 to 6 in the past 3 years (5)
5	Tororo	Western Division S/C	2007 (3)	5	Increased from 2 to 5 in the past 5 years (3)
6	Mbale	Mbale town	<b>2012</b> (8)	15	Increased from 11 to 15 in the past 5 years (5)
7	Sironko	Town Council	<b>2014</b> (21)	0	Increased from 0 to 1 (Only 1 in the district) (1)
8	Kumi	Town Council	2008 (5)	7	Increased from 5 to 7 last year (2)
number of employees per rice miller (in average)			10.25		Increased by 24 locations on and after 2012 onward 24 locations.

\*1 Including both regular staffs and seasonal employment.

\*2 Excluding the rice mill where the hearing was conducted.

\*3 Including the rice mill where the hearing was conducted, if it was established from 2012.

### 3.2.2.2 Other Positive and Negative Impacts

#### (1) On gender aspect

In the beneficiary survey, we asked if it is a male or female who does the majority of the farm-work for rice cultivation (land preparation, seeding, fertilization and pesticide spraying, weeding, harvesting and marketing/rice sales). The results are shown in Table 8. While the marketing is taken charge of by male in higher percentage, other farm-works are taken charge of by both male and female to the degree as high as about 80%.

<sup>16</sup> The rice mills visited were small-scaled, and mill the rice brought in from rice farmers in the neighborhood. They are not the type of mills to process imported rice.



Table 8: Ratio of Male and Female Engaged by Types of Farm-work

(%)

Types of farm-work	Male	Female	Both Male and Female
Land preparation	12.6	7.4	80.0
Seeding	10.3	8.0	81.7
Fertilization and pesticide spraying	13.2	7.5	79.3
Weeding	10.3	8.0	81.7
Harvesting	10.3	7.4	82.3
Marketing (rice sales)	43.7	13.8	42.5
Average	16.7	8.7	74.6

Source: Result of beneficiary survey at the ex-post evaluation period (sample size: 175 households)

Table 9 shows the result of survey who in the household decides how to spend the income gained from rice sales. The highest percentage was the case where both husband and wife make decision, with 63.2%. The second highest was the husband with 22.4%.

Table 9: Decision Maker on How to Spend the Profit

Decision maker	Respondents	Percentage (%)
Husband	39	22.4
Wife	21	12.1
Both husband and wife	110	63.2
Other members of family	3	1.7
Unknown	1	0.6
Total	174	100.0

Source: Result of the beneficiary survey at the ex-post evaluation (sample size: 175 households, 174 valid respondents for this question)

According to the hearings from farmers, rice cultivation requires more labor than cultivating other crops. When they cover that labor with outside laborers, the labor cost will run up, so farmers would try to manage labor within their family as much as possible. As a result, females engage in farm-work jointly with males. Farmers say that this has led to women's having more say in decision making. Out of the 175 households of farmers interviewed in the beneficiary survey, about half of them were those who started irrigated rice cultivation after the beginning of the Project. It is possible to say that at least in the farming households that newly started rice cultivation, the degree of participation for the female in decision-making is increasing through engaging in farm-works for rice cultivation gender-equally.

## (2) Impact on better livelihood of farmers

Of the farmer households that were interviewed in the beneficiary survey, 52.7% of households responded that their rice sales income covers 75% or more of their gross income, which shows that in many farmer households, the percentage of rice sales income out of gross income is high. When comparing the income from rice cultivation of the farmers who participated in the training and those who did not, the former showed 1.78 million Ugandan Shillings (approx. 57,000 Japanese Yen<sup>17</sup>) (per cropping season) and the latter 1.30 million Ugandan Shillings (approx. 41,000 Japanese Yen). There is 0.48 million Ugandan Shillings (16,000 Japanese Yen) difference between the two. As for the rice cultivation area, the average rice cultivation area has increased from the earlier figure of approx. 0.27 ha to the recent 0.44 ha for both farmers who participated in the training and those who did not. However, the yield per unit for the farmers who participated in the training was 2.6 t/ha on average, while it was 1.9 t/ha on average for those who did not participate in the training. The fact that the trained farmers have higher yield per unit area is considered to be the primary factor for the income difference. The realization of higher yield is regarded as the fruit of the training in the Project. Judging from this point, the Project has strongly contributed to a better livelihood of the farmers.

It was confirmed in the beneficiary survey that the main use of the income from rice production included an education fee for children, food and drink for families, healthcare for families, agricultural inputs/materials and so on. Some were able to build a new house or buy a motorbike for starting a transportation business.

## (3) Job creation through rice production growth

The fact that the number of rice mills is increasing by the growth in rice production signifies that the number of workers at the rice mills is rising, although quantitative data has not been acquired. Table 7 showed the results of hearings on the changes in the number of rice mills in recent years. Where the hearings were conducted, at least 24 rice mills have been newly established from 2012. In the 8 rice mills where the hearings were conducted, the number of employees (both regular and temporary) was 10.25 on average. Therefore, it can be assumed that employment for 146 persons has been created in these 8 areas. In addition, it seems that the employment and labor opportunity for the traders who transport harvested rice from rice production farmers to rice mills (transporters who own cars and transporting staffs who use motorbikes) is on the rise.

## (4) Influence to the wetland environment

In the Eastern Region, the irrigated rice cultivation in the wetlands had progressed even before the Project had begun, which had created concerns for its influence on the

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<sup>17</sup> Calculated with JICA's rate for fiscal year 2016 (annual average: 1 Ugandan Shilling = 0.03189 Japanese Yen).

wetland environment. From the 1990s, the GoU had developed a National Policy for the Conservation and Management of Wetland (1995) and also formulated guidelines<sup>18</sup> for wetland conservation and management as measures for the conservation of wetlands. The Project considered wetlands conservation with efforts such as selecting the Project Sites through consulting the district environmental officers and providing explanation in the training for agricultural officers and key farmers on national wetlands policies and guidance not to overexploit wetlands and to take care of their conservation. However, in the hearings from the district agricultural offices at the time of ex-post evaluation, the findings were that it is widely acknowledged that the irrigated rice cultivation in the wetlands has even more progressed. While the expansion of irrigated rice cultivation area in the wetlands has been a tendency before the Project began, it is confirmed with officers of district agricultural offices that the area of irrigated rice cultivation has further expanded after the Project as shown in table 5 and it appears that the planting undertaken exceeds the regulation. (According to the Ugandan rule<sup>19</sup>, crop cultivation is allowed in up to 25 % of wetlands area.) According to staff of the district agricultural offices, main factor of increase of irrigated rice cultivation area in wetlands is higher profitability of rice cultivation in wetlands compared with upland rice cultivation and also cultivation of other crops. Considering that this information is obtained through hearing at limited project area and detailed cause analysis was not able to carry out, relation of cause and effect with the Project can't be confirmed clearly.

#### (5) Land acquisition and resident resettlement

Technical transfer of irrigated rice cultivation techniques to farmers has been carried out using training/demonstration plots constructed at the Project Sites. It is confirmed with the officer in charge of the Project at the implementing agency, MAAIF, that land acquisition and resident resettlement were not occurred at the Project Sites.

The Project saw the advancement of extension services by agricultural officers, application of irrigated rice cultivation techniques by smallholder farmers and contributed to the increase in rice productivity. The Project also contributed to increase of irrigated rice cultivation farmers and rice production in Eastern Region even after the project completion. However, it can't be confirm whether the target of the Project in term of rice production is achieved with sufficient evidences, therefore, effectiveness and impact are evaluated as fair.

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<sup>18</sup> *Guidelines for Paddy Rice Cultivation in Seasonal Wetlands (2001) and Wetland Edge Gardening (2002)*

<sup>19</sup> This is regulated in the *National Environment (Wetlands, River Banks and Lake Shores Management) Regulations* formulated in 2000. In this set of regulations, it is stated that in the case of its violation, there may be a penalty of fine or imprisonment.

### 3.3 Efficiency (Rating: ③)

#### 3.3.1 Inputs

Below are the planned and actual inputs on the Japanese and Ugandan sides of the Project.

Table 10: Planned and Actual Inputs to the Project

Inputs	Plan	Actual (at the Project completion)
(1) Experts	<ul style="list-style-type: none"> <li>● Long-Term 3 persons</li> <li>● Short-Term 10 persons</li> </ul>	<ul style="list-style-type: none"> <li>● Long-Term 3 persons</li> <li>● Short-Term 6 persons</li> </ul>
(2) Trainees received	As required	Total 19 trainees (16 in Japan, 3 in the third country) (Main training topics: irrigation and drainage management, paddy rice cultivation techniques, farmers' groups for water management, agricultural machine improvement, etc.)
(3) Equipment	Vehicles, agricultural machinery	Audio-visual equipment for research, vehicles, office equipment
(4) Operational expenses	88 million yen	41 million yen
Japanese Side Total Project Cost	464 million yen	328 million yen
Ugandan Side Total Project Cost	(not known)	1 million yen

#### 3.3.1.1 Elements of Inputs

For the dispatch of experts, 3 long-term experts<sup>20</sup> and short-term experts from 10 areas<sup>21</sup> were assumed at the time of planning. As an actual result, 3 long-term experts<sup>22</sup> and short-term experts from 6 areas<sup>23</sup> were dispatched. There are some differences between the plan and the actual results; although there is no change in the number of the long-term experts, the chief advisor turned to short-term and a long-term expert on livelihood improvement and project management was sent instead.

As for the short-term experts, there was no need to send experts on rice variety selection proper to the Project, as the NERICA Rice Promotion Project in Uganda (2008-2011), a technical cooperation project, was underway at the same period and the tests for selecting the suitable variety were included in the activity field of NERICA Rice Promotion Project and such experts had already been dispatched. For the fields of remote sensing and marketing, they became unnecessary since there were no activities directly

<sup>20</sup> 1) Chief advisor, 2) Farming/extension, 3) Project coordinator/training

<sup>21</sup> 1) Irrigated agriculture, 2) Farmer's economic survey, 3) Rice variety selection test, 4) Remote sensing, 5) Farming community/organization strengthening/gender, 6) Environmental society consideration, 7) Education material preparation, 8) Agricultural infrastructure development, 9) Post-harvest processing/marketing 10) Agricultural machinery

<sup>22</sup> 1) Project coordinator/training, 2) Farming/extension, 3) Livelihood improvement/project management

<sup>23</sup> 1) Chief advisor, 2) Irrigated agriculture, 3) Small-scale water sources development, 4) Farmer's economic survey, 5) Farmer economy and agricultural survey, 6) Rice cultivation

related to these areas. As for the receiving of trainees, there was no exact number shown at the time of planning (in the ex-ante evaluation sheet). As an actual result, 16 trainees participated in the training in Japan to acquire knowledge on paddy rice cultivation techniques and extension, irrigation and drainage technology, agricultural water management by farmers' groups, improvement of agricultural machinery and so on. Three (3) trainees participated in the training in the third country (Egypt) to acquire the technology of agricultural water management in the field-level (Total of 19 trainees). The equipment was supplied as planned.

#### 3.3.1.2 Project Cost

The actual project cost (328 million Japanese Yen) was 136 million Japanese Yen less than the estimated cost at the time of planning (464 million Japanese Yen) (71 % of the plan). The main reason for this was the reduction of the dispatched short-term experts from the original plan of 10 to 6 and thus the cost was saved. Also, a part of the irrigation facilities in the Project Sites were constructed in a farmer-participation way (labor provided without recompense). While the construction of concrete structures and water source protection facilities were entrusted to the local contractor, easy facility maintenance such as irrigation canals maintenance, paddy plot development and plot leveling were conducted by farmers<sup>24</sup>, which led to the reduction of expense.

#### 3.3.1.3 Project Period

The Project period was planned as 3 years from June 2008 to June 2011. The actual Project period was 3 years from June 2008 to June 2011, exactly as planned.

The project cost was within the plan and project period was as planned. Therefore, efficiency of the Project is high.

### 3.4 Sustainability (Rating: ②)

#### 3.4.1 Related Policy and Institutional Aspects for the Sustainability of Project Effects

After project completion, there have been announcements of new national development plans and agriculture related plans and policies. Also, in the policies and plans that were effective at the time of ex-post evaluation, there is a focus on rice production growth, productivity enhancement and application of irrigation technology. In addition, the strengthening of agricultural extension capability and extension system is focused in agricultural extension policy and strategy.

Specifically, in the plan regarding agricultural field in the *Second National Development Plan (2015/16-2019/20)*, there is a policy to prioritize the investment in 12

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<sup>24</sup> By farmers taking charge of water canal maintenance and paddy plot preparation, they understood the way of developing and maintaining water canals. This led to the effect of enhancing sustainability in managing the canals and also new development of canals by farmers themselves.

types of agricultural commodities, one of which is rice. The items to be focused include 1) strengthening agricultural research, 2) implementing the single spine agricultural extension<sup>25</sup> and 3) technology adaptation at the farm level.

MAAIF's *Agriculture Sector Strategic Plan (2015/16-2019/20)* places rice as one of the prioritized crops. Included in its four items of investment strategies are increasing agricultural production and productivity, and improving service delivery through strengthening the institutional capacity of MAAIF and other agencies. Also, it is shown that investment for irrigation infrastructure is necessary to achieve a rice production growth target. Together with the establishment of the Directorate of Agricultural Extension Services (DAES) (2015) at MAAIF, the *National Agricultural Extension Policy (2016)* and *National Agricultural Extension Strategy (2016/17-2020/21)* were formulated at the end of the year 2016 and the agricultural extension system is being reinforced. There are 4 policy goals stated in the *National Agricultural Extension Policy (2016)*, including building institutional capacity for effective delivery of agricultural extension services and developing a sustainable mechanism for packaging and disseminating appropriate technologies. Furthermore, the Steering Committee for Development of the Rice Industry in Uganda<sup>26</sup> is continuing its activity. According to MAAIF, since the plan period of the current UNRDS ends in 2018 and the period is approaching its completion, MAAIF is showing its intent to formulate the strategy for the next decade from 2018.

From the above, the sustainability of the Project related to policy aspect is evaluated as high.

#### 3.4.2 Organizational Aspects for the Sustainability of Project Effects

At the time of conducting the Project, there was the parallel existence of the extension system by agricultural officers employed by the district agricultural offices and the extension service system by agricultural officers from NAADS. Therefore, the target participants for capability enhancement of irrigated rice cultivation techniques and training were the agricultural officers who were under both systems described above. NAADS organization was reorganized in 2014, 3 years after the Project completion, and all the staffs related to extension were dismissed. Then, the new Directorate of Agricultural Extension Service (DAES) was established inside MAAIF in 2015, and the system was changed into a single spine agricultural extension system in which MAAIF, district agricultural offices and sub-county offices are in line. Accordingly, the

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<sup>25</sup> Until NAADS was reorganized in 2014, there was a parallel existence of the extension service by NAADS employed staff and that by MAAIF agriculture-related staff. After NAADS was reorganized, there remains agricultural extension service by MAAIF only, so it is called the single spine agricultural extension.

<sup>26</sup> The Steering Committee for Development of the Rice Industry in Uganda was established in April 2007. It holds meeting basically twice a year, where stakeholders related to rice gather and raise proposals for future direction of rice sector. Members are MAAIF, National Environment Management Authority, Office of the Vice President, NARO, Ministry of Trade, Industry and Cooperatives, Ministry of Local Government, Uganda National Farmers Federation, Uganda Seed Trade Association, Rice processing association, FAO, JICA and NAADS.

agricultural officers at NAADS who received training in the Project were all dismissed temporarily and the agricultural officers employed by district agricultural offices stayed. Later, a part of the dismissed NAADS officers were reemployed at the district agricultural offices; furthermore from the year 2016, agricultural officers (new recruits) are being increased in district agricultural offices all over the country including the Eastern Region. Continuingly, the augmentation of agricultural staffs is planned in 2017-2018.

The organizational system of the agricultural office in each district is as follows. The office located at the center of a district has jurisdiction over the whole district. There is the district production officer, the district agricultural officer, and officers in charge of agricultural crops, animal husbandry and fisheries. A district is divided into administrative divisions of sub-counties, in each of which there are extension officers for agricultural crops, animal husbandry and fisheries. In case of agricultural crops (including rice), it is set as a target to place an officer in each sub-county. A part of those who were newly recruited and placed in sub-counties is receiving the training on rice cultivation techniques (upland rice cultivation and irrigated rice cultivation) in the PRiDe Project (2011-2018), a technical cooperation project conducted by JICA which is under implementation at the time of the ex-post evaluation. The number of agricultural officers who has acquired rice cultivation techniques is in the stage of increase<sup>27</sup>. The training for agricultural officers is conducted at NaCRRI and the staffs that belong to the crops program at NaCRRI take the role of instructors. The fact that there is no unit in charge of training in NaCRRI organization is a problem to be solved; however, at the time of ex-post evaluation, there is a study going on for establishing a training unit<sup>28</sup>.

As shown above, the extension system at MAAIF and district agricultural offices are being developed on the organizational and personnel aspects, hence it is evaluated that they are in a state in which sustainability can be generally secured if strengthening of organizational structure is executed as planned.

### 3.4.3 Technical Aspects for the Sustainability of Project Effects

In order to sustain the outputs and effects of the Project, it is important for the trained agricultural officers who have acquired the rice cultivation skills to transfer techniques to other agricultural officers who do not hold knowledge of irrigated rice cultivation techniques so that the other officers become able to extend irrigated rice cultivation techniques. It is also essential to extend irrigated rice cultivation techniques to farmers other than those who were the target of extension in the Project by using manuals and materials that have been made on irrigated rice cultivation techniques.

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<sup>27</sup> Currently there are 32 districts in the Eastern Region, out of which 18 districts are the targeted areas of the PRiDe project. The agricultural officers in the district agricultural offices and sub-county offices in these districts received training. The scale of the training was approximately 100 participants per year in 2013 and 2014 and approximately 40 participants per year in 2015 and 2016.

<sup>28</sup> The situation is that it has been drafted where to place the training unit in the organization chart of NaCRRI and also what the roles of the training unit are.

There are opportunities such as internal meetings at district agricultural offices, where the agricultural officers who have acquired rice cultivation techniques transfer skills or share information to other agricultural officers. These occasions are limited but there are times the techniques are maintained. Agricultural officers extend rice cultivation techniques in response to the request from farmers; however, since the activity expense and means of transportation needed for extension are limited, the activities for extending irrigated rice cultivation techniques are limited.

Agricultural officers are using the technical manuals produced in the Project as needed. (In some cases, they use the guidebooks produced and revised in the PRiDe Project.) The PRiDe Project currently conducted at the time of ex-post evaluation gives training for a part of the agricultural officers in half of the districts in the Eastern Region. However, it is not covering all the agricultural officers in the Eastern Region, and since there are newly employed officers too, it is necessary to continue conducting training for farmers and for newly recruited agricultural officers in order to secure the sustainability of the technical aspect of irrigated rice cultivation techniques for agricultural officers.

As for the training and demonstration plots set up in the Project Sites, the maintenance of the irrigation canals from the water source to the plots and of plots themselves was conducted in a farmer-participation way. This led to the enhancement of the sustainability of irrigation canal maintenance as well as farmers' capability to manage building and maintaining new canals to bring in irrigation water to the farmers' plots other than training and demonstration plots and developing rice paddy plots (preparing levee to make the water control in the rice paddy plots easy) on their own. The results of the hearings from agricultural officers in district agricultural offices revealed that technical extension is made among farmers. Especially in the case where a farmer had a good harvest, the farmers in the vicinity will show high interest and learn the techniques. The results of the beneficiary survey targeted at the farmers who participated in the training showed that 8 farmer households (on average) in the vicinity newly started rice cultivation after the end of the Project. This also confirmed the fact that technical extension is present among farmers. In the PRiDe Project being conducted at the time of ex-post evaluation, an extension way to spread technical transfer from key farmers' groups to other farmers' groups, as well as using demonstration plots is being tried. As the method is established, it is hoped that the extension way combining technical transfer among farmers will be wide spread.

From the above, it is evaluated that there is sustainability in technical aspect as the techniques are seen to have been fixed among farmers who have received training and the technical transfer is found among farmers from those who have received training to others. However, it is evaluated that the sustainability is not high enough because the extension activity of irrigated rice cultivation techniques by agricultural officers to farmers is limited and the training on irrigated rice cultivation techniques for newly



recruited agricultural officers is insufficient.

#### 3.4.4 Financial Aspects for the Sustainability of Project Effects

It is the role of the agricultural officers at the district agricultural offices (including offices in sub-counties) to extend irrigated rice cultivation techniques to farmers. The activity expenses at the district agricultural offices are borne by MAAIF. However, the annual activity expense per district at the time of ex-post evaluation is approximately 2 million Ugandan Shillings (approx. 63,000 Japanese Yen<sup>29</sup>), a very small amount. Although there are some cases where agricultural officers give technical guidance in response to the farmers' requests, there is rarely an occasion to gather rice farmers of certain numbers and conduct training using the farmers' training program produced in the Project due to limited budget for extension activity as constraint factor. On the other hand, according to the budget plan in the *National Agricultural Extension Strategy* (See Table 11), the operational cost in sub-county level for Fiscal Year (FY) 2017/18 is planned to boost from FY 2016/17 budget (57% increase compared to the previous year). Therefore, the improvement in the activity expense is anticipated compared to the current situation. The overall budget of MAAIF (actual values) increased in FY 2015/16 by approximately 45% compared to the last three years. In FY 2016/17, the level was maintained (excluding external funds<sup>30</sup>). When the external funds are included, the FY 2016/17 budget has almost tripled from FY 2014/15. According to the *National Agricultural Extension Strategy*, more budget increase is expected from FY 2017/18 and on (Table 12). As the external funds have the tendency to increase, and also the government funding is planned to increase, it is anticipated that the budget for extension activities shall be boosted.

Table 11: Budget Plan Related to Agricultural Extension Activities Shown  
in the National Agricultural Extension Strategy\*

(Unit: billion Ugandan Shillings)

Items	2016/2017	2017/2018	2018/2019	2019/2020
<b>District Agricultural Offices</b>				
Fixed cost	18.18	0	0	0.87
Operational cost	12.31	12.31	12.59	12.51
Technology development cost	10.10	10.10	10.10	10.10
Sub-total	40.59	22.41	22.68	23.48
<b>Sub-county offices</b>				
Fixed cost	17.33	9.12	4.56	1.92
Operational cost	26.26	41.46	46.99	46.99
R&D cost	32.07	50.64	57.39	57.39
Sub-total	75.66	101.22	108.94	106.30

Source: *National Agricultural Extension Strategy*

<sup>29</sup> Calculated with JICA's rate for 2016 (annual average: 1 Ugandan Shilling = 0.03189 Japanese Yen).

<sup>30</sup> Funds from donor organizations and others

\*Amount excluding the personnel expenses of district agricultural offices and sub-county offices

Table 12: MAAIF's Budget for the Past Five Years and Two Years from the Present

(Unit: billion Ugandan Shillings)

Items	Amount of Approved Budget					Planned Budget (future)	
	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Salary	5.46	5.89	5.89	5.59	5.58	5.58	5.86
Non-salary operating budget	14.76	23.85	24.70	42.36	43.82	33.44	36.78
Development budget	35.41	32.35	33.27	45.27	44.14	116.5	133.98
External funds (Note)	24.97	21.47	18.62	37.35	154.01	156.71	170.64
Total (Excluding external funds)	55.64	62.09	63.86	93.22	93.54	155.53	176.62
Total (Including External funds)	80.60	83.56	82.48	130.57	247.54	312.23	347.26

Note: External funds are the amount of funding by donor organizations. Major donors are World Bank, Islamic Development Bank, International Fund for Agricultural Development, Global Environment Facility and others. One of the supports by the World Bank is the Agriculture Cluster Development Project, launched in 2015. The components support for production consolidation of selected crops including rice, for agricultural water management under sustainable wetlands management and for post-harvest processing, storage and added value creation.

Source: *National Budget Framework Paper, Ministry of Finance, Planning and Economic Development*, for each FY.

Although the governmental budget for the agricultural extension had been limited until recently, there is an increasing trend of the MAAIF budget and also a plan of activity budget increase at the sub-county level. Therefore, the sustainability of the Project in financial aspect is evaluated as fair.

From all the above, the Project holds partial problems in organizational, technical and financial aspects. Therefore, the sustainability of the effects manifested by the Project is fair.

#### **4. Conclusion, Lessons Learned and Recommendations**

##### **4.1 Conclusion**

The Project has been conducted by MAAIF as the implementing agency and has been targeted at agricultural officers and smallholders in 22 districts of Eastern Region of Uganda with the aim to increase the productivity and production of rice of smallholder farmers through training and extension of irrigated rice cultivation techniques.

Specifically, the agricultural officers from the 22 districts received training on techniques of irrigated agriculture, usage of appropriate agricultural machinery, marketing and organizing farmers groups and so on. By enhancing the capability of agricultural officers necessary for training and extending the irrigated rice cultivation techniques and also strengthening the extension system, the Project supported the training of irrigated rice cultivation techniques by trained agricultural officers to smallholder

farmers.

The Project, aims to increase rice production and productivity, holds a high relevance as it is consistent with the Ugandan development policies and development needs at the times of planning and project completion and also the Japan's ODA policy at the time of planning. The Project Purpose has been achieved, while the Overall Goal is predicted to have been achieved, however it cannot be fully confirmed quantitatively and qualitatively. Therefore, effectiveness and impact are evaluated as fair. Since the Project cost is within the plan and the Project period is as planned, the efficiency of the Project is high. As an organizational issue, there is a need to reinforce the stationing of agricultural officers. As a technical issue, there is a need to implement training on irrigated rice cultivation for the newly recruited agricultural officers, and as financial aspect, there is a need to increase the budget especially for extension activities. In other words, there are partial problems in organizational, technical and financial aspects; therefore, the sustainability of the effects manifested by the Project is evaluated as fair.

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

## 4.2 Recommendations

### 4.2.1 Recommendations to the Implementing Agency

#### Recommendation to MAAIF

##### a. Increase the extension activity budget

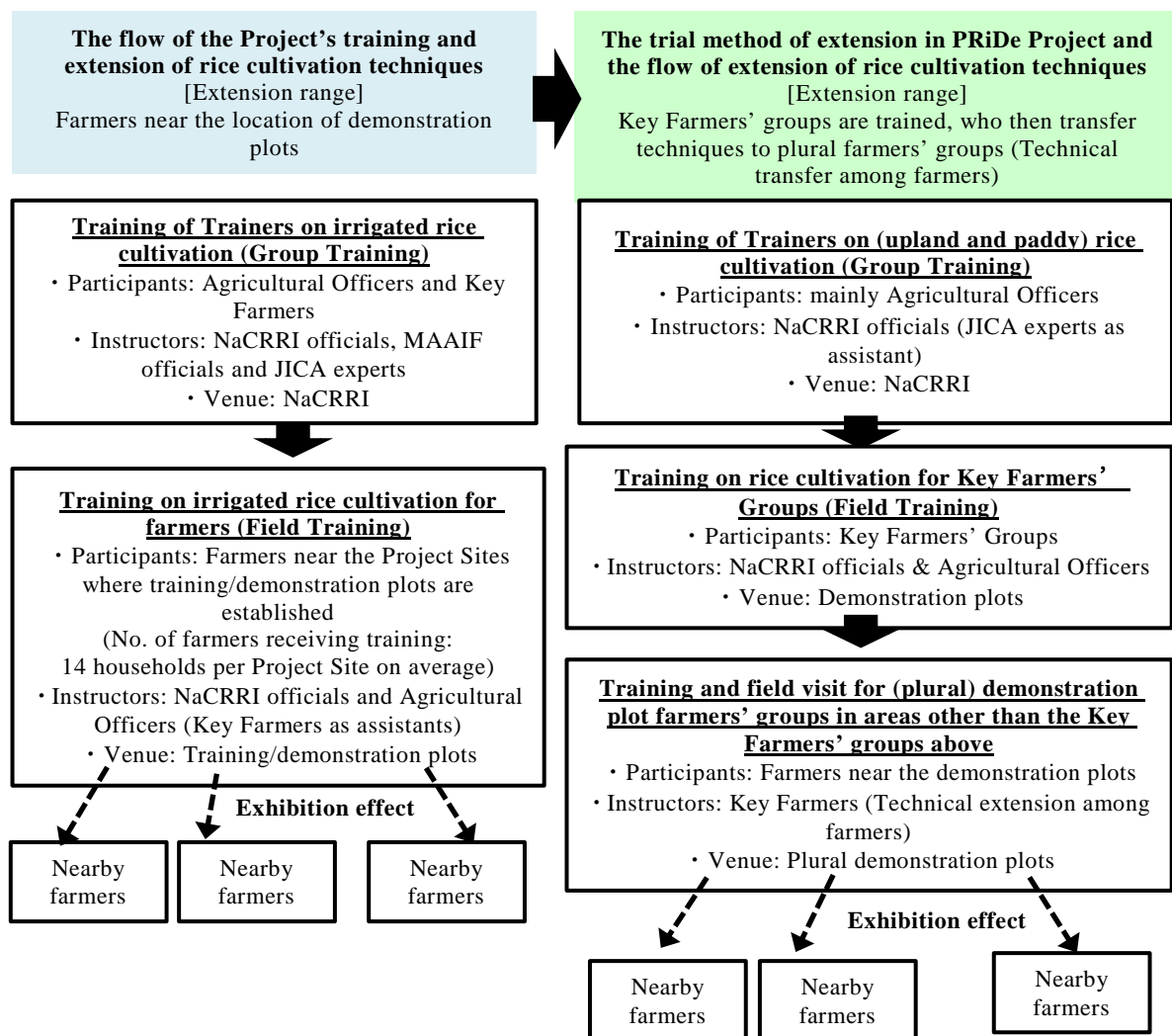
While new agricultural officers are steadily being recruited at district agricultural offices (including sub-county offices), the activity expenses allotted to the district agricultural offices are extremely limited. The means of transportation such as motorbikes needed for extension activities is also limited. As a result, agricultural officers are unable to visit communities and farmers' groups sufficiently. Although it is understandable that MAAIF is giving priority to increasing the number of staffs, the extension operation cannot be conducted in full without enough activity expense. In order to disseminate appropriate irrigated rice cultivation techniques to as many farmers as possible, the budget for extension activity expense must be increased significantly according to the policies in the *National Agricultural Extension Strategy* and others.

##### b. Study of methods for technical extension among farmers

It was confirmed from the results of the beneficiary survey that the technical extension is present among farmers from the farmers who received training to others. It seems especially that the farmers whose rice growing condition was good and high yield was gained are communicating the techniques to other farmers. In extending irrigated rice cultivation techniques without visiting to farmers frequently by agricultural officers, it would be valuable to consider introducing a method of extension to place the excellent

irrigated rice cultivation farmers at the core, with agricultural officers taking the role of coordinators and advisers, to extend techniques to other farmers. In the *National Agricultural Extension Strategy*, the importance of extension among farmers is stated. Also as mentioned already, in the PRiDe Project, an extension method is being tried out to spread technical transfer from key farmers' groups to other farmers' groups while using demonstration plots at the same time. In regard to such situations, it is hoped that the extension method combining technical transfer among farmers will be wide spread once the method is established as a method for extending irrigated rice cultivation techniques.

The figure below shows the extension method in the Project and the extension method in the PRiDe Project and the new method, in trial, in order to improve the extension.



Note: In the extension method on a trial basis, farmers who belong to the key farmers' group conduct technical extension in the demonstration plots in other areas to farmers in the vicinity of those demonstration plots.

Figure 3: Extension methods in the Project and in the PRiDe Project

c. Preparation of rice production statistics by district

It is difficult to quantitatively evaluate the effect of rice cultivation projects of the area because there is no statistics of rice production by district. The lack of rice production statistics also leads to the inability to appropriately build upon the policies and plans on rice promotion. It is a fact that the number of staffs in charge of statistics at MAAIF is being increased. Now it is necessary to reinforce collecting operation of statistical data regarding the crop cultivation (cultivation area, production amount and so on) in collaboration with staff of district agricultural offices. Also, according to the result of the beneficiary survey, farmers sold 77 % (on average) of rice harvested. Rice is a cash crop for farmers and most of the rice is carried to rice millers after harvest. Therefore, it is one of the realistic ways to figure out rice production more accurately by having the amount of rice brought into the rice millers recorded at the mills.

4.2.2 Recommendation to MAAIF and JICA

a. The promotion of use of the Guidelines for Irrigation Development Process in Wetlands

Rice cultivation in wetlands is expanding with the background that rice is a cash crop with a stable fairly price and high profitability compared to maize and other major crops. Therefore, the Government has been problematizing the deterioration of natural environment of wetlands by the disordered use of land. In the past, the GoU issued the *National Policy for the Conservation and Management of Wetland Resources* (1995) and *Wetland Sector Strategic Framework 2011-2020*, as well as guidelines related to wetlands conservation and management (*Guidelines for Paddy Rice Cultivation in Seasonal Wetlands, 2001* and *Wetland Edge Gardening* (2002)) and has been taking actions to promote conservation and wise use of wetlands.

Considering the population growth and improvement of farmers' livelihood, a set of guidelines is necessary not only on the study of conservation and use of specific wetlands but also of watershed areas and appropriate use of wetlands in reconciling conservation that considers hydrological balance and its sustainable use. In JICA's Project on Irrigation Scheme Development in Central and Eastern Uganda (2014-2017), technical cooperation for Development Planning, the Guidelines for Irrigation Development Process in Wetlands were issued. Described in these guidelines are the legal basis of environmental conservation and cases of processes for implementing field investigations, and also the recommended processes when implementing mid- to large-scale irrigation and drainage projects. Therefore, when mid- to large-scale irrigation projects become implemented in Uganda, it is expected hereafter that the use of these guidelines will be promoted. Furthermore, it is hoped that the activities to educate farmers on reconciling

the wetlands conservation and sustainable use will be implemented.

#### 4.3 Lessons Learned

##### Securing the continuity of training and technical extension system built in the Project

The activities related to training and technical extension during the Project implementation had depended mostly on funding from Japan. After the Project completion, the continuity of training and extension activities is not sufficiently secured due to the restriction on budget related to farmers' training and extension activities. In order to secure continuity, it is important to build an action plan and budget plan for post-project completion during the Project period, and to support the activities to be incorporated as one of the regular activities in the implementing organization.

##### Irrigation facilities and plot preparation in a farmer-participation way

In the Project Sites, there were training and demonstration plots prepared. At the time of establishing the demonstration plots related to irrigated rice cultivation, farmers participated in irrigation canal construction and rice plot development. This led to the sustainability of water canal maintenance and also to the development of new water canals now possible to do by farmers themselves.

##### The timing for holding training on irrigated rice cultivation

In the Project, the trainings on irrigated rice cultivation were divided into four periods: 1) land preparation, 2) rice nursery and seeding, 3) transplanting, and 4) harvesting. The participants learned by practice according to the growth stages of rice. As seen from this, it is evaluated that participating in training multiple times and at important times of rice growing cycles, contributes to the establishment of the techniques learned among farmers.