The Republic of Sierra Leone
Ministry of Agriculture, Forestry and Food Security

The Sustainable Rice Development Project in Sierra Leone

Final Report

November 2014

Japan International Cooperation Agency (JICA)

RECS International Inc.

NTC International Co., Ltd.

Currency equivalent
(average rate October 2010–September 2014)
SLL 1 = JPY 0.02
Source: OANDA
(http://www.oanda.com/currency/converter/)

Summary

Project Purpose: To establish rice production techniques and their extension method, which are applicable throughout Sierra Leone

Indicators	Results
1. TP-R and extension method are officially endorsed by MAFFS.	1. A forum on the Project was held in July 2014, in which those involved shared the project output and experience including the TP-R contents, focusing on fertilizer application, TP-R development procedure and dissemination, and farmers' views of the project approach. More than 50 participants from various organizations (e.g., MAFFS, SLARI, RARC, Njala University, etc.) who attended the forum indicated their support for the revised TP-R as standard rice cultivation techniques.
2. 80% of MAFFS officials who received training in each district confirm effectiveness of the TP-R and its extension method.	2. A training course in TP-R was provided to 102 officers of MAFFS district offices from March to April 2014. After the session, 99% of the trainees endorsed the effectiveness of TP-R.

Output 1: To revise the TP-R, which can realize higher yield and profit, through on-farm verification

Indicators	Results
1-1. More than 3.0 Mt/ha of yield is obtained more than 80% of the locations of on-farm verification, where revised TP-R is applied, in the cropping seasons by 2013[1].	1-1. Target yield of 3.0 t/ha was attained at only about 50% of trial sites. The level of attainment was attributed to low fertility of IVS soil in general, inadequate development of IVS rice fields where the trial sites were established, and low skill of farmers in rice cultivation.
1-2. Revised TP-R, that includes method on appropriate dosage of fertilizer and profitability, is developed.	1-2. TP-R was revised incorporating yield increase and profit making. Recommended fertilizer rate was set at $N\text{-}P_2O_5\text{-}K2O$ = 40-40-40 kg/ha.
1-3. A manual on TP-R for use of extension workers is prepared.	1-3. A technical manual summarizing TP-R contents was prepared for extension workers to understand the essence of the TP-R and transfer technology of rice production.

Output2: To extend TP-R to small-scale farmers through Farmer Based Organizations (FBOs) in Kambia district

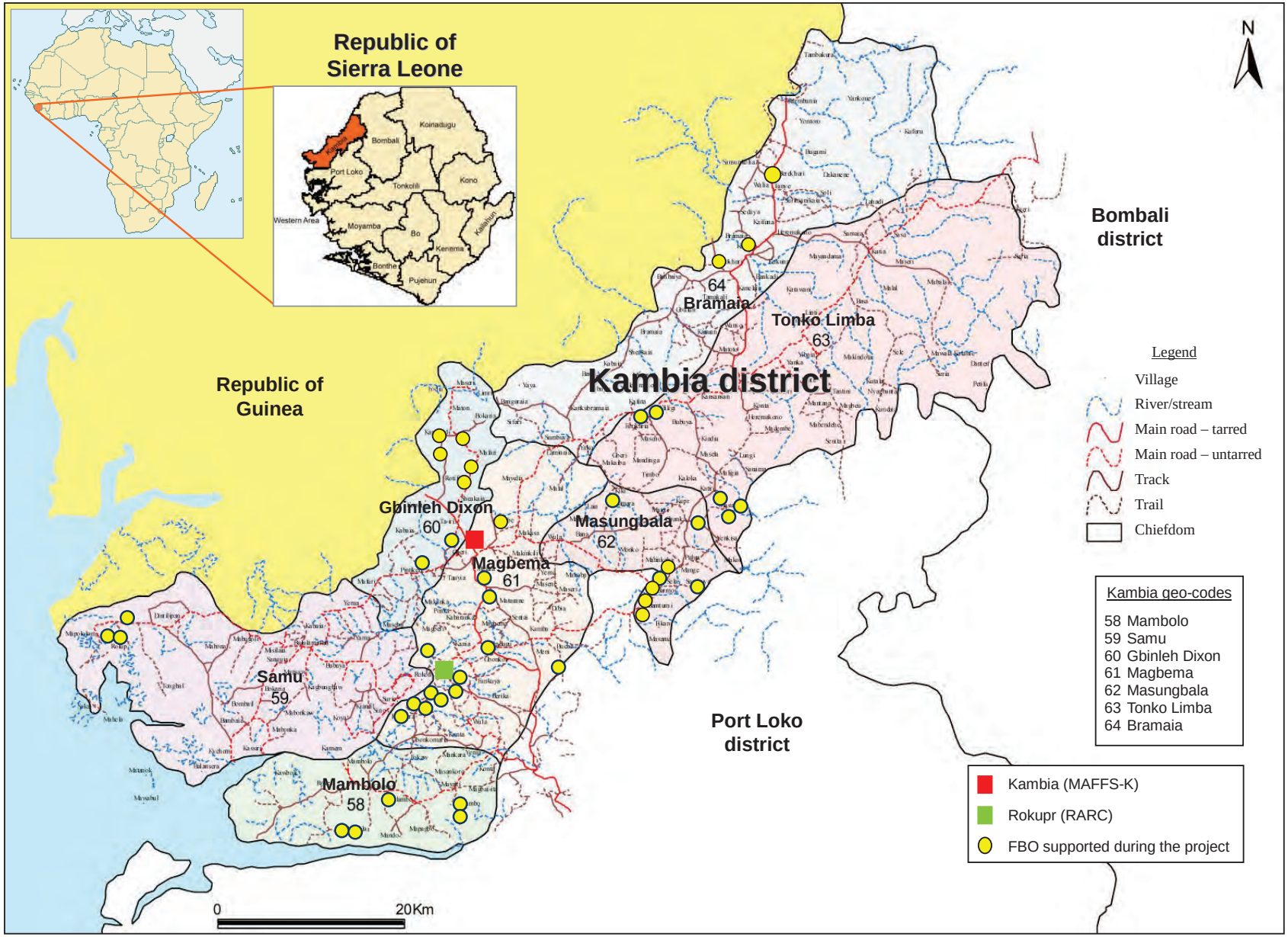
Indicators	Results
2-1. More than 300 FBO farmers[2] receive training on TP-R.	2-1. A total of 512 FBO farmers and 10 farmer facilitators[3] participated in various training courses in TP-R during the project period. Practical training in small-scale irrigation development was provided to a total of 129 farmers.
2-2. More than 50% of the FBO farmers who received training apply several techniques of the TP-R.	2-2. As of December 2013, of the 165 farmers interviewed, more than 50% adopted 14 and more than 80% adopted 11 techniques out of the 18 farming techniques in TP-R.
2-3. Extension materials for disseminating revised TP-R are prepared.	2-3. Extension material containing many photos and illustrations was prepared and distributed to the participants in the Project forum and MAFFS extension workers nationwide.
2-4. A guideline on implementation of Farmer Field School (FFS) on rice cultivation based on the TP-R is developed.	2-4. Guidelines, consisting of a technical manual and an extension guide, for the dissemination of rice cultivation techniques based on the TP-R through FFS were developed and distributed to MAFFS extension workers nationwide.

Output 3: To extend the contents of TP-R and an extension method to officials of MAFFS's district agricultural offices other than MAFFS-Kambia.

Indicators	Results
3-1. 30 officials acquire knowledge and skills of TP-R and extension method.	3-1. A total of 102 MAFFS district staff participated in the training course on the TP-R, of whom 31 (30%) scored higher than the average (50%) on the achievement test after training.

[1] Applicable places are rice fields in IVS where field water control is possible for effective fertilization.
[2] FBO farmers who were given advices and monitored intensively by FFS supervisors and Japanese experts in wet season of 2012 and 2013
[3] Certified by MAFFS after receiving various technical training courses on agriculture.

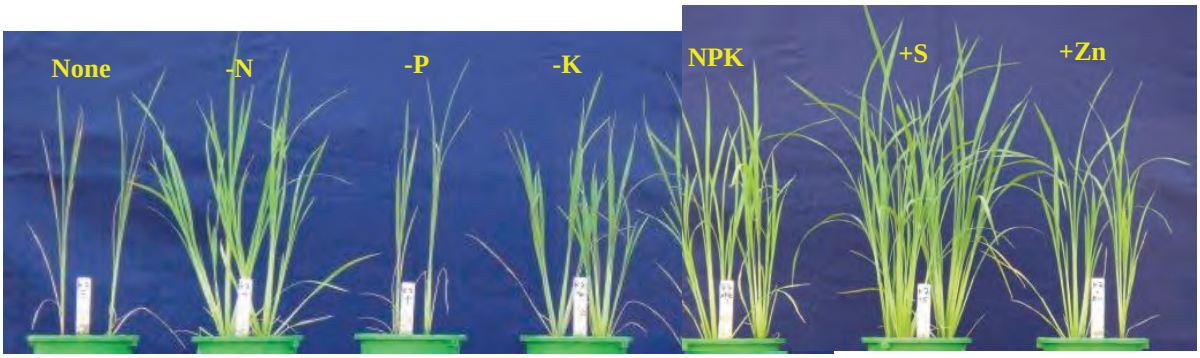
Project Area Map



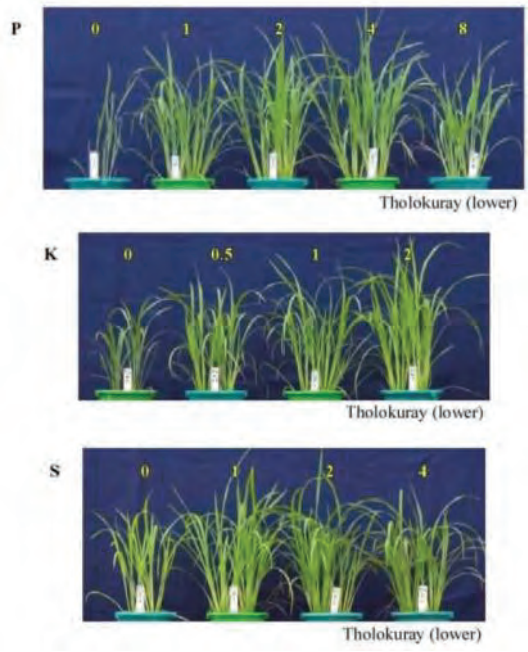
Photographs of Project Activities (1/2)

Greenhouse constructed for pot trials at RARC

Pot trials in the greenhouse



Rice grown in pots under various nutrition depletion treatments (with IVS soil at Kamaranka II, Bombali)



Rice grown in pots under various rates of nutrients (IVS soils of Tolokuray, Tonko Limba, Kambia)

Treatment plots of on-farm fertilizer trial in Kambia (above: Laya, Masungbala; below: Masineh, G. Dixon)

Photographs of Project Activities (2/2)

Rice grown in the rainy season at FBO farm in Kambia (Masiaka, G. Dixon)

Rice grown in the dry season at FBO farm in Kambia (Rotifunk, G. Dixon)

Training session for FBO farmers on TP-R (at Masiaka, G. Dixon, Kambia)

Practical training session for extension workers on TP-R (Masineh, G. Dixon, Kambia)

Field visit to TP-R applied FBO farm by MAFFS district officers (at Masineh, G. Dixon, Kambia)

Training session for MAFFS district officers on TP-R (in Kambia)

The Sustainable Rice Development Project in Sierra Leone

Final Report

Contents

List of Tables

Appendices

Acronyms and Symbols

Acronym	Name
AAG	Agricultural Advisory Group
ABC	Agricultural Business Centre
AfDB	African Development Bank
ASREP	Agricultural Sector Rehabilitation Project
BES	Block Extension Supervisor
BRAC	Bangladesh Rural Advancement Committee
CAADP	Comprehensive Africa Agriculture Development Programme
CARD	Coalition for African Rice Development
CF	Community Facilitator
DAO	District Agricultural Officer
EU	European Union
FAO	Food and Agriculture Organization
FBO	Farmer Based Organization
FEW	Frontline Extension Worker
FFS	Farmer Field School
FS	FFS Supervisor
GAFSP	Global Agriculture and Food Security Program
GIZ	German Federal Enterprise for International Cooperation
IFAD	International Fund for Agricultural Development
IVS	Inland Valley Swamp
JCC	Joint Coordinating Committee
JICA	Japan International Cooperation Agency
K	Potassium
MAFFS	Ministry of Agriculture, Forestry and Food Security)
MAFFS-K	MAFFS Kambia District office
MC	Monitoring Committee
N	Nitrogen
NGO	Non-Governmental Organization
NSADP	National Sustainable Agricultural Development Plan
P	Phosphorus
P4P	Purchase for Progress
PDM	Project Design Matrix
PEMSD	Planning, Evaluation, Monitoring and Statistics Division
PO	Plan of Operation
PPR	Project Progress Report
RARC	Rokupr Agricultural Research Centre
RD	Record of Discussion
S	Sulfur
SCP	Smallholder Commercialisation Programme
SLARI	Sierra Leone Agricultural Research Institute
SMS	Subject Matter Specialist
SRDP	Sustainable Rice Development Project
TP-R	Technical Package on Rice production
WAAPP	West Africa Agricultural Productivity Program
WFP	World Food Programme
Zn	Zinc

1. INTRODUCTION

This is the Final Report ("the Report" hereafter) on the Sustainable Rice Development Project in Sierra Leone ("the Project" hereafter), which was implemented for four years starting in October 2010 in accordance with the Record of Discussion (RD) agreed upon and signed on July 19, 2010, between the Government of Sierra Leone and Japan International Cooperation Agency (JICA).

The Report presents the results of the Project and its activities carried out during the Project period and the attainment of the Project purposes. It also presents the lessons learned through the activities, and the recommendations to be followed by the Government of Sierra Leone after the Project.

1.1 Background of the Project

The socio-economic conditions of Sierra Leone have recovered since 2002 when the civil war ended. Economic growth rate of the Country in 2008 was announced at 5.5%. However, according to the *Human Development Report* of UNDP in 2009, the Human Development Index of Sierra Leone was ranked 180th of 182 countries. Although the rank is mainly attributed to the low rating in health, the recovery of socio-economic infrastructure including water, electricity and road has not been enough. Under such situation, external assistance in human resources development and infrastructure development has continuously been required.

Sierra Leone is one of the Africa's largest rice consuming countries. Annual per capita consumption of rice is as high as over 100 kg. Sierra Leone once exported rice to neighboring countries. However, during the civil war, many rice farmers fled and their rice fields were devastated. This resulted in a sharp decrease in both cultivation area and production. In 2001, the production of rice (paddy or rough) was as low as 200,000 ton, the lowest in the past. Then, the production started to recover as the area under rice cultivation increased and reached about 640,000 ton in 2007. However, the country's self-sufficiency rate for rice is less than 70%, and the deficit is filled by import.

Rice production in Sierra Leone depends heavily on small-scale farmers with land less than 1 ha. According to the *National Census* in 2004, the majority (about 85%) of the 640,000 rice farmers in the country are in the bracket of small landholders with less than 1 ha. Given this, the increase in the farmers' income through rice production increase is expected to contribute to poverty reduction, which is the most important national policy. In particular, Kambia District located in the northwestern part of the country, once a nation's rice production center, has drastically decreased rice production due to the aftermath of the civil war. It is urgently needed for the district to recover the production.

Under the aforementioned condition, JICA implemented the Agricultural Development Project in Kambia ("the previous project" hereinafter) for three years from 2006 in cooperation with the Ministry of Agriculture, Forestry and Food Security (MAFFS) as the implementing agency in Sierra Leone to strengthen the agricultural support system in Kambia District. In the previous project, an agricultural technical package and agricultural technical support guidelines was developed to contribute to increase in productivity for crops including rice. In preparation of the *Technical Package on Rice Production*

("the TP-R" hereinafter), the target yield was set at 1.0 to 1.5 ton/ha referring to the estimated yield of 0.5 ton/ha at that time based on the baseline survey results. The TP-R has then been developed for various agro-ecologies through the rice cultivation trials conducted at seven pilot sites for two cropping seasons.

The techniques adopted in the TP-R mainly consist of basic ones such as preparation of a cropping calendar; timely sowing (for upland rice); and proper land preparation, transplanting, weeding, crop protection, and seed treatment. In the previous project, the JICA Project Team carried out capacity development of the staff members of MAFFS Kambia District office (MAFFS-K) through daily collaborative work in the pilot areas, a series of training sessions, and the preparation of radio extension programmes.

When the previous project was completed, the Government of Sierra Leone requested the Government of Japan to extend technical cooperation. The purpose of the next phase of the technical cooperation is twofold: to improve the TP-R through additional trials with the Rokupr Agricultural Research Center (RARC) under the Sierra Leone Agricultural Research Institute (SLARI) and to disseminate the TP-R to the rice farmers in Kambia District.

In response to the request, JICA dispatched a preliminary project study team to Sierra Leone in March 2010, and the team decided on the framework of the Project through a series of discussion with the Government of Sierra Leone. Then, JICA and the Government of Sierra Leone discussed and confirmed the framework as well as the implementing arrangements of the Project and signed the RD on the Project on July 19, 2010. To undertake the Project, JICA nominated a team of Japanese experts in the respective fields led by RECS International Inc. ("the JICA Project Team" hereafter).

1.2 Project Purpose and Expected Results

According to the RD, the Project purpose is **"to establish rice production techniques and its extension method which are applicable throughout Sierra Leone"**. And the overall goal of the Project is **"to increase production and incomes of the small-scale rice farmers in Sierra Leone"**.

The Project purpose is considered to be achieved when the following results are obtained.

Expected Results through the Project	
Result 1:	To revise the TP-R, which can realize higher yield and profit, through on-farm verification.
Result 2:	To extend TP-R to small-scale farmers through Farmer Based Organizations (FBOs) in Kambia District.
Result 3:	To extend the contents of TP-R and an extension method to the officials of MAFFS's district agricultural offices other than MAFFS-Kambia.

The Project was implemented as part of the Smallholder Commercialization Programme (SCP) under the National Sustainable Agricultural Development Plan (NSADP). Through the capacity development of small-scale rice farmers and the support for inputs, the Project was expected to contribute to the success of the SCP and hence the NSADP.

1.3 Project Area, Implementing Arrangements, and Beneficiaries

Project area

The Project covered the whole Kambia District; lowland, especially the inland valley swamp (IVS) agro-ecology, was regarded as important.

Implementing agencies

MAFFS and SLARI implemented the Project as the counterparts of JICA. The counterparts of the JICA Project Team specialists were the staff members of MAFFS-K and RARC. Each of the two agencies assigned one fulltime staff member as counterpart expert.

Coordinating and auxiliary entities

For the harmonious and smooth implementation of the Project, the Joint Coordinating Committee (JCC) and the Monitoring Committee (MC) were established to coordinate, follow up, and monitor the Project activities.

Beneficiaries

The Project activities were targeted at several different groups of beneficiaries. In its research activities, the beneficiaries were RARC researchers and FBO farmers who cooperated in the Project in the implementation of fertilizer trials. In the TP-R dissemination activities, they were MAFFS-K extension workers assigned to the SCP and FBO farmers supported by the SCP. In the capacity development for the TP-R, they were MAFFS district officers.

2. PROJECT RESULTS

The level of achievement of the aforementioned three Project results was examined and evaluated by the project design matrix (PDM) as follows.

Result 1: To revise the TP-R, which can realize higher yield and profit, through on-farm verification.

Objectively verifiable indicators and their achievement level:

1-1. More than 3.0 Mt/ha of yield is obtained more than 80% of the locations of on-farm verification, where the revised TP-R is applied in the cropping seasons by 2013[4]: Achievement rate = 60%.

1-2. The revised TP-R, that includes methods on appropriate dosage of fertilizer and profitability, is developed: Achievement rate = 100%.

1-3. A manual on the TP-R for use of extension workers is developed: Achievement rate = 100%.

Assessment:

1-1. The target yield of 3.0 t/ha was attained at only about 50% of the trial sites. The low level of attainment was attributed to (i) low fertility of IVS soil in general, (ii) inadequate development of the IVS rice fields where the trial sites were established, and (iii) low skill of the farmers in rice cultivation.

1-2. The TP-R was revised incorporating yield increase and profit making. Based on the results of the on-farm verification, the recommended fertilizer rate was set at $N\text{-}P_2O_5\text{-}K_2O$ = 40-40-40 kg/ha. The yield varied depending on the IVS condition and the soil fertility even though the same farming practices were applied. To attain the target yield, proper water management and careful farm management are required.

The rice farmers gained a profit by the improved cultural practices and fertilizer manipulation through the application of the TP-R. However, the production increase by the fertilizer manipulation was about 1.0 t/ha, which was just enough to break even under the current socio-economic conditions. Considering the present situation that IVS were not properly developed for rice farming and that the farmers' skill in rice farming is low, yield enhancement should be pursued first through the improvement of rice farming techniques. If rice yield is to be further improved by fertilizer application, some kind of government support should be provided. Also, research on fertilizer application methods should be continued to further improve fertilizer recovery.

1-3. A technical manual summarizing the contents of the TP-R was prepared for extension workers, which constituted the extension guidelines, combined with the TP-R extension guide.

[4] Locations selected from rice fields in IVS where water control was possible for effective fertilization.

Result 2: To extend TP-R to small-scale farmers through Farmer Based Organizations (FBOs) in Kambia district.
Objectively verifiable indicators and their achievement level: 2-1. More than 300 FBO farmers[5] receive training on TP-R: Achievement rate = 100%. 2-2. More than 50% of the FBO farmers who received training applies several techniques of the TP-R: Achievement rate = 100%. 2-3. Extension materials for disseminating revised TP-R are prepared: Achievement rate = 100% 2-4. A guideline on implementation of Farmer Field School (FFS) on rice cultivation based on the TP-R is developed: Achievement rate = 100%.
Assessment: 2-1. A total of 512 FBO farmers and 10 farmer facilitators[6] participated in various training courses in the TP-R during the project period. Practical training in small-scale irrigation development was provided to a total of 129 farmers. 2-2. As of December 2013, of the 165 farmers interviewed, more than 50% adopted 14 and more than 80% adopted 11 techniques out of the 18 farming techniques in the TP-R. 2-3. Extension material containing many photos and illustrations was prepared and distributed to the participants in the Project forum and MAFFS extension workers nationwide. 2-4. Guidelines, consisting of a technical manual and an extension guide, for the dissemination of rice cultivation techniques based on the TP-R through FFS were developed and distributed to MAFFS extension workers nationwide.

Result 3: To extend the contents of TP-R and an extension method to officials of MAFFS's district agricultural offices other than MAFFS-Kambia.
Objectively verifiable indicators and their achievement level: 3-1. 30 officials acquire knowledge and skills of TP-R and extension method: Achievement rate = 100%.
Assessment: 3-1. A total of 102 MAFFS district staff participated in the training course on the TP-R, of whom 31 (30%) scored higher than the average (50%) on the achievement test after the training.

Given the outcomes described above, it is concluded that the Project results have been achieved.

[5] FBO farmers who were given advices and monitored intensively by FFS supervisors and Japanese experts in wet season of 2012 and 2013

[6] Position certified by MAFFS on completion of various technical training courses in agriculture.

3. ACHIEVEMENT OF PROJECT PURPOSE

The level of achievement of the Project Purpose was measured according to PDM in the following.

Project Purpose:	**To establish rice production techniques and their extension method, which are applicable throughout Sierra Leone**
Objectively verifiable indicators and their achievement level:	
1. TP-R and extension method are officially endorsed by MAFFS: Achievement rate = 100%.	
2. 80% of MAFFS officers who received training in each district confirm effectiveness of the TP-R and its extension method: Achievement rate = 100%.	
Assessment:	
1. MAFFS executive officers gradually understood the effectiveness of the TP-R through various opportunities such as inspection of rice fields where the TP-R was applied and explanation of the results of the trials for revising the TP-R given by the JICA Project Team in JCC. A forum on the Project was held in July 2014, in which those involved shared the project output and experience including the contents of the TP-R, focusing on fertilizer application, procedure for the TP-R development and its dissemination, and farmers' views of the project approach. More than 50 participants from various organizations (e.g., MAFFS, SLARI, RARC, Njala University, IFAD, WFP, BRAC, and CARITAS) who attended the forum indicated their support for the revised TP-R as the standard rice cultivation techniques to be disseminated by MAFFS. The Agricultural Extension Division of MAFFS later instructed the staff of MAFFS district offices who attended the TP-R training course to transfer what they learned in the course to extension workers assigned to the SCP.	
2. A training session on the TP-R, which included the inspection of rice fields where the TP-R was applied, was provided to 102 officers of MAFFS district offices from March to April 2014. After the session, 99% of the trainees endorsed the effectiveness of the TP-R.	

Given the above, it is concluded that the Project purpose was achieved.

4. PROJECT ACTIVITIES

In the Project, the following activities were planned in accordance with the plan of operation (PO) of the RD, to attain the Project results, thereby the Project purpose:

4.1 Activities for Result 1

1-1 Collection of information on rice production in districts other than Kambia and a field survey (as necessary)
1-2 Decision on the revision of the TP-R developed in the previous project
1-3 Preparation of annual plans for TP-R trials
1-4 Site selection for on-farm verification of the TP-R
1-5 Pot-experiments at RARC and on-farm verification at selected rice fields
1-6 Monitoring of pot-experiments and on-farm verification; analysis of their results
1-7 Revision of the TP-R

4.2 Activities for Result 2

2-1 Preparation of an annual extension plan in line with the FFS method
2-2 Preparation of draft guidelines on the implementation of FFS in rice cultivation based on the TP-R and FFS extension material
2-3 Selection of FFS trial plots in collaboration with selected FBOs
2-4 Preparation of training material for extension workers and farmer facilitators
2-5 Training of frontline extension workers and farmer facilitators of the selected FBOs
2-6 Implementation of extension activities based on the progress at FFS trial plots
2-7 Monitoring of the progress of the extension activities
2-8 Examination of the results of the extension activities and the formulation of an improved extension method of the TP-R

4.3 Activities for Result 3

3-1 Preparation of a training plan for officers of MAFFS district offices other than Kambia District
3-2 Training in the TP-R and its extension method for officers of MAFFS district offices other than Kambia District
3-3 Monitoring of the utilization of the TP-R and its extension method at each MAFFS district office

The schedule and details of the activities are presented in Table 1 and Table 2, respectively. Technical transfer from the JICA Project Team to the Sierra Leonean counterparts was carried out through daily collaborative work in all activities.

In the initial stage of the Project implementation, a pamphlet was prepared for public relations purposes and distributed to those involved in or associated with the Project. The Project progress

reports were prepared periodically compiling the activities undertaken during the respective periods; they were submitted to the JCC members. From the third year of the Project implementation, a newsletter was issued monthly highlighting important activities and distributed to those involved in agriculture and rural development activities in Sierra Leone.

Representatives of international donors, such as the World Bank on West Africa Agriculture Productivity Project (WAAPP), Brazil delegation, Gesellschaft für Internationale Zusammenarbeit [German Federal Enterprise for International Cooperation] (GIZ), Bangladesh Rural Advancement Center (BRAC), United Nations World Food Programme (WFP), among others visited the Project sites. The JICA Project Team and the Sierra Leonean counterparts discussed and examined with them the possibilities of immediate and future collaboration.

It should be noted that, on MAFFS request, the JICA Project Team conducted a series of study on the introduction of double cropping in cooperation with FBO farmers whose IVS fields have enough water for second cropping in the dry season. The JICA Project Team provided the farmers who were willing to try second cropping with technical guidance and fertilizer. Furthermore, the MAFFS-K extension workers and the JICA Project Team monitored the utilization of fertilizer by the FBO farmers as support for the SCP and analyzed the cost and benefit of rice cultivation and power tiller use.

Table 1. Work Schedule for Project Results

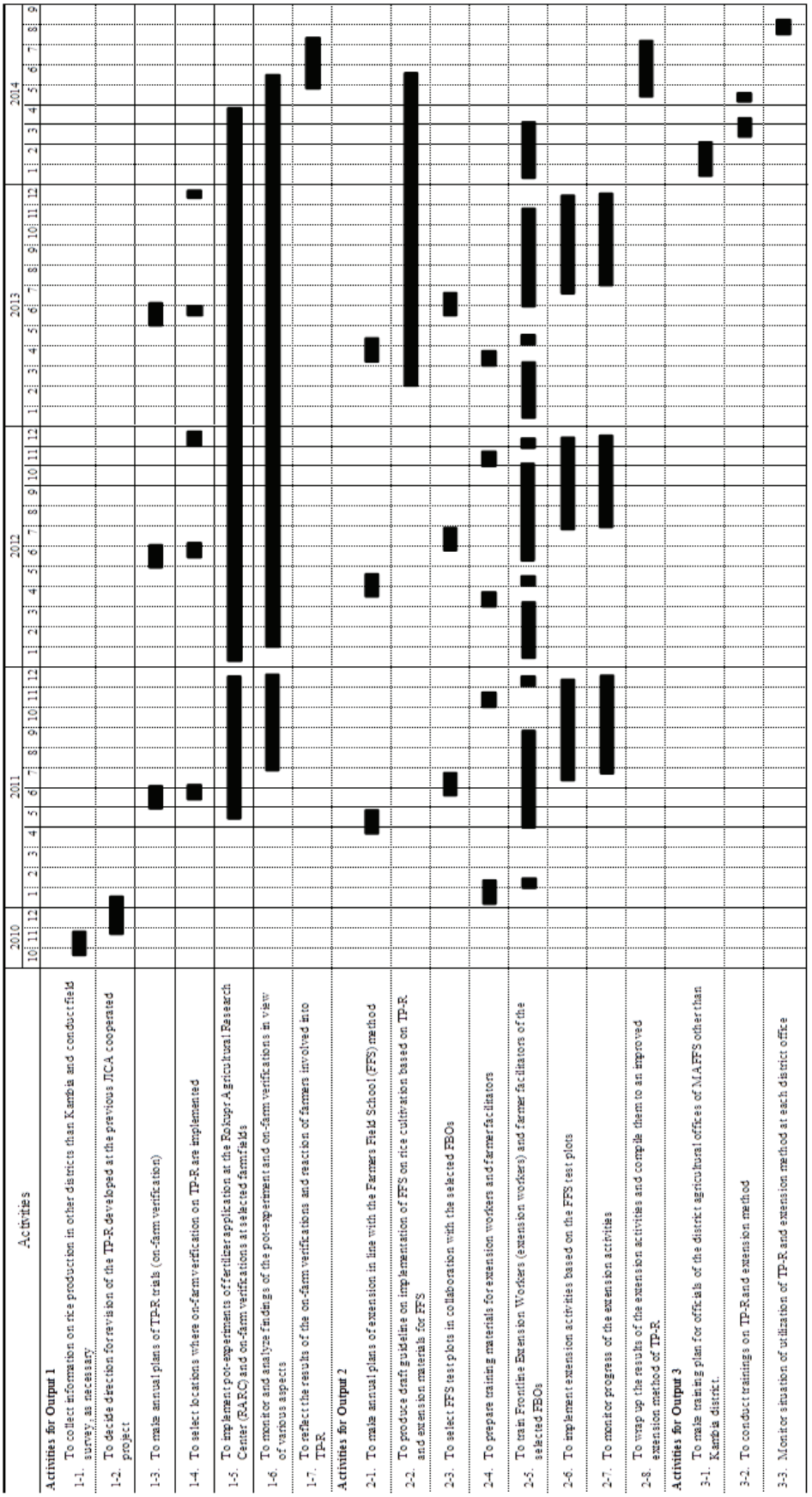


Table 2. Details of Project Activities

Activities for Result 1
1-1. Collection of information on rice production in districts other than Kambia and a field survey (as necessary) Details: Statistics on rice production were collected and analyzed. FBOs' activities supported by the SCP and the status of FFS implementation were studied. A study on the situation of IVS and rice cultivation was conducted at districts other than Kambia (Tonkolili, Bombali, Kenema, Bo, and Port Loco). Through these activities, the following were clarified: Rice yield in Sierra Leone had generally been low. FBOs supported by the SCP were not active. FFS had not been implemented at most FBO fields in Kambia. There had not been much difference in rice growth between Kambia and other districts.
1-2. Decision on the revision of the TP-R developed in the previous project Details: The objective of experimental trials for revising the TP-R was discussed with RARC nine times, and it was decided that the objective would be the optimum fertilizer application method for rice productivity enhancement.
1-3. Preparation of annual plans for TP-R trials Details: On-farm trials were planned based on the results of the pot experiment and the on-farm trials conducted in the previous year. The objective of the on-farm trials in the initial stage was agreed: to study the effects of water management and fertilizer rates on grain yield. Later, the objective was changed to study the optimum fertilizer dose for yield increase.
1-4. Site selection for on-farm verification of the TP-R Details: On-farm trials sites were selected every year based on a site survey and interviews with the farmers.
1-5. Pot-experiments at RARC and on-farm verification at selected rice fields Details: In pot experiments, soils of the diverse agro-ecologies in Sierra Leone were collected at 37 sites. The sample soils were subjected to nutrient depletion/addition treatments or graded nutrient application treatments. Rice plants were grown in pots with treated soils in a submerged condition for about four weeks. Soil nutritional status was diagnosed on the basis of dry matter production during the plant's growth. The on-farm verification was conducted based on the findings of the pot experiments; rice plants were grown under various rates of nutrients application at the selected FBO fields.
1-6. Monitoring of pot-experiments and on-farm verification; analysis of their results Details: The pot experiments and on-site verification were monitored, and the results were analyzed. Researchers at RARC were provided with guidance on chemical analysis of soils as part of their capacity building. Phosphorus (P) deficiency was most severe and widely spread over the country; sulfur (S), potassium (K), and nitrogen (N) were lacking in many areas and zinc (Zn) in some areas. The deficiency level in N, P, K, S, and Zn in IVS was 30, 70, 30, 60, and 10 on average nationwide, respectively. The productivity of the indigenous soils varied greatly, but the differences in productivity decreased under fertilized condition due to the positive growth response to nutrient application. A plant's response to an application rate varied among the soils: the larger the deficiency level, the greater the response in general. On the other hand, the on-farm verification results showed no yield response to increased application rates of P or application of S. Grain yield did not decrease even with the

reduced dose of N. The contradictory results between the pot experiments and the on-farm verification may be attributed to the difference in growth environment, nutrient supply condition, and the existence of growth limiting factors other than nutrients. Based on these results, the recommended fertilizer dose in the revised TP-R was changed to N-P_2O_5-K_2O= 40-40-40 kg/ha.
1-7. Revision of the TP-R Details: The TP-R was revised based on the results of the pot experiments, soil chemical analysis, on-farm verification, and monitoring of rice farming practices at FBO fields. The main points of revision included fertilizer application methods, economic analysis of rice production, and seed production. The importance of crop management in the vegetative growth stage, during which the number of panicles is determined, as well as preparation of a cropping calendar and its observance was emphasized.

Activities for Result 2
2-1. Preparation of an annual extension plan in line with the FFS method Details: An extension plan for the TP-R was prepared in line with the FFS method.
2-2. Preparation of draft guidelines on the implementation of FFS in rice cultivation based on the TP-R and FFS extension material Details: Based on the TP-R and the extension material for FFS, guidelines for the dissemination of rice cultivation techniques were prepared. The guidelines consist of an extension manual and an extension guide. The manual presents the contents of the TP-R in simple words. The guide shows the procedure to disseminate the TP-R to FBO farmers in FFS, dividing the TP-R's contents into subjects according to the rice growth stages.
2-3. Selection of FFS trial plots in collaboration with selected FBOs Details: Along the implementation of the SCP, FFS test plots were prepared in cooperation with extension workers at FBO fields selected by MAFFS. In selecting the locations for FFS plots, site conditions such as topography, soils, and water environment were carefully examined so that the experimental results would not be attributed to other factors than experimental treatments.
2-4. Preparation of training material for extension workers and farmer facilitators Details: Based on the problems on rice farming practices identified through the growth monitoring at FBO fields and on the proposed improvement measures, extension material on TP-R dissemination was prepared for extension workers and farmer facilitators to train rice farmers. The material contains many photographs and illustrations for the ease of understanding considering the low literacy rate of farmers. In preparing the material, its draft was distributed to extension workers to elicit their comments for improvement and finalization.
2-5 Training of frontline extension workers and farmer facilitators of the selected FBOs Details: Training sessions on rice cultivation techniques for both extension workers and farmer facilitators were held in the classroom as well as in the field. In the classroom, inappropriate farming practices were described and explained with photographs taken at FBO fields during field monitoring, and appropriate practices were introduced. At the FBO farms and FFS test plots, rice plants' growth and field conditions were observed and the way to improve farming techniques to improve the growth was explained. The

training session on a yield survey was held for extension workers to learn the necessity of the survey and its methods in the classroom. The extension workers practiced unit area sampling, one of yield survey methods, and calculated yield components in the field. In response to MAFFS' request, a study on the introduction of double cropping of rice was conducted. A dry season cropping trial was carried out, in cooperation with FBO farmers participating in the SCP, at several FBO farms where water sources could be secured in the dry season. The study results showed that yield response to fertilizer was larger in the dry season than in the wet season under appropriate farm management practice because of easier water management and larger solar radiation in the dry season. In the dry season 3.0 t/ha can be obtained with cultivars of 4-month growth duration and 2.5 t/ha with 3-month varieties.
2-6. Implementation of extension activities based on the progress at FFS trial plots Details: During the Project period, improved rice farming practices were extended to FBO farmers at FFS trial plots in 44 FBO farms in cooperation with extension workers. One FBO participating in the SCP was provided with support for inputs and technical guidance for one cropping or one year; the support was found to be insufficient to build the farmers' capacity. Therefore, the Project repeatedly provided direct technical guidance to the FBO farmers who were eager to learn rice cultivation techniques.
2-7 Monitoring of the progress of the extension activities Details: In the latter part of the Project period, an interview survey of FBO farmers supported by the SCP who received training from the Project was conducted. The purpose of the survey was twofold: to find out if or how much they adopted and practiced the rice farming techniques recommended by the TP-R and if and how much their yield changed.
2-8. Examination of the results of the extension activities and the formulation of an improved extension method of the TP-R Details: The contents of the revised TP-R and the results of all the extension activities were incorporated into the extension method (extension guidelines and material) of the TP-R.

Activities for Result 3
3-1. Preparation of a training plan for officers of MAFFS district offices other than Kambia District Details: The JICA Project Team prepared a training program on the TP-R for the staff of MAFFS district offices in consultation with the extension division of MAFFS. The completion of the program was delayed for one year due to the delay in the preparation of the TP-R and the extension material.
3-2. Training on the TP-R and its extension method for officers of other MAFFS district offices Details: The training course on the TP-R for the staff of MAFFS district offices was held for three weeks from March 2014. A total of 102 officers attended the course; they were divided into three groups and received four-day training in their groups. The course consisted of field inspection and classroom session. In the field inspection, the participants spent a half day examining rice fields where the TP-R was applied. In the classroom session, they were lectured on the essence (10 subjects) of the TP-R. During the course, the participants provided the JICA Project Team with information on rice cultivars and cropping calendars in their districts for understanding of the situation of rice farming in each district; they practiced calculation of fertilizer dose and seed requirement. The

effects of the training were measured by a pre-training test and an achievement test conducted at the beginning of and the end of the course, respectively. In addition to MAFFS officers, three agricultural officers of BRAC and two officers of WFP participated in the training session to expand the coverage of TP-R dissemination.

It should be noted that another training session on the TP-R was held for three days in May 2014, in cooperation with WAAPP. This training was for the capacity development of 26 officers of MAFFS district offices and 5 officers of the Guinean Agriculture Ministry assigned to WAAPP, whose objectives were similar to the Project's, in rice cultivation techniques.

3-3. Monitoring of the utilization of the TP-R and its extension method at each MAFFS district office

Details: After the training session for MAFFS district officers nationwide, MAFFS Headquarters instructed the district agricultural officers who participated in the session to share the results of the session with frontline extension workers.

5. INPUT

5.1 Dispatch of JICA Project Team Experts (Name, Expertise, Duration, and Activities)

During the 4-year implementation period, a total of 11 agricultural experts in 10 fields were dispatched to Sierra Leone for a total of 125.43 person-months as JICA Project Team members. The schedule and the main tasks of these experts are presented in Table 3.

5.2 Training (Objectives, Duration, Number of Trainees, and Contents)

Training conducted during the Project period is broadly divided into three categories: (1) training for counterpart personnel, (2) training for farmers, and (3) training in a third country and Japan.

(1) Training for counterpart personnel

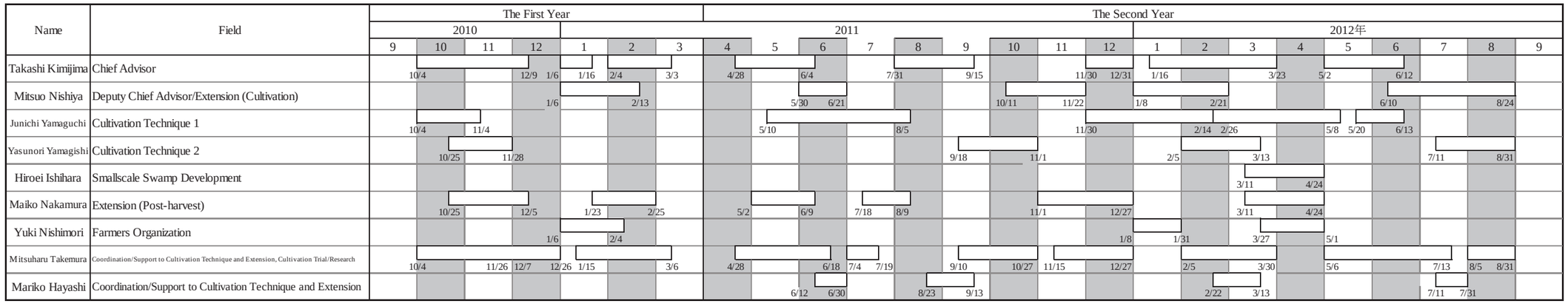
In the first year, the JICA Project Team organized a training session for MAFFS-K extension workers to transfer rice cultivation techniques to them and to grasp their level of understanding of rice cultivation techniques and extension. Through the session, it was revealed that the majority of the extension worker participants lacked the knowledge of rice production and also basic calculation skill, and that their extension skill in disseminating rice production techniques to farmers was limited.

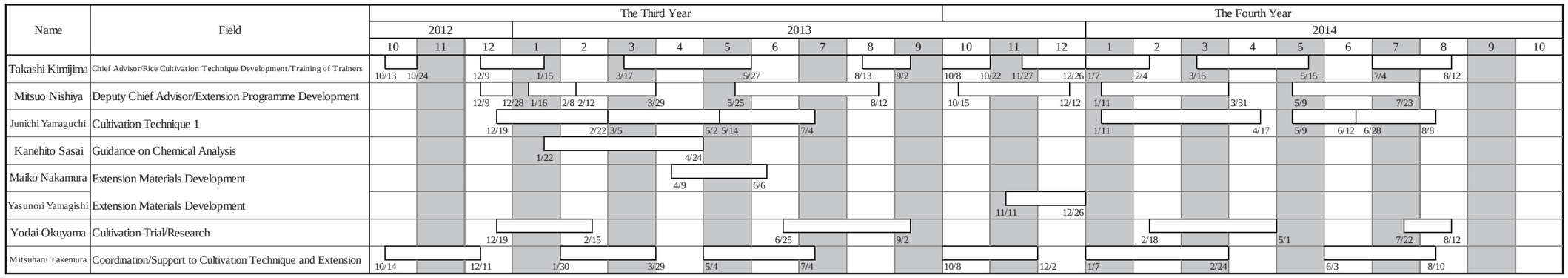
In the second year, the JICA Project Team designed a new training course based on the experience of the training session conducted in the first year and in consideration of the contents of the TP-R and the growth stages of rice. A series of training sessions for MAFFS-K extension workers was provided in both the classroom and the field at different growth stages of rice. For example, the extension workers learned the theory of the yield survey through lectures before practicing it in the field. As a result, they gained a full understanding of the yield survey. Concurrently with the training, the JICA Project Team prepared extension material on the TP-R, which contained photographs and illustrations for the ease of rice farmers to understand its contents. The extension material was distributed and its usage explained to the extension workers at the training session so that they would be able to transfer the TP-R's contents properly to the farmers.

From the third year, besides the training sessions using the extension material, MAFFS-K extension workers visited and observed rice fields of advanced FBOs and participated in farmer training as lecturers to gain more knowledge of rice farming and enhance their facilitation techniques. Farmers' comments on the extension material were collected to further improve its contents. In the fourth year, more than 100 staff members of MAFFS at district level were trained the contents of TP-R to expand the coverage of the Project results.

Throughout the four years of the entire Project activities, the number of counterparts who participated in the training courses reached 888 in total. Detailed information on the training provided in the Project including contents, duration, and participants is presented in Table 4.

Table 3. Dispatch Schedule of JICA Experts and Their Main Tasks





Chief Advisor/Rice Cultivation Technique Development/Training of Trainers
- Supervision and coordination of the project
- Mutual consultation with counterpart agency and JICA
- Determination of detailed activity plan and indicators on PDM
- Implementation of baseline survey
- Technical guidance and monitoring on rice cultivation in both rainy and dry season
- Provision of training for MAFFS district officers and FBO farmers
- Support to input procurement (Rice seed, fertilizer and laboratory equipment)
- Public relations (Newsletter and radio broadcast)
- Holding JCC
- Strengthning of coordination with MAFFS and donor agencies
- Support to training in Japand and the third country
- Cooperation on mid-term review and terminal evaluation mission
- Hodling project forum
- Preparation of reports (TP-R, extension guideline, PPR, etc)

Deputy Chief Advisor/Extension Programme Development
- Translation of the result from on-farm trial to TP-R dissemination
- Technical guidance and monitoring on rice cultivation in both rainy and dry season
- Provision of training for MAFFS district officers and FBO farmers
- Preparation of newsletter
- Strengthning of coordination with MAFFS and donor agencies
- Cooperation on mid-term review and terminal evaluation mission
- Preparation of extension guideline and materials

Cultivation Technique 1 and 2
- Implementation of baseline survey
- Determination of detailed activity plan for TP-R improvement
- Implementation of TP-R improvement and documentation
  (Pot trial, soil chemical analysis and on-farm trial)
- Support to RARC in strengthening reaserach environment
- Cooperation on mid-term review and terminal evaluation mission
- Preparation of manual (TP-R and soil chemical analysis)

Smallscale Swamp Development
- Reconnaisance survey on smallscale swamp development
- Technical guidance on smallscale swamp development
  (Survey, construction of smallscale structures)
- Preparation of extension guideline (Smallscall swamp develoment)

Guidance on Chemical Analysis
- Implementation of TP-R improvement (Soil chemical analysis)
- Preparation of manual (Soil chemical analysis)

Extension (Post-harvest)
- Implementation of baseline survey
- Technical guidance and monitoring on rice cultivation in both rainy and dry season
- Provision of training for extension officers in MAFFS-K and FBO farmers
  (Harvesting and post-harvesting techniques)

Extension Materials Development
- Translation of the result from on-farm trial to TP-R dissemination
- Technical guidance and monitoring on rice cultivation in both rainy and dry season
- Provision of training for extension officers in MAFFS-K and FBO farmers
  (Utilization of extension materials)
- Preparation of extension material

Farmers Organization
- Survey on FBO under SCP
- Monitoring on utilization of rice seed and fertilizer

Cultivation Trial/Research
- Implementation of TP-R improvement (Pot trial and on-farm trial)
- Technical guidance and monitoring on rice cultivation in both rainy and dry season
- Provision of training for MAFFS district officers and FBO farmers
- Support to RARC in strengthening reaserach environment

Coordination/Support to Cultivation Technique and Extension
- Implementation of baseline survey
- Technical guidance and monitoring on rice cultivation in both rainy and dry season
- Implementation of TP-R improvement (Pot trial and on-farm trial)
- Provision of training for MAFFS district officers and FBO farmers
- Support to training in Japand and the third country
- Cooperation on mid-term review and terminal evaluation mission
- Hodling project forum

Table 4. Summary of Counterpart Training

Subject of training	Duration (days)	Target extension workers	Number of participants (person-days)	Classroom lectures	Field practice	FFS trial
Year 1 (Oct. 2010–Mar. 2011)						
Rice cultivation techniques	4	MAFFS-K	72	✓	-	-
Year 2 (Apr. 2011–Aug. 2012)						
Rice cultivation techniques and FFS	20	MAFFS-K	317	✓	✓	✓
Year 3 (Oct. 2012–Sep. 2013)						
Rice cultivation techniques and FFS	10	MAFFS-K	87	✓	✓	✓
Year 4 (Oct. 2013–Sep. 2014)						
Rice cultivation techniques and FFS	2	MAFFS-K	4	✓	-	✓
Rice cultivation techniques	12	MAFFS district offices	408	✓	✓	-
Total	48		888			

(2) Farmers' training

In the second year of the Project, through monitoring, it was found that the growth of the rice plant was generally poor at FBOs' fields under the SCP support due to not only the absence of fertilizer application but also inappropriate farming practices. Without improving farming practices, fertilizer application would not be effective in yield increase. If rice farmers realize that they can increase yield by understanding the meaning of each farming practice and by improving it, they will change their farming practices accordingly. The JICA Project Team prepared training plans for FBO farmers to share the monitoring results, disseminate the recommended farming practices based on the TP-R for yield enhancement, and implement the practices.

A training session for FBO farmers consisted of (i) classroom lectures before the cropping season on the life cycle of the rice plant, basic rice physiology, and the relationship between rice growth and farming practices; (ii) guidance in the field through growth monitoring during the cropping season; and (iii) review of the cropping season by the farmers in the classroom. Through a series of training sessions, the farmers realized flaws in their farming, and they became better able to prepare for the next cropping. In the classroom lectures, many illustrations and photographs were used to help the farmers understand the contents of the training.

At the beginning, training sessions were held at the conference hall of MAFFS-K, inviting a few representative farmers from each FBO. However, due the facility's limited capacity and the late arrival of some of the farmers, the JICA Project Team decided to change the venue to a village where there was a meeting place and invited farmers in the village and the neighboring villages. Through this change, the number of participants in the training increased considerably. Also, in the course of the Project, several extension workers who had acquired sufficient knowledge of rice

cultivation and skill in training facilitation through the daily collaborative work with the JICA Project Team experts conducted classroom training.

As shown in Table 5, a total of 651 farmers participated in the training sessions (including those who participated in more than two sessions) during the Project period.

Table 5. Summary of Farmers' Training Sessions

Training subject	Duration (days)	Target	Number of participants (person-days)
Year 2 (Apr. 2011–Aug. 2012)			
Small irrigation development	13	FBO farmers	129
Rice cultivation techniques, monitoring, and evaluation	6	FBO farmers	108
Rice cultivation techniques	1	Farmer facilitator	10
Year 3 (Oct. 2012–Sep. 2013)			
Visit to fields of advanced FBO	3	FBO farmers	36
Rice cultivation techniques, monitoring, and evaluation	8	FBO farmers	278
Year 4 (Oct. 2013–Sep. 2014)			
Rice cultivation techniques, monitoring, and evaluation	2	FBO farmers	90
Total	33		651

(3) Training in Japan and third country training

Not all the issues of the agricultural sector in Sierra Leone are production-related. There are also issues associated with agricultural policy planning and management, extension planning and management, and statistical data management among others. To develop the management capacity of MAFFS in various fields, five officials of MAFFS Headquarters and one RARC researcher were invited to Japan to participate in training programs organized by JICA in 2013 and 2014. At the field level, one senior officer of MAFFS and three officers of MAFFS-K were dispatched to Malawi to participate in a training program in small irrigation development in 2011, and one extension worker of MAFFS-K to Egypt to learn rice cultivation techniques in 2013 and 2014. Details of the training were presented in Table 6.

Table 6. Summary of Training in Third Country and Japan

Year 2 (Apr. 2011–Aug. 2012)

Course Title	Third Country Training in Malawi in Small-Scale Irrigation		
Duration	10–17 July, 2011		
Name	Institution	Position (then)	Position (current)
Abdul Rahman Kamara	MAFFS	Head of Sub-Component 2, SCP	Same as then
John A. Lakoh	MAFFS-K	Subject Matter Specialist (SMS) (Land and Water Development)	SMS (Agricultural Engineering Services)

Amara Kargbo	MAFFS-K	SMS (Extension)	Frontline Extension Worker (FEW)
Andrew Mambu	MAFFS-K	District Coordinator	District Training Focal Person

Year 3 (Oct. 2012–Sep. 2013)

Course Title	Rice Cultivation Techniques for Africa (Egypt)		
Duration	23 April–20 September, 2013		
Name	Institution	Position (then)	Position (current)
Daniel M. Kamara	MAFFS-K	Block Extension Supervisor (BES)	Same as then

Course Title	Agricultural Extension Planning and Management		
Duration	10 July–20 September, 2013		
Name	Institution	Position (then)	Position (current)
Bakarr J. Bangura	MAFFS	Deputy director of extension	Director of extension

Course Title	Planning and Designing of Agricultural Statistics for Food Security Policy Making		
Duration	20 August–22 October, 2013		
Name	Institution	Position (then)	Position (current)
Umaru M. Sankoh	MAFFS-K	District Agricultural Officer (DAO)	Same as then

Course Title	Planning of Agricultural Policy		
Duration	18 August–24 September, 2013		
Name	Institution	Position (then)	Position (current)
Joseph Saidu Bangura	MAFFS	Assistant director of PEMSD	DAO Bo District

Course Title	Promotion of African Rice Development through strengthening coordination between Coalition for African Rice Development (CARD) and Comprehensive Africa Agriculture Development Programme (CAADP) for Sub-Sahara African Countries		
Duration	20 August–10 September, 2013		
Name	Institution	Position (then)	Position (current)
Denis J. Taylor	RARC	Senior Researcher	Same as then

Year 4(Oct. 2013–Sep. 2014)

Course Title	Rice Cultivation Techniques for Africa (Egypt)		
Duration	24 April–26 September, 2014		
Name	Institution	Position (then)	Position (current)
Abu Bakarr Sesay	MAFFS-K	Block Extension Supervisor (BES)	Same as then

Course Title	Agricultural Extension Planning and Management		
Duration	15 July–14 September, 2014		
Name	Institution	Position (then)	Position (current)
Amadu Joseph Sesay	MAFFS-Bombali	Crop Officer	Same as then

Course Title	Promotion of African Rice Development through strengthening coordination between CARD and CAADP for Sub-Sahara African Countries		
Duration	17 July–2 August, 2014		
Name	Institution	Position (then)	Position (current)
Prince Kamara	MAFFS	SCP Coordinator	Same as then

5.3 Provision of Machinery, Equipment, and Inputs

During the Project implementation period, various machinery, equipment, and inputs were provided to MAFFS and MAFFS-K, with net worth of US$400,000 (see Table 7). All the items were properly managed and utilized during the Project period. The officials-in-charge of MAFFS and MAFFS-K assured the JICA Project Team that they would properly maintain and utilize all these items after the Project for the activities in agricultural and rural development.

Table 7. List of Machinery and Equipment Provided

Year	Description (items, specification, model, etc)	Q'ty	Current Condition	Frequency of Utilzation *
2011	MAFFS/MAFFS-K			
	Vehicle (Toyota Land Cruiser)	2	Working	A
	Photocopier (Canon Image runner 2318)	1	Good	A
	Personal Computer (Dell OPTILEX 380)	2	Good	B
	Projector (Dell 1201 MP)	1	Good	C
	Printer (HP Deskjet F2180)	1	Good	B
	Digital camera (Olympus FE-4000)	2	Good	B
	Motorbike with helmet (Honda XL125)	2	Good	A
	Technical Package on Rice Cultivation	1,000	-	B
	Seed Rice	14,000 kg	-	C
	Fertilizer	56,300 kg	-	C
	RARC			
	Motorbike with helmet (Honda XL125)	1	Good	C
2012	MAFFS/MAFFS-K			
	Vehicle (Toyota Hilux)	1	Good	A
	Seed Rice	1,950 kg	-	C
	Fertilizer	12,025 kg	-	C
	RARC			
	Personal Computer (Compaq Presario V6700)	1	Good	B
	Photocopier (Canon IR 2016)	1	Good	B
	Printer (HP Laser jet 1505P)	1	Good	B
	Construction of overhead electric cable	1	Good	A
	Borehole construction	1	Good	A
	Laboratory equipment	1 set	Good	C
	Chemical reagent	1 set	Good	C
	Glassware	1 set	Good	C
2013	MAFFS/MAFFS-K			
	Fertilizer	11,400 kg	—	C

* Classification of the frequnecy of utilization

A: used frequenty (almost daily), B: used well (1-3 times per week), C: used in specific season(s) only

5.4 Project Operation Cost

Table 8 presents the actual operating expenses for the four years of the Project implementation.

Table 8. Project Operation Cost

Description	Amount (SLL)			
	Year 1	Year 2	Year 3	Year 4
Employment of local staffs	24,446,355	135,325,971	106,335,890	103,150,539
Transportation (fuel, maintenance, etc)	99,239,476	72,566,149	130,085,142	99,901,856
Equipment (stationery, motorbike, electoronics, etc)	182,187,423	366,197,836	78,372,938	7,332,283
Communication (internet, radiobroadcast, etc)	5,709,702	98,330,799	94,606,271	101,702,374
Documentation	12,638,450	17,267,925	11,384,515	7,659,171
Operation and maintenance (generator, office space)	4,275,975	113,270,866	72,477,955	41,822,054
Allowance	2,573,101	16,344,506	20,131,790	112,852,007
Chemical analysis	0	0	214,037,627	0
Conference expense	0	0	2,553,401	15,232,240
Total	331,070,483	819,304,051	729,985,528	489,652,525
Grand total	2,370,012,587			

Year 1 (October, 2010 – March, 2011) Year 2 (April, 2011 – August, 2012)

Year 3 (October, 2012 – September, 2013) Year 4 (October, 2013 – September, 2014)

6. PLANS TRIED IN PROJECT IMPLEMENTATION

6.1 Alignment with Government Program

As presented in the section 1.2, the Government of Sierra Leone has been implementing the SCP under the NSADP since 2010 to vitalize the agricultural sector through the promotion of agricultural business activities by smallholder farmers. The SCP consists of six sub-programs (Component 1 to 6): (1) intensification, diversification, value addition, and market promotion of food crops focusing on rice; (2) small irrigation development; (3) Enhancement of market access through the improvement of rural roads; (4) improvement of access to agricultural finance; (5) establishment of social security, food security, and social safety net; and (6) strengthening of planning, coordination, monitoring, and evaluation systems. The SCP aims to achieve the respective objectives of these sub-programs. As required to align with the SCP in its implementation, the Project mainly supported Component 1 from the viewpoint of productivity enhancement.

Within the framework of the SCP, all the stakeholders active in agriculture and rural development fields are required to coordinate with the SCP. MAFFS established a system of information sharing among the stakeholders through the establishment of Agricultural Advisory Group (AAG) meeting, SCP general meeting, SCP sub-program meeting, SCP policy orientation meeting, and others. These meetings provided donors and NGOs with opportunities to share their activities and findings with other stakeholders. The JICA Project Team also reported its activities and their results to MAFFS, other donors, and NGOs in various occasions as requested aside from the JCC. In particular, the results of the soil fertility analysis conducted by the JICA Project Team, which clarified critically deficient nutrients for rice growth in the soils of Sierra Leone, received much attention from the Minister of MAFFS as well as many participants in the JCC. This led to cooperative efforts with several donors that promote rice production in Sierra Leone.

Such close coordination with the Government program contributed to the achievement of the Project purpose as well as the recognition of the Project. On the other hand, the Project's implementation followed the progress of the SCP in respect for the ownership of the Government of Sierra Leone. This reduced some flexibility of the Project resulting in the restriction of its activities, as presented in the section 7.1.

6.2 Process of Technical Transfer

The JICA Project Team transferred rice cultivation techniques to extension workers including community facilitators and FFS supervisors assigned to the FBOs supported by the SCP. Technical transfer in the Project was undertaken through many training sessions as presented in the section 5.2. In the training sessions, not only rice production techniques but also FFS planning and the results of the monitoring of other FFS at different sites were discussed. In so doing, information on the latest events happening in the field were shared among the extension workers. Also, the JICA Project Team experts visited FBO fields and provided technical guidance to the FBO farmers and their extension workers as necessary to help facilitate the effectiveness of their training. Through such

collaborative work, two extension workers of MAFFS-K were capacitated to train FBO farmers in rice cultivation technique by themselves.

6.3 Field Activities and Coordination with Central Government

From the beginning, the Project's field activities were based in Kambia District because they were targeted at FBO farmers and MAFFS-K extension workers. As mentioned in the section 6.1, the JICA Project Team prepared progress reports periodically and presented them at the JCC meetings to share the Project activities and their results with the committee members. Important findings and results of the Project were also reported at the AAG meeting and SCP-related meetings. However, the JICA mission for the mission of the mid-term review of the Project found such activities to be insufficient. The JICA mission recommended that the Project activities be undertaken in closer coordination and communication with the Sierra Leonean Government. This recommendation was based on the mission's viewpoint that the Project results would need to be disseminated all over the country as stipulated by the Project purpose.

Given the recommendation, the JICA Project Team, in cooperation with JICA, requested MAFFS to provide an office space for the Project activities in the MAFFS office buildings, and MAFFS arranged one room for the purpose. Also, the JICA Project Team set up a liaison office in the MAFFS Headquarters in Freetown and employed a local staff member to work in the office as a liaison. Further, at least one of the JICA Project Team experts was present several days a week working in the liaison office. With this increased presence in Freetown, contact between the Japanese Project Team members and MAFFS executive officers as well as other international donors and NGOs increased, so as the recognition of the Project.

6.4 Research and Extension

Pursuing productivity enhancement of rice through research and extension activities, the JICA Project Team supported MAFFS/MAFFS-K and SLARI/RARC technically and financially. One of the notable results of the research activities was the identification of P and S as the main growth limiting factors of rice in the lowland of Sierra Leone through a series of pot experiments at RARC. As a result of the pot experiments, it was found that P and S were severely lacking in the lowland soils. However, the rice growth environment is quite different between the experimental pot and the field, such as soil volume or root development zone, temperature, and solar radiation. The results of a pot experiment may not be replicated in the field. Therefore, based on the pot experiments' results, field experiments were planned with RARC researchers at farmers' rice fields. The purposes of the field experiments were to examine the effects of P dose on rice growth and yield and to determine the optimum combination of fertilizer to produce 3.0 t/ha yield that would generate a profit. From the results of the field experiments, it was concluded that 3.0 t/ha of rice yield could be obtained under fertilized condition and if necessary conditions such as proper water management and farming practices are provided.

These activities also helped reduce the gap between research (by RARC) and extension (by FBO farmers and MAFFS) by providing opportunities for RARC researchers to visit the field experiment site and for MAFFS extension workers to observe the pot experiments.

6.5 Collaboration with Other Donors and NGOs

During the project implementation period, many other donors including AfDB, World Bank, IFAD, WFP, FAO, and BRAC were active in the agricultural sector in Sierra Leone, and they contributed to the SCP sub-programs. The JICA Project Team became acquainted with staff members of many of these donors and exchanged information on project activities and results through various meetings and the distribution of *Project Newsletter*. In the course of association, those donors and the JICA Project Team came to see that the Project outcomes could complement many of their projects in a synergic manner. As a matter of course, the JICA Project Team commenced collaboration with several donors during the Project implementation period.

Examples of the JICA Project Team's collaboration with other international donors are presented below.

(1) AfDB

AfDB has implemented the Agricultural Sector Rehabilitation Project in five districts including Kambia aiming at enhancing agricultural production and farmers' income. In Kambia District, some facilities and farmland have been rehabilitated by this project (each contracted to local contractors): the office and other buildings of MAFFS-K, the staff quarters at RARC, and IVS[7] (including construction of drainage canal, peripheral canals, and bunds). The results of the rehabilitation of the facilities of MAFFS-K and RARC were satisfactory and generally acceptable. However, the land development works for the IVS were inadequate: inappropriate alignment of drainage and peripheral canals, insufficient or excessive discharge capacity of drainage canals, excessive bund size, no field leveling, etc. These conditions would certainly not help improve rice growth or yield. Such low quality construction was attributed to insufficient supervision of construction[8] and incompetent engineering work by the contractors. The JICA Project Team made some effort to improve the developed farmland in hope to change it to a favorable growth environment for rice. In so doing, the FBO farmers were mobilized to construct internal bunds and inter-drainage and to level the land within their capacity. At the improved farmland, the JICA Project Team, together with the extension workers, transferred appropriate rice cultivation techniques in the TP-R to the FBO farmers, resulting in enhanced productivity.

[7] In the true sense of the word, the rehabilitation of the IVS was farmland development, as there was almost no developed IVS in Kambia District, and the works started with a land survey.

[8] Though MAFFS was responsible for granting approval for the construction design and supervision of the IVS development, its capacity to assess the design and supervise the construction was inadequate due to the lack of time, survey equipment, and skilled engineers.

(2) BRAC

BRAC started its support for Sierra Leone in 2008. In agricultural development, BRAC provided various support projects including rice seed certification and production, rice production, vegetable production, technical extension, IVS development, and poultry in five districts. As BRAC supported the rice sector in Sierra Leone, the JICA Project Team started to associate with BRAC from the early stage of the Project through mutual visits to the sites of project activities and exchange of views on development. As part of the exchange, the JICA Project Team invited three BRAC agricultural staff to a TP-R training session for the staff of MAFFS district offices. The BRAC agricultural staff found the session to be highly effective and useful; they later conducted similar technical training to other local agricultural staff of BRAC using the presentation material provided by the JICA Project Team.

(3) WFP

The WFP launched an IVS development project in Port Loco District in 2013 with the financial support of the Japanese Government. In the project, food (for *food for work* as compensation for participating farmers' work), equipment, and technical guidance on rice production were provided to the local small farmers to increase their rice production. The JICA Project Team invited two engineers of the WFP to a TP-R training session to help them develop their capacity in rice production techniques. Also, one of the JICA Project Team experts visited the development area in the WFP project and advised WFP staff on the development. Aside from this, it was planned that the advanced FBO farmers in Kambia who had participated in TP-R training sessions would visit the WFP project area to transfer rice cultivation techniques to the farmer participants in the project. Also, the JICA Project Team conducted a study to examine the possibility of purchasing rice from the FBO farmer participants in the Project using the Purchase for Progress (P4P) approach.

(4) World Bank

The World Bank dispatched a mission to Sierra Leone to conduct the mid-term review of WAAPP in March to April in 2014. Several members of the mission visited Kambia in the end of March to observe the Project's training course on the TP-R for extension workers from all over the country. Having been impressed with the contents as well as facilitation of the course, the delegates requested JICA and MAFFS to provide similar training to extension officers in the neighboring countries involved in WAAPP, namely, Guinea and Liberia. In response to the request, the JICA Project Team in cooperation with MAFFS-K and MAFFS organized a special training session on rice cultivation techniques under the finance of WAAPP, and provided three-day training to 5 extension officers from Guinea and 26 officers from 13 MAFFS district offices in Sierra Leone in May 2014.

Through the activities presented in the above sections 6.1 through 6.5, the TP-R became widely recognized and its extension area coverage expanded. Aside from these activities, it is noted that the

JICA Project Team received a Brazil delegation in January 2014 and a GIZ mission in March 2014, respectively, in Kambia and exchanged views on the future collaboration.

7. LESSONS LEARNED FROM PROJECT ACTIVITIES

7.1 Collaboration with Government Program Financially Dependent on Other Donors

The SCP depended on external financial support for its implementation. In 2010, the first year of the program, the SCP received financial support from the EU Food Facility with FAO's technical assistance. In 2011, the Global Agriculture and Food Security Program (GAFSP) decided to provide the SCP with financial support under the management of IFAD.

However, as communication between the Sierra Leonean Government and IFAD has faltered, the implementation process of the SCP has been delayed. Especially the release of GAFSP fund for FFS-related activities to be carried out by extension workers in the respective sub-program (Component 1) was suspended until 2014. This affected the Project activities as well.

The cost of extension workers was not budgeted in the Project because its original plan was to only transfer technical knowhow to the extension workers assigned to the SCP. However, it soon became apparent that the delay in the delivery of GAFSP fund would negatively affect the Project implementation. Under the circumstance, the JICA Project Team was compelled to appropriate a budget for mobilizing the extension workers in Kambia District from the Project budget. Nevertheless, they were not motivated enough to conduct FFS probably because they were given no field allowance. This led to increase in the workload for field extension activities on the part of the JICA Project Team members.

As presented above, there were times when the Project activities were on the verge of delay or suspension because of the SCP's financial dependence on other donors. On one hand, the JICA Project Team respected the ownership of the Sierra Leonean Government and acted accordingly throughout the course of the Project implementation. On the other hand, the Team had to be prepared for any such emergency so that the expected results could be achieved without delay or suspension in the Project activities.

7.2 Strategic Human Resources Development for Rice Production Technical Extension

For rice farmers to understand the TP-R and realize increase in yield and income, they must have basic knowledge of rice growth and physiology. To help the farmers acquire the basic knowledge, the theory of rice growth and physiology is explained in simple words at the beginning of the guidelines prepared by the Project for the dissemination of the TP-R. The extension workers need to explain the knowledge to the farmers in the field. Although they may be able to tell when and how a specific farming practice should be performed, only a few of them can, at present, recognize problems with farming practices just by looking at rice plants growing in the field.

On advice from the JICA Project Team, MAFFS dispatched two MAFFS-K extension workers to Egypt to participate in the third country training course in rice cultivation techniques in 2013. They stayed in Cairo for six months to learn the basic knowledge of rice and related subjects (e.g., soil, climate, water, and irrigation) and practiced rice cultivation for one cropping season. Through this

course, they gained deep knowledge and experience in rice cultivation. It is expected that the two extension workers will disseminate what they learned in Egypt to their peers, leading to further development of the extension workers' capacity in rice production techniques.

JICA provides several training courses in rice production techniques in Japan to developing countries, to which MAFFS sends trainees every year. In 2012, six Sierra Leonean trainees were dispatched to one of the courses in rice cultivation at International Rice Research Institute (IRRI) in the Philippines. However, those trainees selected for the course were neither involved in the Project nor given chances to share their experiences with other MAFFS staff after they returned to Sierra Leone. The Government of Sierra Leone or MAFFS should provide opportunities for those trainees who have studied rice production techniques abroad to share their experiences with their peers working in rice development and exchange views on rice development in the country. Through such sharing, new knowledge and skills that they have acquired can be extended to other government staff, and their voices may be reflected in the future rice development policy, programs, and projects in Sierra Leone.

8. REVISION OF PDM

During the Project implementation period, the PDM was revised two times. The points of the revision are presented below; the original PDM (ver. 1) and the two revised versions (ver. 2 and ver. 3) are presented in Appendices 1-1 to 1-3.

8.1 PDM Version 1 (Original)

The original PDM (ver. 1), which was attached to the RD, was approved in the inception meeting. It was confirmed by the participants in the inception meeting that the PDM would be revised as necessary in the course of the Project implementation.

8.2 PDM Version 2

The PDM was revised at the mid-term review of the Project. The purpose of the revision was to set realistic and concrete indicators of the Project achievement and to ensure the sustainability of the Project as the extension area coverage of the revised TP-R expanded. The main points of the revision are the following:

- Determination of realistic and concrete indicators for the overall goal, Project purpose and the Project results for objective assessment of the achievement of the Project;
- Addition of a new Project result (Result 3, "The contents of the TP-R and its extension method are extended to the officers of MAFFS district agricultural offices other than MAFFS-K"); and
- Addition of activities related to Result 3 and modification of activities related to Result 1 and 2 according to the revised indicators.

8.3 PDM Version 3

The Project pursued productivity enhancement of rice focusing on the IVS ecology, and thus it was determined that the assessment of the overall goal of the Project, rice production increase in Kambia District, would be confined to rice production in IVS only. This decision was made because the effects of fertilizer application would be best examined at IVS rice fields in which water control was possible.

9. RECORD OF JOINT COORDINATING COMMITTEE MEETING AND DISCUSSION

During the Project period, the JCC meeting was held 8 times as shown in Table 9. Although the main objective of the JCC was to present and discuss the contents of the Project Progress Report (PPR), other topics such as cost-benefit analysis of rice production and introduction of hand tractors were dealt with in response to the request from MAFFS. The minutes of the JCC meetings are presented in Appendices 2-1 to 2-8.

Table 9. JCC Meetings

No.	Date	Venue	Number of attendants	Contents
1	1 Mar., 2011	Conference room Forestry Div., MAFFS	10	Discussion on the contents of PPR1 and approval thereof
2	9 Dec., 2011	Conference hall MAFFS	15	Discussion on the contents of PPR2 and approval thereof
3	19 Mar., 2012	Same as above	23	Discussion on the contents of PPR3 and approval thereof
4	10 Jan., 2013	Same as above	20	Discussion on the contents of PPR4 and approval thereof
5	19 Apr., 2013	Conference hall RARC	56	Inspection of Project sites and discussion on the contents of PPR5 and approval thereof
6	10 Dec., 2013	Conference hall MAFFS	18	Discussion on the contents of PPR6 and approval thereof; presentation on cost-benefit analysis of rice production; cropping pattern; and reports submitted by JICA training participants
7	24 Jan., 2014	Same as above	28	Discussion on the contents of terminal evaluation report and approval thereof
8	12 May, 2014	Same as above	20	Discussion on the contents of PPR7 and approval thereof; presentation on labor requirement for rice production in japan; an cost-benefit analysis on introduction of hand tractors

10. RECOMMENDATIONS TO THE GOVERNMENT OF SIERRA LEONE

10.1 Dissemination of TP-R

After the completion of the Project in November 2014, MAFFS is expected to take responsibility for disseminating the TP-R to FBO farmers through extension workers. A total of 102 staff members of MAFFS district offices all over Sierra Leone participated in the training course on the TP-R offered in the Project. In the training course, they were provided with an extension package (consisting of extension guidelines, manual, and material). Since the completion of the training course in April 2014, the Agricultural Extension Division of MAFFS Headquarters has instructed those who received the training to transfer the knowledge of the TP-R to FEWs. They are expected to review the contents of the TP-R and the extension method by themselves to fully understand what they have learned before disseminating them to the FEWs. On the other hand, MAFFS Headquarters should prepare a training program on the TP-R for the FEWs of every district office and monitor the implementation.

As recommended in the TP-R, while improved farming practices and fertilizer application are necessary to realize optimum yield, preparation of fields in which water can be controlled and managed is prerequisite to make the best use of fertilizer. However, there are not so many such rice fields at present. Under the current situation, profit to be generated by yield increase is unlikely to be able to cover the cost of fertilizer. In consideration of the farmers' financial situation, when applying the TP-R, it is strongly recommended to introduce improved farming techniques first. If fertilizer is used, financial support such as a subsidy for the purchase of fertilizer should be provided.

10.2 Continuation of Fertilizer Trial on TP-R

It was verified that yield of 3.0 t/ha or more could be obtained at farmers' fields through the fertilizer trials on the TP-R conducted several times during the Project period. However, optimal fertilizer dose should be reexamined, as yield itself as well as yield response to fertilizer dose varied among the soils tested, perhaps due to the difference in soil fertility. The types of cultivation trials considered to be necessary are as follows:

(1) Trials with periodical planting throughout the year to examine the effects of solar radiation on grain yield,
(2) Trials with high P dose based on the result of the high P adsorption coefficient,
(3) Trials with S treatment given the severe S deficiency in many soils, and
(4) Fertilizer trials with various combinations of nutrients.

10.3 Development and Update of Rice Cultivation Techniques in Other Agro-ecologies

The revised TP-R was developed based on the IVS condition in the light of its potential identified in the National Rice Development Strategy. However, there are five agro-ecologies for rice production in Sierra Leone: mangrove swamp, IVS, boliland, riverine, and upland. When applying to other

agro-ecologies, the revised TP-R needs to be modified according to the specific condition of the respective ecology. It is recommended that MAFFS, SLARI, and RARC make efforts to develop and update cultivation techniques as necessary to increase rice production in the agro-ecologies aside from IVS.

10.4 Development of IVS and Promotion of Land Development

There is almost no developed IVS in Kambia District. In undeveloped IVS, it was often observed during the Project that water control was difficult during cropping seasons, rice growth was hindered by flood or deep water, and that fertilizer was ineffective. All of these conditions would lead to poor grain yield. There have been some IVS development projects implemented by external funding (e.g., AfDB and IFAD) to improve the present situation nationwide. However, the quality of engineering works is far from satisfactory. IVS should be developed with proper facilities to control and manage water, solid bunds to keep water inside, and leveled fields to provide uniform water condition for rice. In such IVS, rice plants can grow uniformly, and yield can be enhanced with proper rice farming practices and fertilizer application.

Thus, the level of engineering should be improved for proper development of IVS. It is also recommended that in land development, construction of contour bunds be introduced to reduce earthwork for land leveling and that the construction be carried out by farmers themselves.

10.5 Reexamination of FBO Supported under SCP

The JICA Project Team has made as much effort as it is able to transfer the cultivation techniques in the TP-R to FBO farmers supported by the SCP through training and guidance, as the support from the SCP to one FBO was limited to only one cropping season. However, it still has a long way to go to sufficiently build the farmers' capacity. While it is not known how FFS will be implemented under the SCP in the future, certain mechanism should be developed to continue support for FBOs in rice cultivation techniques and provide it for at least two cropping seasons.

If there are enough water sources in an IVS, technical support for double cropping may be provided. As attempted during the Project, repeated training to FBO farmers can be effective. Three training sessions including FFS are recommended: (1) to learn rice growth and physiology with farming practices before the cropping season, (2) to review the farmers' regular practices in comparison with recommended methods after the cropping season, and (3) to monitor the rice growth during the cropping season in the FFS format. Visit exchange between FBOs is also considered to be effective.

APPENDICES

(1) Project Design Matrix (Version 1)

Project Title: Sustainable Rice Development Project in Sierra Leone
Project Period: 2010 August – 2014 July
Implementing Agency: Ministry of Agriculture, Forestry and Food Security (MAFFS)
Target Area: Kambia district
Beneficiaries: 10 -15 rice producing FBOs, RARC and MAFFS Kambia office (MAFFS-K)

Date: July 19, 2010

Narrative Summary	Indicators	Source	External conditions
Overall Goal To increase production and incomes of small-scale rice farmers in Sierra Leone	- Self sufficiency of Sierra Leone in rice increase to 70-100%	National agricultural statistics	- No significant change in national policy on rice development is made.
Project Purpose To establish rice production techniques and its extension method which are applicable throughout Sierra Leone	- XX % of MAFFS officials in each district confirms effectiveness of the TP-R and its extension method.	Project reports Workshop at the end of the Project	- Necessary budget for extension of the TP-R is secured.
Outputs 1. To elaborate the Technical Package for Rice (TP-R) through on-station and on-farm verification	- XX % of trial farms which applied TP-R accomplish production target. - XX % of the rice produced in trial farms which applied TP-R satisfy the quality target. - The elaborated TP-R is drawn up.	Project reports	- No major barrier appears in extending TP-R to other districts.
2. To extend TP-R to small-scale farmers through Farmers Based Organizations (FBOs) in Kambia district	- XX rice farmers take the trainings on rice production. - XX % of rice farmers which took trainings apply the technical package.	Project reports	

Activities

1-1. To collect information on rice production in other districts than Kambia and conduct field survey, as necessary
1-2. To decide direction for elaboration of the current TP-R
1-3. To make annual plans of TP-R trials with a good combination between on-station and on-farm verification
1-4. To select FBOs where on-farm TP-R trials are implemented
1-5. To implement on-station trials at the research fields of the Rokupr Agricultural Research Center (RARC) and on-farm trials at selected FBOs' farm fields
1-6. To monitor and analyze findings of the trials in view of various aspects
1-7. To reflect to TP-R the results of the trials and reaction of farmers involved in extension activities

2-1. To make annual plans of extension in line with the Farmers Field School (FFS) method
2-2. To revise the manuals and materials made in the Agricultural Development Project in Kambia
2-3. To select demonstration farms in collaboration with the selected FBOs
2-4. To train Front Extension Workers (FEWs) and farmer facilitators of the selected FBOs
2-5. To set demonstration farms in collaboration with the selected FBOs
2-6. To implement extension activities based on the demonstration farms
2-7. To monitor progress of the extension activities
2-8. To wrap up the results of the extension activities and compile them to an improved extension method of TP-R

Inputs

< Japanese Side >
- Experts
  1. Chief adviser
  2. Rice cultivation technique
  3. Post-harvest technique
  4. Extension
  5. Farmers organization
  6. Coordination
- Equipment
  1. Vehicles
  2. Necessary equipment for extension activities
  3. Other necessary equipment
- Counterpart training in Japan
- Operational expenses

< Sierra Leonean side >
- Counterparts
- Project office
- Facilities for technical verification at RARC
- Operational expenses

- FEWs who took the trainings remain in the same position.

Pre-condition

- Security condition in the target areas does not deteriorate.

Project Title: Sustainable Rice Development Project in Sierra Leone
Project Period: 4 years (from October 2010 to September 2014)
Implementing Agency: Ministry of Agriculture, Forestry and Food Security (MAFFS)
Target Area: Mainly Kambia district
Beneficiaries: FBO farmers supported under SCP, RARC and MAFFS Kambia office (MAFFS-K)

Date of revision: July 10, 2012

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal To increase rice production in Kambia district To apply the Technical Package on Rice Production (TP-R) and extension method[1] all over Sierra Leone	1. Rice production is increased 30 % in Kambia district compared with the rice production in 2014. 2. Extension workers of the district agricultural offices in the country other than Kambia district disseminate revised TP-R using extension method developed under the Project to farmers more than 10,000 persons by the end of 2018	1. Statistical data on rice production 2. Data of the district agricultural offices in the country,	- No significant change in national policy on rice development is made.
Project Purpose To establish rice production techniques and its extension method which are applicable throughout Sierra Leone	1. TP-R and extension method are officially endorsed by MAFFS 2. 80 % of MAFFS officials who received training in each district confirm effectiveness of the TP-R and its extension method.	1. Document of endorsement 2. Results of questionnaire survey to officials of MAFFS district agricultural offices	- Necessary budget for extension of the TP-R is secured.
Outputs 1. To revise the TP-R, which can realize higher yield and profit, through on-farm verification	1-1. More than 3.0 Mt/ha of yield[2] is obtained more than 80% of locations of on-farm verification, where revised TP-R is applied, in the cropping seasons by 2013. 1-2. Revised TP-R, that includes method on appropriate dosage of fertilizer and profitability, is developed. 1-3. A manual on TP-R for use of extension workers is produced.	1-1. Project reports 1-2. Document on TP-R 1-3. Manual on TP-R	- Water control environment is ensured. - Fertilizer is secured by FBO farmers
2. To extend TP-R to small-scale farmers through Farmers Based Organizations (FBOs) in Kambia district	2-1. More than 300[3] FBO farmers receive training on TP-R 2-2. More than 50% of the FBO farmers who received training applies several techniques of the TP-R. 2-3. Extension materials for disseminating revised TP-R are prepared 2-4. A guideline on implementation of Farmer Field School (FFS) on rice cultivation based on the TP-R is developed.	2-1. Project reports 2-2. Sample Survey to farmers 2-3. Extension materials 2-4. Guideline on implementation of FFS	
3. To extend the contents of TP-R and an extension method to officials of MAFFS's district agricultural offices other than MAFFS-Kambia.	3-1. 30 officials acquire knowledge and skills of TP-R and extension method.	3-1. Project reports	

Project Design Matrix (Version 3)

Project Title: Sustainable Rice Development Project in Sierra Leone
Project Period: 4 years (from October 2010 to September 2014)
Implementing Agency: Ministry of Agriculture, Forestry and Food Security (MAFFS)
Target Area: Mainly Kambia district
Beneficiaries: FBO farmers supported under SCP, RARC and MAFFS Kambia office (MAFFS-K) Date of revision: September 10, 2014

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal To increase rice production in Kambia district[i] To apply the Technical Package on Rice Production (TP-R) and extension method[ii] all over Sierra Leone	1. Rice production is increased by 30 % in Kambia district compared with the rice production in 2014. 2. Extension workers of the district agricultural offices in the country other than Kambia district disseminate revised TP-R using extension method developed under the Project to farmers more than 10,000 persons by the end of 2018	1. Statistical data on rice production 2. Data of the district agricultural offices in the country,	- No significant change in national policy on rice development is made.
Project Purpose To establish rice production techniques and their extension method, which are applicable throughout Sierra Leone	1. TP-R and extension method are officially endorsed by MAFFS 2. 80 % of MAFFS officials who received training in each district confirm effectiveness of the TP-R and its extension method.	1. Document of endorsement 2. Results of questionnaire survey to officials of MAFFS district agricultural offices	- Necessary budget for extension of the TP-R is secured.
Outputs 1. To revise the TP-R, which can realize higher yield and profit, through on-farm verification	1-1. More than 3.0 Mt/ha of yield is obtained more than 80% of locations of on-farm verification, where revised TP-R is applied, in the cropping seasons by 2013[iii]. 1-2. Revised TP-R, that includes method on appropriate dosage of fertilizer and profitability, is developed. 1-3. A manual on TP-R for use of extension workers is produced.	1-1. Project reports 1-2. Document on TP-R 1-3. Manual on TP-R	- Water control environment is ensured. - Fertilizer is secured by FBO farmers
2. To extend TP-R to small-scale farmers through Farmers Based Organizations (FBOs) in Kambia district	2-1. More than 300 FBO farmers[iv] receive training on TP-R 2-2. More than 50% of the FBO farmers who received training applies several techniques of the TP-R. 2-3. Extension materials for disseminating revised TP-R are prepared 2-4. A guideline on implementation of Farmer Field School (FFS) on rice cultivation based on the TP-R is developed.	2-1. Project reports 2-2. Sample Survey to farmers 2-3. Extension materials 2-4. Guideline on implementation of FFS	
3. To extend the contents of TP-R and an extension method to officials of MAFFS's district agricultural offices other than MAFFS-Kambia.	3-1. 30 officials acquire knowledge and skills of TP-R and extension method.	3-1. Project reports	

[i] Production increase is expected to happen in the rice fields in IVS (Inland Valley Swamp).

[ii] Extension method means the practical guideline on implementation of FFS and extension materials on rice cultivation

[iii] Applicable places are rice fields in IVS where field water control is possible for effective fertilization.

[iv] FBO farmers which are advised and monitored intensively by Supervisors and Japanese experts in wet season of 2012 and 2013

Activities	**Inputs**	- Extension workers who took the trainings remain in the same position.
1-1. To collect information on rice production in other districts than Kambia and conduct field survey, as necessary 1-2. To decide direction for revision of the TP-R developed at the previous JICA cooperated project 1-3. To make annual plans of TP-R trials (on-farm verification) 1-4. To select locations where on-farm verification on TP-R are implemented 1-5. To implement pot-experiments of fertilizer application at the Rokupr Agricultural Research Center (RARC) and on-farm verifications at selected farm fields 1-6. To monitor and analyze findings of the pot-experiment and on-farm verifications in view of various aspects 1-7. To reflect the results of the on-farm verifications and reaction of farmers involved into TP-R 2-1. To make annual plans of extension in line with the Farmers Field School (FFS) method 2-2. To produce draft guideline on implementation of FFS on rice cultivation based on TP-R and extension materials for FFS 2-3. To select FFS test plots in collaboration with the selected FBOs 2-4. To prepare training materials for extension workers and farmer facilitators 2-5. To train Front Extension Workers (extension workers) and farmer facilitators of the selected FBOs 2-6. To implement extension activities based on the FFS test plots 2-7. To monitor progress of the extension activities 2-8. To wrap up the results of the extension activities and compile them to an improved extension method of TP-R 3-1. To make training plan for officials of the district agricultural offices of MAFFS other than Kambia district. 3-2. To conduct trainings on TP-R and extension method 3-3. Monitor situation of utilization of TP-R and extension method at each district office	< Japanese Side > - Experts 1. Chief adviser 2. Rice cultivation technique 3. Post-harvest technique 4. Extension 5. Farmers organization 6. Coordination - Equipment 1. Vehicles 2. Necessary equipment for extension activities 3. Other necessary equipment - Counterpart training in Japan and/or third country - Operational expenses < Sierra Leonean side > - Counterparts - Project office - Facilities for technical verification at RARC - Operational expenses	**Pre-condition** - Security condition in the target areas does not deteriorate.

Minutes of the Joint Coordinating Committee Meeting on the Baseline Survey Report and Progress Report 1 for the Sustainable Rice Development Project in Sierra Leone

The first Joint Coordinating Committee Meeting (the Meeting) on the Sustainable Rice Development Project (SRDP) in Sierra Leone (the Project) was convened at the conference room of the Forestry Division of the Ministry of Agriculture, Forestry and Food Security (MAFFS), Youyi Building, at 10:00 a.m. on 3rd March, 2011. The attendants are shown in Annex 1.

The Meeting, chaired by Mr. Francis A. R. Sankoh, Director General, MAFFS, proceeded according to an agenda as shown in Annex 2.

In his opening remarks, the chairman apologized for poor attendants, due to other important meetings taken place on the same day. Nevertheless, the chairman insisted on the importance of the Project and the necessity of the technical cooperation extended by the Project, and the Meeting proceeded.

1. Minutes of the Inception Meeting

The minutes of the inception meeting (Annex 3) was distributed and discussed. Main points of the discussion on the minutes of the inception meeting were shown in the following.

Comment No.11 (of the Minutes of the Inception Meeting): Although the both sides agreed on the RD, some issues related budget (counterpart funds and transport of JICA's experts, etc) would be carefully discussed within the Ministry again because of necessity of arrangement with the Ministry of Finance and Economic Development (MOFED).

Chairman: Counterpart fund should be given by the Project

Chief Advisor, JICA: This is regarding the clarification on the undertakings of the Sierra Leonean Government, undertakings of which are stated in the Project's Record of Discussion which have been agreed upon and signed by the both Governments before the commencement of the Project. We expect the Sierra Leonean Government would make efforts to shoulder its counterpart fund as it could lead to the assurance of the Project sustainability.

RARC provided the Project with one permanent counterpart at the cost of RARC.

No.12: Some incentive for technical staff should be taken in consideration like other development partners (AfDB, World Bank etc)

Chairman: What do you think about this issue? Technical staffs usually have some incentives including allowance, fuel, etc. to implement their activities.

Chief Advisor, JICA: We have provided three (3) motorbikes to one Community Facilitator (CF), one District Coordinator (DC), and one RARC counterpart, respectively, to facilitate implementation of the

Project activities.

Chairman: Not only motorbikes but also fuel should be provided to support the assigned staff's activity.

Chief Advisor, JICA: CFs under SCP are receiving allowance at this moment. Besides, results and/or outputs of the Project are expected to be replicated to other districts as the Project aims to improve TP-R and establish an extension system which can be applicable throughout the country. If we provide any allowance to them to motivate their SCP related activities, you also have to follow the same manner in other districts. We have to be careful not to press the budget of Sierra Leonean Government further. When we ask them to do extra work, of course, we are willing to provide the allowance as compensation.

Chairman: CFs have to extend the number of FFS to fulfill our responsibility to increase the productivity, and for this we need fuel and provision of two (2) motorbikes is not enough.

Chief Advisor, JICA: We provided 24 motorbikes in the previous project and many of them are still operational. During the first phase for the Project, we just provided the motorbikes for those who do not have mobility and spare parts for DCs. We are not planning to increase the number of FFS in the Project, because we are supposed to support the FBOs under SCP in developing their members' capacity through the establishment of FFS. But we are willing to change and/or modify our proposed plan depending on SCP framework.

No. 1: PEMSD should be involved in the monitoring of the Project.

Sierra Leonean Participant: According to this issue, PEMSD is expected to be involved monitoring the project. PEMSD always should be involved. Is there any possibility PEMSD will be provided their mobility?

Chief Advisor, JICA: We understand the importance and necessity of monitoring and evaluation under SCP, and therefore we always welcome to collaborate with PEMSD. However, as the PEMSD is not a member of the Monitoring committee, we have not considered the issue on the mobility of PEMSD. We take note of this issue. What is the more important constraint for PEMSD, mobility or human resources?

Chairman: PEMSD plays a very important role to estimate rice production and yield through yield survey at sample plots in the rice fields of various ecologies. Through the yield survey, we will estimate more accurate production. However, due to lack of resources, we cannot have that data. We need mobility to do this work.

No. 10: Monitoring Committees should be chaired by a third person. The District Agriculture Committee at the Kambia District Council should be involved to the project implementation body.

Sierra Leonean Participant: What does this issue mean? What are the relationship between the project and District Council at present?

Chief Advisor, JICA: The Monitoring Committee (MC) is supposed to be held at quarterly basis with District Agricultural Officer (DAO) of Kambia as a chairperson. However, DAO is also an implementer as a project manager for this project. In the inception meeting, therefore, one recommended us that the MC should be chaired by a third person, as it is difficult to conduct a fair and independent review under such set up.

We do not have enough linkage with District Council so far. We explain our activity to the Council from time to time.

No. 2: JICA establishes demo-farm for a trial, while SCP pursues commercialization. Does JICA still continue experiment?

Sierra Leonean Participant: Are you still planning to conduct the some experiments?

Chief Advisor, JICA: Answer is yes. We are mandated to attain the Project objective mainly through two outputs in the Project: (i) to elaborate technical package on rice (TP-R), and (ii) to extend the TP-R to small scale farmers through FBO (FFS). To obtain these outputs, on-farm and on-station trials will be conducted in collaboration with RARC.

Chairman: As a conclusion, please think about the support of M&E and other relevant staff members. Fuel should be provided one gallon per week for each CF to facilitate their activities.

Chief Advisor, JICA: As I said, we are willing to work with PEMSD, but for the support we really need to know the current M&E system you are adopting. We take note of the fuel issue.

After the above discussions, the Minutes of the Inception Meeting was adopted.

2. Presentation of Baseline Survey Report and Progress Report 1

After the discussion on the minutes of the Inception Meeting, Chairman asked Mr. Takashi KIMIJIMA, Chief Advisor of the Project (SRDP), to present the Baseline Survey Report and Progress Report 1.

The JICA Chief Advisor of the Project made presentations on the two reports using a Power Point (Annex 4), along with the main portion of the Progress Report 1, which was distributed to the participants (Annex 5).

After the presentation, the following discussions were made.

Sierra Leonean Participant: We now understand the performance of the staff and level of inputs you mentioned in your presentation. There are still several issues about rice cultivation such as land preparation, harvesting, etc., and women usually are engaged in uprooting, transplanting and post-harvest activities.

Chairman: To reduce the heavy burden from farmers, labor saving activities (machinery) must be introduced. Research work with RARC is also important because they have been conducting a lot of experiment since the station was established in 1934.

RARC representative: We are now planning and implementing some research works under WAAPP and CARD. Of course, machinery is one of the targets, while extension activities to fill the gap between research and farmers' reality are also required. RARC always welcomes the technical advice from JICA.

Chairman: Capacity of staff is sometimes insufficient. Training for extension workers should be conducted continuously and you also should train farmers as well.

We understand you have some absent period from March to April. Who will manage the project during that period? Although the project should be looked after by DAO, I do not think DAO is good enough to handle the project. Therefore, we recommend you to hire the national counterpart for the proper project operation, and it must help you, even though you are absent.

Chief Advisor, JICA: TP-R is expected to be a comprehensive one including various farming practices like land preparation, weeding, etc.

We understand RARC has long experiences with some decades, but unfortunately, there has not been a detailed technical package for extension workers to utilize. During the Project period, JICA experts will work closely with RARC researchers to improve the present TP-R through a series of experiments.

We understand mechanization is required in the future, but in the light of circumstance at present we do not think it will work well immediately. We need cost-benefit analysis, well managed services with good mechanics, etc., so that farmers could really be benefited from mechanized agriculture. Operation and maintenance of the sophisticated machinery require human capacity of various field, and it will take long time to develop such capacity.

Chairman: We know the feasibility of mechanization depends on farming scale. However, mechanization is a must for further development. Without mechanization there will be no progress. We need high quality machine with durability.

Sierra Leonean participant: In page 3-3 of the handouts, third item of 2) above, it is mentioned that farmers are willing to participate in the development of IVS without payment if proper guidance is given. Is it true? As far as I know, farmers do not work without any incentives.

Chief Advisor, JICA: In the course of the first phase activity, we made dialog with the farmers in two villages, which were candidate of on-farm trial for TP-R improvement. There, we have come to know they were willing to participate in the swamp development without incentives under the conditions that technical guidance is offered and farming tools are provided as necessary.

Chairman: As a conclusion, please continue and intensify the training, involving the CFs and FBO farmers. I recommend you to hire a national counterpart at your own cost to make the project operation smooth and efficient with MAFFS while the experts are absent, so that the project will not be interrupted. We still need more mobilization and would like to move forward with the mechanization.

The Meeting was adjourned at 12:30 p.m.

end

Annex 1 List of participants on the First Joint Coordinating Committee

Sierra Leonean Side:

Name	Position	Organization
Mr. Francis A.R. Sankoh	Director General	MAFFS
Dr. Idriss Baggie	Research Coordinator (Officer in charge)	SLARI (RARC)
Mr. Abdul Rahman Kamara	Irrigation Engineer, SCP Component 2	MAFFS
Mr. Mac. A. Bockari	Assistant Director (Forestry)	MAFFS
Mr. Cyril Konnel	Assistant Director (Forestry)	MAFFS
Mr. Mohamed H. Deen	Livestock Officer	MAFFS

Japanese Side:

Name	Position	Organization
Mr. Takashi Kimijima	Chief Advisor of SRDP	JICA-SRDP
Mr. Mitsuharu Takemura	Coordination/Ass. Cultivation Technique (Extension)	JICA-SRDP
Mr. Masahiro Yoshikawa	Representative	JICA Sierra Leone Field Office
Mr. Joseph K. Lewis	Programme Officer	JICA Sierra Leone Field Office

AGENDA OF THE JOINT COORDINATING COMMITTEE (JCC)
ON THE SUSTAINABALE RICE DEVELOPMENT PROJECT IN SIERRA LEONE

Venue: Conference room, MAFFS, Youyi Building
Date: 3rd March, 2011
Time: 10:00am

TIME	ACTIVITY
10:00-10:10	**Opening** 1. Chairman's Opening Remarks – Hon. Minister
10:10-11:10	**Summary** 1. Review of minutes of the inception meeting 2. Presentation of Progress Report and Baseline Report
11:10-11:40	**Discussion**
11:40-11:55	**Conclusions and next steps**
11:55-12:00	**Closing Remarks**

Minutes of the Inception Meeting on the Sustainable Rice Development Project in Sierra Leone.

The captioned meeting was held at 10:00 on 7th October, 2010 at Conference hall of the Ministry of Agriculture, Forestry and Food Security, Youyi Building.
The meeting was chaired by Permanent Secretary, Mr. Edward M. Kargbo.
Mr. Takashi KIMIJIMA, Chief advisor submitted twenty copies of Inception Report on the Project, and made presentation on the contents of the Inception Report using Power Point.
He clarified the objectives and expected results of the Project, explained the planned activities to attain the objectives, institutional setup expected, and undertakings of JICA and Sierra Leonean Government.
After the presentation, comments, clarification, suggestions were made from the participants. Main ones are the following.

1. PEMSD should be involved in the monitoring of the Project.
2. JICA establishes demo-farm for a trial, while SCP pursues commercialization. Does JICA still continue experiment?
3. For commercialization, post-harvest aspects are important. But, there is no mentioning about this aspect in the presentation.
4. Processing is important for value addition of rice. Post-harvest aspects should be looked into in the Project.
5. Federation of National Farmers was established to streamline the four national farmers' organizations. Farmers groups should be a part of the Project team.
6. In the presentation, the Project seems train only extension workers. FBO farmers and research people should also be trained.
7. There were many research works conducted in 1970s and 80s at RRS-R. Specialities and knowledge of RARC's researchers and technical staff of MAFFS Crop Service Division should be fully utilized.
8. One of the key issues in establishing technical package which are applicable to farmers is varieties and qualities of fertilizers. In addition, process and value addition should be taken into consideration.
9. In order to solve mobility constraint in the Ministry, motorbikes should be provided to division of M&E.
10. Monitoring Committees should be chaired by a third person. The District Agriculture Committee at the Kambia District Council should be involved to the project implementation body.
11. Although the both sides agreed on the RD, some issues related budget (counterpart funds and transport of JICA's experts, etc) would be carefully discussed within the Ministry again because of necessity of arrangement with the Ministry of Finance and Economic Development (MOFED).

12. Some incentive for technical staff should be taken in consideration like other development partners (AfDB, World Bank etc).
13. Portion of budget should be seriously considered. Cost of despatching international experts in a district is more than portion of material's provision to farmers.
14. Land preparation is key issues for improvement of rice yield.
15. The Agricultural Development Guideline should be copied and circulated among stakeholders.
16. There are no clear strategies of spread out into nationwide of Technical Package for Rice while implementing only in the Kambia district for four years.
17. During a baseline survey, it is necessary to study production cost which farmers actually spend.
18. Donor coordination should be necessary under the CSP.

The Sustainable Rice Development Project in Sierra Leone

Presentation of Progress Report 1 and Baseline Survey Report

3rd March, 2011
MAFFS Conference Room,
Youyi Building

Project Purpose and Outputs

- Project Purpose:
  To establish rice production techniques and its extension method which are applicable throughout Sierra Leone
- Outputs:
  - To elaborate the Technical Package on Rice (TP-R) through on-station and on-farm verification
  - To extend the TP-R to small-scale farmers through Farmers Based Organizations (FBOs) in Kambia

Approach to the Project 1

(1) Elaboration of TP-R
- To obtain higher yield (target yield to be set)
- To pursue profitability
- IVS is the target ecology to be focused

(2) Dissemination of TP-R to FBO farmers
- To develop capacity of extension workers (community facilitators) assigned to the FBOs
- To adopt Farmer Field School (FFS) as extension method

1. Project Activities during the First Phase (Oct. 2010 – Feb. 2011)

a. Inception meeting
b. Baseline survey
c. Training of CFs and DCs on lowland rice cultivation technique
d. Designing of experiment for improving technical package on rice production
e. Provision of equipment for the Project implementation

1. Project Activity
a. Inception Meeting

Meeting with:
MAFFS (Oct. 6, 2010),
MAFFS-K (Oct. 12, 2010),
RARC (Oct. 17, 2010)

- Project objective and expected results
- Project activities planned
- Implementation set up
- Clarification of undertakings of JICA and MAFFS

1. Project Activity
b. Baseline survey

1 Rice production trend and rice related projects (statistical data analysis)
2 Characteristics of IVS and rice cultivation (field reconnaissance)
3 Situation IVS under FBO/SCP (field reconnaissance)
4 Situation of FFS (interview to CFs and DCs, visit to FFS experiment plots)
5 FBOs supported under SCP (inventory of FBOs supported by SCP, interview to FBO members)
6 Adoption of improved rice cultivation techniques in the pilot project sites in the previous project (interview to the farmers groups of the pilot projects)

1. Project Activities
c. Training of SCP extension workers

1. Target: 10 community facilitators, 3 district coordinators, 3 BES, and 1 SMS (extension) at MAFFS Kambia; Total of 17.
2. Duration: 4 days (Feb. 7 – 10, 2011)
3. Contents: Lecture on rice production techniques (life cycle, growth duration, seeds, land preparation, crop management, fertilizer application, harvest and post-harvest, cost-benefit analysis, yield survey), mini-test, homework
4. Materials: Technical package and manual on rice production (JICA, 2009), and handouts, power point presentation

1. Project Activities
d. Designing of experiment

A series of discussions have been held with RARC. Main discussion points included:

1. Experiment themes and methods for technical package improvement, and
2. Project related equipment to be provided by JICA (equivalent to US$100,000).

1. Project Activities
e. JICA's Inputs during the first phase

1 Sending Japanese experts (7 experts with 15 person-months from Oct. 2010 – Mar.2011)
2 Reprint of technical package and manual on rice production (1,000 copies)
3 Preparation of project pamphlet (100 copies)
4 Provision of GPS (7 units) and topo-maps (for Kambia district) for IVS inventorization
5 Provision of motor-bike (3 units), one each for CF, DC and RARC, and spare parts of motor-bike for DCs
6 Office equipment (Desktop computer (2), a printer, a photocopy machine, a projector, digital camera (2), etc.) and furniture (desks (5) and chairs (8), etc.) to MAFFS Kambia

2. Findings and Issues
IVS development and utilization (1)

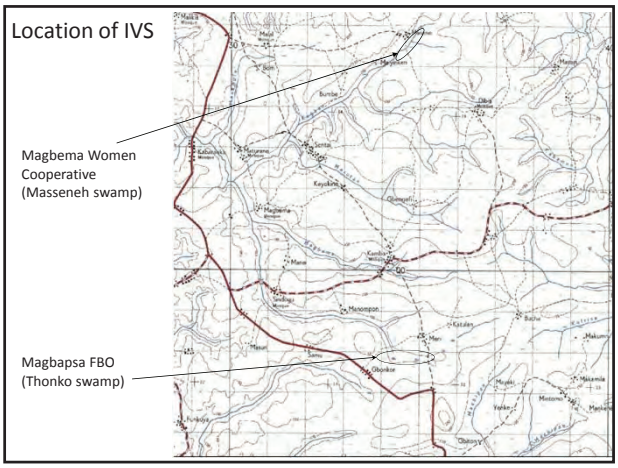
- Characteristics of IVS and rice cultivation (comparative study between Kambia and other districts)
  - IVSs in Kambia are generally smaller in scale as compared to other districts due to the topographic conditions
  - IVS development is left behind in Kambia
  - Improved rice cultivation technique has not been disseminated well in Kambia
  - Soil conditions and diseases do not vary much among districts.

2. Findings and Issues
IVS development and utilization (2)

- IVS development situation in Kambia
  - Contribution of ASREP intervention for IVS development is modest due to its status of partial development
  - ASREP intervention failed to involve beneficiary farmers in the development works because of not fulfillment of their commitment
  - Farmers are willing to participate in the development of IVS without asking money if proper guidance is given.

2. Findings and Issues
IVS development and utilization (3)

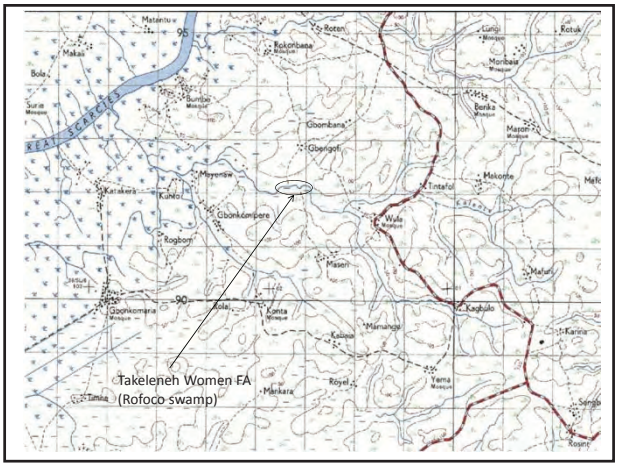
- IVS development by FBOs supported by SCP
  - None of IVS has been utilized fully. Development scale was 15 ha at maximum. The least area was less than 3ha.
  - Some IVSs have limited development potential due to its location, while other IVSs have peaty soil where machinery cultivation is difficult.
  - Difficult access to IVS is another constraint to machinery utilization.
  - Use of fertilizer is minimal under the above situation.
  - Estimated yield in very low (less than 0.5 ton/ha in many cases)


Location of IVS
Magbema Women Cooperative (Masseneh swamp)
Magbapsa FBO (Thonko swamp)


Masseneh swamp,
5th Nov. 2010

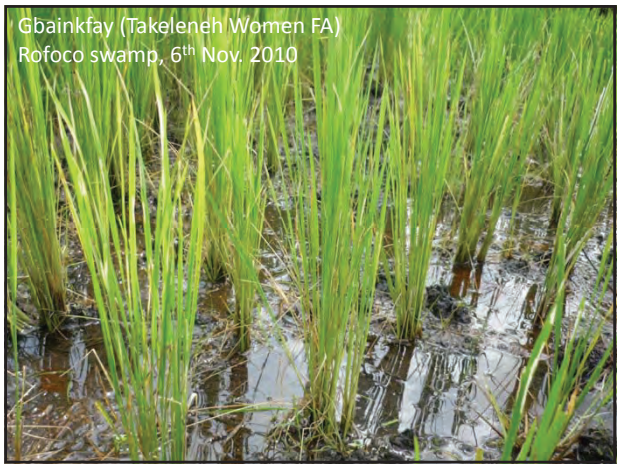

Magbapsa FBO (Thonko swamp),
5th Nov. 2010


Magbapsa FBO (Thonko swamp),
5th Nov. 2010


Takeleneh Women FA
(Rofoco swamp)


Gbainkfay (Takeleneh Women FA)
Rofoco swamp, 6th Nov. 2010


Gbainkfay (Takeleneh Women FA)
Rofoco swamp, 6th Nov. 2010


Gbainkfay (Takeleneh Women FA)
Rofoco swamp, 6th Nov. 2010


Gbainkfay (Takeleneh Women FA)
Rofoco swamp, 6th Nov. 2010

3. Findings and Issues Situation of FFS (1)

- Attitude of Community facilitators (CF) and District coordinators (DC)
  - 10 CFs and 3 DCs of Kambia district have received FFS training at Makali two times (2008-2009, 2010)
  - 28 FFS were conducted at the field of FBOs. One CF was responsible for 2 to 3 FFS
  - They were supposed to sensitize the FBOs, establish experiment plots, and made regular visits for technical guidance.
  - However, 14 FFS only have established experiment plots.
  - Established experimental plots were poorly managed in many cases

3. Findings and Issues Situation of FFS (2)

- Capacity of CF and DC
  - Results of training: Grade A (7); B (8); and C (2)
  - In general, they do not have enough capacity in calculation (seed rate, fertilizer application, etc.)
  - Their capacity on rice cultivation technique has not fully developed yet, and need continuous training.

Examples of calculation test 1

- Calculate rice seed requirement (xx kg/ha, and yy kg/acre) under the following assumptions.
  - 1) Plant density is 20 hills/m2;
  - 2) Number of seedlings is 3/hill;
  - 3) Germination rate is 80%;
  - 4) 1,000-grain weight is 25 g

    (A.=18.75kg/ha)

Examples of calculation test 2

- In case that the fertilizer application rate is 60 kg/ha of N, 40 kg/ha of P_2O_5, and 40 kg/ha of K_2O, how many kg of compound fertilizer (15-15-15) and Urea are necessary for 1 ha of rice field?

  (A.=15-15-15: 267kg, urea: 43.5kg)

3. Findings and Issues Situation of FBOs

- Of the eight (8) lowland (IVS) FBOs supported under SCP, cultivating rice in IVS in Kambia district, only two (2) FBOs have gone through FFS.
- The success of farmer to farmer extension depends much on the farmer facilitator's motivation.
- FBOs are often divided into sub-groups which sometimes are very small (less than 10), for convenience of extension by CF.

3. Findings and Issues Lessons learned from the previous project (1)

- Adopted technologies:
  - Simple, manageable, cost saving, yet bring about visible effect.
    - Transplanting few seedlings per hills (disseminated to surrounding areas as "JICA method", shallow transplanting, proper spacing, transplanting at low tide, fertilizer application at low tide, etc.
- Utilization of machinery
  - Profit making machine tended to be managed well.
    - Rice huller (but need technical skill for O&M and site selection)

3. Findings and Issues Lessons learned from the previous project (2)

- Group activity
  - Basis for sustainable development and farmer to farmer extension
  - Weak or dictatorial leadership and/or unaccountable financial management develop distrust among members
- Necessity of follow up and monitoring
  - Necessity of close monitoring and follow up for the farmers to sustain the activity properly

4. Plan for the next phase (May 2011 -) Strengthening of Extension Activity (1)

- Capacity Development of CFs and DCs
  - Continuous training (both theoretical and practical) on rice production technique (refresher course, calculation, field measurement, yield survey, etc.)
  - Support to the FFS implementation
    - training of farmers,
    - experiment design at FFS,
    - regular visit
  - Monitoring of CFs and DCs performance
    - Farmers viewpoint
    - Experts viewpoint

4. Plan for the next phase (May 2011 -) Strengthening of Extension Activity (2)

- Capacity development of FBOs
  - Training of FBO farmers on rice cultivation at sensitization period (by CF and DC)
  - Conduct study tour to the advanced rice cultivation areas (exchange views among farmers)
  - Development of extension materials for farmers (photos, illustration, video, radio programme, etc.)

4. Plan for the next phase (May 2011 -) Research Activity (1)

Improvement of the technical package

Proposed design of experiment 1

- Objective: to know the effect of fertilizer and water control on the yield of rice in IVS ecology
- Target yield: 3 to 3.5 ton/ha
- Target ecology: IVS
- Experiment sites: 3 (2 farmers fields and a RARC field)
- Farming practices: following the technical package
- Treatment: fertilizer application (3 levels) and water control (with and without bund) = 6
- Variety: NERICA L19 (medium duration variety)
- Measurements: labour inputs, growth (plant height and tiller number), yield, and yield component, B/C, etc.

4. Plan for the next phase (May 2011 -) Research Activity (2)

Experiment 2

- Objective: to assess the growth limiting nutrients on IVS soils
- Experiment method: Pot experiment
- Treatments: soils (IVS) and fertilizer application
- Variety: NERICA L19
- Observation: symptom of nutrient deficiency, plant growth, etc.
- Measurement: dry matter production, major nutrients absorbed by plants, soil chemical analysis

4. Plan for the next phase (May 2011 -) Inputs

- Sending of Japanese experts (total of some 27.4 person-months)
- Research equipment necessary for the Project implementation (RARC)
- Seed and fertilizer for the support of FBOs under SCP in Kambia district
- Other office equipment and farm tools as necessary

5. Recommendations

1. Harmonization of development activities between Component 1 and 2
2. Strengthening of monitoring function of FFS (both extension workers and FBOs)
3. Revision of seed quantity to be supported by SCP
4. Careful selection of fertilizer for support (not assorted but specific)

Thank you for your attention.

Ministry of Agriculture, Forestry and Food Security
The Republic of Sierra Leone

The Sustainable Rice Development Project in Sierra Leone

Progress Report 1

March 2011

Japan International Cooperation Agency

RECS International Inc.

NTC International Co., Ltd.

The Sustainable Rice Development Project in Sierra Leone

Progress Report 1

Contents

List of Tables

Abbreviations

ABC	Agricultural Business Center
ASREP	Agricultural Sector Rehabilitation Project
CF	Community Facilitator
DC	District Coordinator
FBO	Farmers Based Organization
FFS	Farmers Field School
IVS	Inland Valley Swamp
JCC	Joint Coordination Committee
JICA	Japan International Cooperation Agency
MAFFS	Ministry of Agriculture, Forestry and Food Security
MAFFS-K	MAFFS - Kambia
MC	Monitoring Committee
NERICA	New Rice for Africa
NRDS	National Rice Development Strategy
NSADP	National Sustainable Agricultural Development Plan
PEMSD	Planning, Evaluation and Monitoring Statistics Division
RARC	Rokupr Agricultural Research Center
RD	Record of Discussion
SCP	Smallholder Commercialization Programme
SLARI	Sierra Leone Agricultural Research Institute
SMS	Subject Matter Specialist
SRDP	Sustainable Rice development Project
TP-R	Technical Package on Rice cultivation

1. Introduction

The Sustainable Rice Development Project in Sierra Leone ("the Project" hereinafter) is implemented in accordance with the Record of Discussion on the Project ("the RD" hereinafter) which have been agreed upon and signed between JICA and the government of Sierra Leone on July 19, 2010.

This Progress Report 1 for the Project is prepared compiling the activities made jointly by Ministry of Agriculture, Forestry and Food Security ("MAFFS" hereinafter) and the Japanese expert team sent by Japan International Cooperation Agency ("JICA" hereinafter) during the first phase, their findings obtained and issues identified, and activity plan in the second phase.

1.1 Project Purpose and Expected Results

According to the RD, the project purpose is "to establish rice production techniques and its extension method which are applicable throughout Sierra Leone". And the overall goal of the project is "to increase production and incomes of the small-scale rice farmers in Sierra Leone".

The project purpose is expected to be achieved through the results as shown below.

Expected Results through the Project	
Result 1:	To elaborate the Technical Package for Rice (TP-R) through on-station and on-farm verification.
Result 2:	To extend the TP-R to small scale farmers through Farmers Based Organizations (FBOs) in Kambia district.

It can be said that the Project aims at preparing the nationwide technical extension for rice cultivation through the improvement of TP-R and through the establishment of extension method of TP-R through FBOs. The Project is implemented as a part of the Smallholder Commercialization Programme ("SCP" hereinafter) under National Sustainable Agricultural Development Plan ("NSADP" hereinafter). Through the capacity development of small-scale rice farmers and through the support of inputs provision, the Project is expected to contribute to the success of SCP, and hence NSADP.

1.2 Project Area, Counterparts, and Implementation Organization

Project Area

The project area covers the whole Kambia district. Lowland, especially inland valley swamp ("IVS" hereinafter) is regarded as important agro-ecosystem.

Trials to improve TP-R are conducted both in the experimental farms of RARC and in farmers fields in the Kambia district. Dissemination of TP-R is carried out using the Farmers Field School ("FFS" hereinafter) method for 10 to 15 FBOs to be selected in the course of the Project based on the baseline survey results.

Implementing agency

The Project is implemented by MAFFS and SLARI as implementing agencies (counterpart agencies).

Essential counterparts are the staff members of MAFFS-K and RARC, and one full-time counterpart is assigned from each of the two agencies.

Implementation organization

To implement the Project harmoniously, a Joint Coordination Committee ("the JCC" hereinafter) and a Monitoring Committee ("the MC" hereinafter) are established to coordinate, follow up, and monitor the Project activities.

2. Project Activities

2.1 Inception meeting

The Project started in October, 2010, when three JICA Project experts left Japan.

After arriving in Sierra Leone, the JICA experts held a series of Inception Meetings with concerned offices as follows.

- MAFFS : Oct. 6, 2010,
- MAFFS-K: Oct. 12, 2010,
- RARC: Oct. 17, 2010

In the meeting JICA experts distributed the Inception Report of the Project and explained the contents clarifying: (i) Project objective and expected results, (ii) Poject activities planned, (iii) Implementation organization, and (iv) Undertakings of JICA and MAFFS.

2.2 Baseline survey

A series of baseline survey conducted for the purpose of grasping the existing situation and issues on rice production and knowing the activities and organizations for the rice production promotion. The results are supposed to be utilized in determining the direction for the improvement of TP-R and dissemination, and in determining various indicators for the evaluation at the time of the Project completion.

The baseline survey is conducted mainly by the JICA experts in collaboration with the Sierra Leonean counterparts. Survey items and methodologies are in the following.

Table 2.1 Subjects of baseline survey and their survey methods

Survey subject	Method (source of information)
Rice production trend	Statistics (PEMSD, MAFFS, NRDS, Africa Rice Center)
Rice related projects	Report (NRDS)
Agricultural extension and FFS	Interview
Farmer based organization (FBO)	Data analysis and Interview
Features of IVS and its utilization	Site reconnaissance (In and outside Kambia district)
Adoption of technical package in the pilot villages in the previous project	Interview (farmers' groups of the pilot project areas)

Results of the baseline survey were compiled separately as the Baseline Survey Report.

2.3 Capacity development of extension workers on lowland rice production technique

In order for extension workers to have common understanding of rice production techniques in theory, and to evaluate their knowledge on rice production technique as well as extension capacity, the JICA Project Team organized a four-day-training on rice production from 7th through 10th February, 2011. The training program was prepared and lecturers were selected by subject as shown in Table 2.2.

Table 2.2 Program of SRDP Training (1) on Rice Production

	Subject	Lecturer
[1] Feb 07	**Lifecycle of Rice**	
10:00 - 11:00	Opening, Orientation	P. Fofana, Kimijima, Nishiya
11:00 - 12:00	Pre-Test	Nishiya
13:00 - 14:00	Physiology of Rice, Variety of Rice	Kimijima
14:00 - 15:00	Proper time of cultivation, Yield Component	Kimijima
15:00 - 16:00	Mini Test	Kimijima
[2] Feb 08	**Rice Cultivation Method 1**	
09:30 - 10:00	Review of Mini Test	Kimijima
10:00 - 11:00	Seed	Takemura, Nishiya
11:00 - 12:00	Seed Rate (Practice, Homework)	Nishiya
13:00 - 14:00	Seedling, Land Preparation, Transplanting	Nishiya
14:00 - 15:00	Video on Rice Production	Nakamura
15:00 - 16:00	Mini Test	Nishiya
[3] Feb 09	**Rice Cultivation Method 2**	
09:30 - 10:00	Review of Mini Test and Homework	Nishiya
10:00 - 11:00	Fertilizer	Nishiya
11:00 - 12:00	Fertilizer Application Rate (Practice, Homework)	Nishiya
13:00 - 14:00	Field management (Water management)	Kimijima
14:00 - 15:00	Field management (Weed control, Pest control)	Kimijima
15:00 - 16:00	Mini Test	Kimijima
[4] Feb 10	**Rice Cultivation Method 3**	
09:30 - 10:00	Review of Mini Test and Homework	Nishiya
10:00 - 11:00	Harvesting, Post-harvest handling	Nakamura
11:00 - 12:00	Yield Survey	Kimijima
13:00 - 14:00	Cost-Benefit Analysis	Nishiya
14:00 - 15:00	Mini Test, Evaluation, Closing	Nishiya, S. Tarawali, Kimijima

The participants in the training consisted of three (3) SCP District Coordinators, 10 SCP Community Facilitators, and selected four (4) extension staffs of MAFFS-K who would be involved in the SCP activities. All participants are male. Average age is 51 years old and duration of MAFFS staffs is 29 years. Out of 17 participants, 10 have attended the FFS training in 2008 and/or 2010. In addition, there were three (3) observers, consisting of a SMS in charge of extension and two (2) local staffs of the Project.

At the beginning, a questionnaire was distributed and a pre-test was conducted to know personal data and present level of knowledge on rice production, respectively. Questions in the pre-test were prepared in consideration of what they were expected to learn in the training. Then, a series of lectures and practices of different subjects regarding rice production were provided using handouts, power point presentation, and/or demonstration by the Japanese experts. Mini-tests were conducted at the end of each day to confirm the achievement of the participants. As for the calculation of seed rate and fertilizer application rate, homework was given to review the practices in the class. All the handouts, pre-test, mini tests, and

presentation materials are presented in the Annex.

The Technical package and technical manual on rice production, the products of the previous project, was used as a main text in the training. In the lectures, original slides were prepared for detailed explanation and additional information. A video entitled "the improvement from reed marsh - Kamedago land development district" was shown on the third day to share the experience of Japanese swamp development. Seed germination test was explained by showing the actual result and practice by the participants. In the practices, the answers to the pre-test were explained, and then further questions were given for group discussion.

2.4 Preparation of experiments for the improvement of technical package on rice production

(1) Meetings

In order to improve the current technical package on rice production further to meet the demand to enhance rice yield, research activities were expected in the Project. The JICA Project Team contacted with RARC from the beginning of the Project, and a series of discussions have been made to come up with the concrete design of the experiment. So far, eight meetings have been held.

In the meeting, project related equipment to be provided to RARC by JICA was also discussed.

Minutes of each meeting with distributed discussion materials are compiled as Annex 2.

(2) Visit to the candidate experiment sites

On 16th February, the JICA Project team, together with two RARC counterparts, visited two villages (Samu and Gbainkfay in Magbema chiefdom) where the villagers utilize IVS nearby for rice cultivation. They explained the village elders the purpose of the visit, and then examined the topographic conditions, soils, rice growth of IVS through field reconnaissance, and flood pattern, duration and magnitude through interview with farmers in each village. After the field visit, they made dialogue with farmers asking if they are interested in cooperating with the experiment.

Summary of the field visit to the candidate experiment sites were presented in Annex 3.

2.5 Inputs from JICA

During the first phase of the Project from October 2010 to March 2011, the following inputs were provided by JICA

1) Sending Japanese experts (17 person-months with 7 experts from Oct. 2010 – Mar.2011)
2) Reprint of technical package and manual on rice production (1,000 copies)
3) Preparation of project pamphlet (100 copies)
4) Provision of 7 units of GPS, 10 sheets of topo-map covering the Kambia district, and 112 gallons of fuel and lubricants for IVS inventorization work for Kambia district
5) Provision of 3 units of motor-bike (3 units); one for CF, one for DC of MAFFS-K and one for

RARC, and spare parts of motor-bike for DCs of MAFFS-K

6) Office equipment (Desktop computer (2), a printer, a photocopy machine, a projector, digital camera (2), etc.) and furniture (desks (5) and chairs (8), etc.) to MAFFS Kambia

2.6 Inputs from Sierra Leonean side

Inputs provided by the Sierra Leonean side were the following:

1) Office space with furniture at MAFFS-K
2) Counterpart personnel from MAFFS, MAFFS-K and RARC

3. Findings and Issues

Main findings obtained and issues identified during the first phase activities are summarized and presented in the following sections.

3.1 Capacity of Extension Workers under SCP

1) Attitude of the community facilitators (CF) and district coordinators (DC) has been inadequate

- 9 CFs and 3 DCs of Kambia district have received FFS training as a refresher course at Makali in 2010.
- One CF was responsible for 2 to 3 FFS and totally 28 FFS were supposed to be conducted in 2010. FFS was expected to be managed under collaboration with the FBOs members and establish experimental plots with regular visit for technical guidance.
- However, 14 FFS only have been established with experiment plots as of Dec, 2010. Besides, established experimental plots were inadequately managed in many cases

2) Capacity of CF and DC needs to be improved

Having taken part in the training actively, all 17 MAFFS-K staffs could receive certificate successfully. The achievement rate of the participants was evaluated in the mini tests and homework. In total score of them was 74.6 in 100 in average. The number of the participants who got Grade A (>= 80), Grade B (>= 60) and Grade C (< 60) was 7, 8 and 2, respectively. In general, they learned the TP-R/TM-R at certain level. The theory in rice cultivation was understood relatively well, but calculation skill for fertilizer application, seed rate, yield estimate and so on was still insufficient.

Table 3.1 Results of the mini test and homework

	Point Allocation	Average	Highest	Lowest	Remarks
Mini test 1	20	11.5	20	8	
Mini test 2	20	16.1	20	8	
Mini test 3	20	14.2	20	8	
Mini test 4	20	14.2	20	8	
Homework 1	10	8.8	10	5	Calculation of seed rate
Homework 2	10	9.7	10	5	Calculation of fertilizer rate
Total	100	74.6	88	53	

At the end of the training, the 17 participants evaluated the training by using questionnaire. The questions and their answers are presented in Table 3.2. At the first question, 13 answered that the training was good because they gained more knowledge. The most impressive subject was fertilizer application, followed by yield component, seed rate, cost-benefit analysis and so on. There were some negative comments on shortage of time, poor English ability of the lecturers, inadequate per diem to the participants and absence of field practice. In other questions, they also requested longer period and frequent training during the remaining Project period. The subjects they wanted to learn in succeeding trainings included: 1) fertilizer application rate, 2) yield estimate, 3) cost-benefit analysis, 4) post-harvest, 5) swamp development, 6) seed rate and 7) IPM.

Table 3.2 Evaluation for training by participants

	Question	Answer
Q 1	What is your opinion about the training?	Good (13), Fair (4), Poor (0)
	Reasons:	[Positive] Gain more knowledge (8) [Negative] Short in time (3), Imperfect English (2), Low per diem (2), Necessity of field practice (1)
Q 2	Did you get any new idea in the classroom lectures?	Yes (16), Somewhat (1), Not at all (0)
	What idea?	Fertilizer and fertilizer application rate (9), Life cycle and yield component (6), Seed rate (4), Cost-benefit analysis (3), Video on Japanese rice development (3), Post-harvest (1)
Q 3	What is your suggestion to improve the training?	More time and frequent (10), More per diem (5), More practical work (3), More hand-out (1), Explanation method (1)
Q 4	Did you face any problems during the training?	None (7), Difficulty in calculation (3), Short in per diem/food (3), Short in time (2), Language (1)
Q5	What are the subjects to be picked up in the future training?	Fertilizer application rate (7), Yield estimate (6), Cost-benefit analysis (5), Post-harvest (3), Swamp development (2), Seed rate (1), IPM (1)

The Project Team will conduct a series of training both in theory and in practice during the Project period, taking those opinions into account.

3.2 Situation of FBOs

Of the eight (8) lowland FBOs cultivating rice in IVS and supported under SCP in Kambia district, only two (2) FBOs have gone through FFS.

The success of farmer to farmer extension depends much on the farmer facilitator's motivation.

FBOs are often divided into sub-groups which sometimes are very small (less than 10), for convenience of extension by CF.

3.3 IVS Development and Utilization

1) Characteristics of IVS and rice cultivation situation in Kambia district and other districts are as follows:

   - IVSs in Kambia are generally smaller in scale as compared to other district due to the topographic conditions
   - IVS development is left behind in Kambia
   - Improved rice cultivation technique has not been disseminated well in Kambia
   - Soil conditions and diseases do not vary much among districts.

2) IVS development in Kambia has faced with problems:

- Contribution of ASREP intervention for IVS development is modest due to its status of partial development
- ASREP intervention failed to involve beneficiary farmers in the development works because of not fulfillment of their commitment
- Farmers are willing to participate in the development of IVS without payment if proper guidance is given.

3) Rice production in IVS by FBOs supported by SCP has not been remarkable.

- None of IVS has been developed fully. Development scale or area under cultivation was 15 ha at maximum. The least area was less than 3ha.
- Some IVSs have limited development potential due to its topographic condition, while other IVSs were of peaty soil where machinery cultivation is very difficult.
- Access to IVS is another constraint to introduce machinery for land preparation.
- Use of fertilizer is minimal under the uncontrolled water condition.
- Estimated yield in very low (less than 0.5 ton/ha in many cases)

3.4 Lessons Learned from the Previous Project

1) Adopted technologies by the pilot project farmers were those which are simple, manageable, cost saving, yet bring about visible effect. Examples of adopted technologies include: (i) transplanting few seedlings per hills (disseminated to surrounding areas as “JICA method”), (ii) shallow transplanting, (iii) proper spacing, (iv) transplanting at low tide (mangrove swamp), fertilizer application at low tide (mangrove swamp), etc.

   However, sustenance of the productivity have not been assured without monitoring and follow up. Yield level of rice tended to be declined.

2) Among the machinery or equipment introduced more utilized one was rice huller. This machine was utilized the most and relatively well managed and maintained, although it needs technical skill for operation and maintenance. When introduce a rice huller, the site selection should be done carefully so that rough rice to be milled could be collected easily.

3) Group activity is the basis for sustainable rice development and farmer to farmer extension. Weak or dictatorial leadership and/or unaccountable financial management develop distrust among members. Therefore, when selecting FBOs, their organizational structure and executive members should be examined carefully.

3.5 Recent Research Results on Rice Production

1) RARC has been conducting various research works on rice. So far as the results obtained, recommended planting density is 20 hills/m2, nursery duration is 20 to 40 days, weeding, if only once, is to be done at 4 to 6 weeks after transplanting. Fertilizer (NPK compound) is applied at 2 weeks after transplanting with the recommended dosage of N-P_2O_5-K_2O = 60-40-40 kg/ha for lowland rice and 80-40-40 kg/ha for upland rice.
2) An experiment using 5 to 10 ton/ha of compost (N = 2-3% on average) made from oil kernel cake showed the same effect as the application of recommended amount of fertilizer. Oil kernel cake is available at palm oil refinery factory at Freetown. Although the results showed the positive effect, it is skeptical if the use of oil palm kernel cake is practical from the viewpoint of economy and access to the raw materials.
3) Rice straw and rice bran, byproducts of rice can be effective materials for productivity enhancement.
4) In IVS, NERICA L19 and L20 perform well. NERICA L19 shows tolerance to iron toxicity.
5) ROK22 with growth duration of 140-150 days, and ROK23 with 180 days grow better in Mangrove swamp.
6) In 1980s, split application of nitrogen with total dosage of 60 kg/ha, after the first application of P_2O_5 and K_2O (40 kg/ha each) has been experimented to enhance nitrogen utilization rate.

4. Activity Plan in the Second Phase

Based on the findings and issues described in the previous Chapter, activity plan in the second phase is formulated. The second phase is going to start at the end of April or early May 2011. Capacity development of CFs and DCs is continued and strengthened. Improved cultivation techniques of rice are disseminated to members of FBOs by CFs through FFS. Performance of CFs in FFS is closely monitored, and necessary advice will be given as necessary.

In order to improve the present technical package for increasing yield, experiment shall be carried out at the farmer's field. Aside from the fertilizer application treatment, some water control measures with minor engineering works will be done as a part of trial.

Detailed activity plan is presented below.

4.1 Strengthening of Extension

1) Capacity development of CFs and DCs

Training (both theoretical and practical) on rice production technique (refresher course, calculation, field measurement, yield survey, etc.) will be continued.

Short time but intensive theoretical training is conducted regularly on the specific topic. Calculation capacity is enhanced through repeated test.

Implementation of FFS will be supported by JICA experts. At the time of sensitization, new cultivation methods which have been proved effective are introduced. Theme of experiment at the experiment plots is selected through dialogue with the farmers. At weekly regular visit, technical guidance is conducted in relation to rice growing stages. Field measurement and yield survey are also conducted using FFS sites.

Performance of the CFs and DCs is monitored mainly from the farmers' viewpoint.

2) Capacity development of FBOs

Training of FBO farmers on rice cultivation is conducted at the sensitization period by CF and DC supported by SMS extension and JICA experts.

Study tour to advanced rice production area and/or other IVS FBOs is organized. The visiting farmers are expected to exchange views to better cultivation method with recipient farmers.

Various extension materials for farmers are developed in consideration of their low literacy rate. Extension materials to be developed include: photos, illustrations, videos, ratio programmes, etc. all of which are audiovisual aid.

4.2 Experiment for the Improvement of the Technical Package

For the improvement of the technical package, the following two sets of experiment are planned.

1) Field experiment

- Objective: to know the effect of fertilizer and water control on the yield of rice in IVS
- Target yield: 3 to 3.5 ton/ha
- Target ecology: IVS
- Experiment sites: 3 (2 farmers' fields (Samu and Gbainkfay in Magbema chiefdom) and a RARC field)
- Farming practices: following the technical package
- Treatment: fertilizer application (3 levels: N-P_2O_5-K_2O= 0-0-0; 40-20-20; 80-40-40) and water control (with and without bund) = 6 (drainage canal and peripheral canals may be constructed)
- Variety: NERICA L19 (medium duration variety)
- Measurements/observation: labour inputs, growth (plant height and tiller number), yield, and yield component, major nutrient absorbed by rice plants, etc.

Emphasis is put on the establishment of accurate measurement methods in this phase.

2) Pot experiment

- Objective: to assess the growth limiting nutrients on IVS soils
- Treatments: soils (IVS) at different location and fertilizer application
- Variety: NERICA L19
- Observation: symptom of nutrient deficiency, plant growth, etc.
- Measurement: dry matter production, major nutrients absorbed by plants, soil chemical analysis

4.3 Proposed Inputs from JICA

In the next phase, JICA is expected to provide the following inputs.

- Sending of Japanese experts (total of some 25 person-months)
- Research equipment necessary for the Project implementation (RARC)
- Seed and fertilizer for the support of FBOs under SCP in Kambia district (FBOs)
- Office equipment and farm tools as necessary (MAFFS-K, RARC, and/or FBOs)

5. Recommendations

Based on the findings obtained and issues identified through the first phase activity, the JICA Project Team makes the following recommendation to MAFFS.

(1) Harmonization of development activities between Components 1 and 2 of SCP

To enhance the productivity of rice in IVS, fertilizer application is indispensable. At the same time, water control is a must to make fertilizer application effective, especially for rainy season cropping.

Currently, Component 1 of SCP has gone ahead by providing FBOs with inputs materials and by constructing ABCs. Whereas, the swamp development of Component 2 has left behind. Under such situation, lowland FBO farmers, especially those in IVS cannot enjoy the real benefit of seed and fertilizer fully, which will make IVS farmers discouraged to cultivate more and apply fertilizer.

Swamp development method adopted by ASREP, which involved local farmers in civil work by paying has created serious problem as it did not fulfilled its commitment.

As the farmers cultivating rice in IVS know that they are the beneficiary of development, they are willing to participate in the development works without asking for money. They just need tools like shovel.

Implementation of Component 2 should be promoted to develop swamp to catch up the progress of Component 1. When on-going inventorization of IVS is finished, prioritization of IVS should be done. Those FBOs utilizing the priority IVS should be considered as candidate FBOs to be supported by SCP after confirming that there is no land tenure problem.

(2) Careful selection of FBOs to be supported under SCP strictly applying the selection criteria.

FBO selection in Kambia district seemed have not been done properly, as many FBOs in IVS have not met their selection criteria. This caused various problems, like low level of understanding of FFS, inadequate cultivation area in IVS, etc., all of which hindered expected production increase.

MAFFS should be involved in the process of selecting FBOs by examining them if candidate FBOs really met the selection criteria, so that the expected benefit could be assured.

(3) Strengthening of monitoring function for FFS implementation (both extension workers and FBOs)

Inadequate FFS progress was partly attributed to the current weak monitoring system. Monitoring and evaluation has not been done in the process of FFS. There must be various indicators set to evaluate FFS. In each of FFS process from sensitization through harvest, some measurable indicators should be set, and monitoring should be done accordingly. Target of monitoring and evaluation includes both extension workers and FBO farmers.

(4) Revision of seed quantity to be supported by SCP

The technical package developed in the JICA's previous project that has been distributed nationwide recommend less seed rate than that under SCP. Under transplanting method, less than 30 kg/ha of seed is needed, which is less than half of the rate SCP distributes to FBO farmers. This less amount has been

commonly adopted in the rice producing countries, and the pilot projects implemented in the previous project has proved its effectiveness. They could enjoy less seeds with more production. In fact, transplanting a few seedlings per hill with proper spacing has been adopted by not only those in pilot project villages but also in surrounding villages as "JICA method".

For most farmers, seed rice is valuable and expensive input which is sometimes obtained as loan from traders and money lenders with very high interest rates. Therefore, they are keen to adopt less seed rate when they know that this will not affect yield or rather increase it.

Purchasing seed rice for distributing to FBO farmers in SCP presses the Government budget. If it can reduce the budget for seed rice even a little, this precious amount could be utilized for other development activity like swamp development.

Distribution of less seed rice deserves the Government's serious attention.

(5) Careful selection of fertilizer for support (not assorted but specific)

At present SCP is supporting FBOs in distributing chemical fertilizers whatever the sort is. Plants require specific nutrients according to their growth stages. Nitrogen is the source of protein forming the structure of body, and it is required more in the panicle initiation stage as well as initial growth stage. Phosphorus fertilizer is particularly important in the initial growth stage, whereas potassium is required in the whole growing stage.

Determination of the required amount of those major nutrients is not easy as it depends on the soil fertility. However, as RARC has set recommended dosage of fertilizer in lowland as $N\text{-}P_2O_5\text{-}K_2O$ = 60-40-40 kg/ha, this proportion should be used for the time being.

It is strongly recommended that the Government should purchase the specific fertilizers which will assure the similar dosage as above by combination.

If compound fertilizer (15-15-15) and urea is available, 21 bags of urea and 129 bags of compound fertilizer will make similar proportion of major nutrients ($N\text{-}P_2O_5\text{-}K_2O$=48.4-32.3-32.3 kg/ha) for 30 ha.

Minutes of the Joint Coordinating Committee Meeting on the Progress Report 2 for the Sustainable Rice Development Project in Sierra Leone (MAFFS-JICA)

The second Joint Coordinating Committee Meeting (the Meeting) on the Sustainable Rice Development Project in Sierra Leone (the Project) was convened at the conference room of the Ministry of Agriculture, Forestry and Food Security (MAFFS), Youyi Building, at 12:00 p.m. on 9th December, 2011. The attendants are shown in Attachment 1.

The Meeting was chaired by Dr. Joseph Sam Sesay, Minister of MAFFS. In his opening remarks, the chairman made a brief explanation about the background of the Project and objectives of the Meeting. Besides, the chairman insisted on the importance of the Project that is aligned with the national flagship project, Smallholder Commercialization Programme (SCP), in terms of enhancement of rice production.

After the explanation, the chairman asked Mr. Takashi KIMIJIMA, JICA chief advisor of the Project (the chief advisor), to present the contents of the Progress Report 2 of the Project.

The chief advisor made the presentations using a PowerPoint, along the four (4) main pillars of the Progress Report 2 including (i) collaborative experimental work with RARC to elaborate technical package on rice production (TP-R), (ii) dissemination of TP-R, (iii) support to 22 FBOs under SCP in 2011, and (iv) third country training in Malawi on small irrigation development. Presentation materials were distributed to all the participants (Attachment 2).

After the presentation, the chairman admired the Project's effort and requested the chief advisor to provide some of presentation slide because those discoveries can be answered to the question in relation to rice production or yield from the presidential task force meeting. Most of the participants showed their interests on the progress of the Project and the following discussions were made.

(i) Collaborative experimental work with RARC to elaborate technical package on rice production (TP-R)

Chairman: According to your presentation about pot experiment results in RARC, application of organic materials including palm kernel cake and rice husk and bran showed negative effect on rice growth. Is the same problem possible to occur in all agro-ecologies like IVS, boliland, mangrove swamp?

Chief Advisor, JICA: This adverse effect could be occurred under submerged condition. Because soil becomes reduced condition in the course of decomposition of those organic materials and it accelerates iron toxicity problem. Therefore, those materials should not be applied unless they are well decomposed.

Chairman: Palm kernel cake and rice by-products are very important for us as fertilizer resources, but any results don't come out from research. Therefore, I would like you to make some experiment by using decomposed materials. Those results must be very useful for us.

Chief Advisor, JICA: I will convey your request regarding decomposed organic materials to our experts who are taking care of experiments at RARC, even though our first priority is to find out what the most critical nutrient in the soil is. Fortunately, some of the researchers in RARC also conduct trials by using palm kernel cake and I hope it will help you.

Sierra Leonean Participant (MAFFS): I would like to know the detailed information about methodology of on-station and on-farm trials.

Chief Advisor, JICA: As for on-station trials, experiment itself was conducted in the greenhouse using plastic pots with 2.5 liters capacity. Nine (9) treatments were set up as described in the report including seven (7) nutrient treatments and two (2) treatments with a single addition either of palm kernel cake or rice husk and bran. Chemical reagents were employed as nutritional sources instead of fertilizer itself since single element fertilizers like potassium chloride and superphosphate are not available in Sierra Leone.

On the contrary, we used NPK compound fertilizer to set three (3) levels of fertilizer application rate for on-farm trial. Surrounding bund was constructed to set water control treatments (with and without).

(ii) Dissemination of TP-R

Sierra Leonean Participant (MAFFS): We admire farmers' effort to obtain more than 3.0 t/ha of yield, which is quite higher than national average (1.7 t/ha). I would like to know the further information about cultivation condition such as variety, ecology, methodology, etc.

Chief Advisor, JICA: Variety employed was NERICA L19 and agro-ecology is pure IVS. We instructed them to construct bund to control water, so that effective utilization of fertilizer can be ensured. Other practices recommended were puddling before transplanting, use of young (3 weeks) seedling, transplant 2 – 3 seedlings per hill shallowly with 20 – 25 cm apart and periodical weeding. Although each practice is quite simple and may conduce slight favorable effect, integrated practices can bring higher yield and I think those can be applicable to all over the country.

Sierra Leonean Participant (MAFFS): I found some swamp pictures with sandy soil in your report. Can we make efficient fertilizer use under such condition?

Chief Advisor, JICA: Nutrition holding capacity in sandy swamp is generally low. As a result, effectiveness of fertilizer application becomes also low. Applying small quantity of fertilizer several times can be recommended to prevent leaching fertilizer from those soils. In addition, if we apply fertilizer before well establishment of roots, fertilizer cannot be fully used by rice plant. Therefore, we also have to consider about the timing of fertilizer application and to avoid too early application.

Sierra Leonean Participant (MAFFS): I wonder the effectiveness of training provided by the Project. Even last phase project emphasized training, but similar problem about low capacity of extension agents still come out up to date. Have they been trained well to develop their capacity?

Chief Advisor, JICA: We are trying to do our best and keep the training quality high. Despite our effort, community facilitators are still low capacity up to date. This is simply because they are lack of basic knowledge, for instance calculation skill. Most of them hardly answer when they are asked about seed rate and fertilizer application rate depending on farmers' cultivation area. Since we try to improve their capacity as much as possible, we also give them some lectures for basic calculation skills by using first 30 minutes of the training session. However, training itself is not review for basic school activities and they should have been well-trained, especially basic scholarship, before they start their own mandate. This is the reality we are facing in the field of

extension.

Sierra Leonean Participant (MAFFS-K): Some of the community facilitators who were trained at Makali a couple of years ago didn't have knowledge about crop cultivation, because they belonged to other sections like forestry, livestock, etc. Those community facilitators had to be replaced with others due to their poor performance under SCP. Selection of proper extension agents is another important issue.

Sierra Leonean Participant (MAFFS): We normally use 62.5 kg/ha of seed rice based on recommendation rate by RARC. However, I heard in other countries 50 kg/ha of seed rice is recommended. What is your recommendation seed rate for typical IVS?

Chief Advisor, JICA: We recommended 30 kg/ha in our previous project, instead of your recommendation. In fact, in Japan 20 kg/ha of seed rice is nursed if we employ manual transplanting. 25 - 30 kg/ha of seed rice is sufficient. Farmers tend to nurse all the seed they received from my experience in this country, as a result seedlings in nursery are overcrowded, too old seedlings are transplanted due to lack of labor force and some leftover seedlings are still found. We'd better reduce the seed rate to practice economy.

Chairman: I think establishment of farming/cropping calendar is another important issue to increase yield because it will not make any cost to practice. Therefore, I would like to know the correct timing of farming practices.

Sierra Leonean Participant (MAFFS): Based on your report, out of 22, 5 FBOs/IVSs has permanent water flow throughout the year. Do you think it is possible to plant rice three (3) times a year in those IVSs? It will be good from the perspective of agribusiness.

Chief Advisor, JICA: I fully agree with you about importance of drawing up farming calendar. In case we employ short duration variety, i.e. 90 days variety, it's possible to plant rice three (3) times a year, so that we can avoid the peak rainy season (July, August and September). Growing rice during peak rainy season cannot be recommended from the viewpoint of solar radiation and difficulties of drying after harvest. But we also take account of farmers' preference, and some farmers desire to grow vegetable during dry season instead of rice since vegetable tend to be more profitable.

(iii) Support to 22 FBOs under SCP in 2011

Sierra Leonean Participant (MAFFS): What were the selection criteria of FBOs? Did you select new FBOs?

Chief Advisor, JICA: FBOs were selected by MAFFS-K. I know they struggled to find out the suitable site for SCP criteria. Kambia district is surrounded by two big rivers and such topographic nature makes streams short and steep, and also makes IVSs smaller.

(v) Issues to be addressed

Sierra Leonean Participant (MAFFS): I want to look at low quality of seed rice provided from RARC. Did you collect Pa Kiamp which showed low germination rate via official channel or somebody in RARC? Because this is an institutional matter and I want to take it up to research.

Chief Advisor, JICA: Seed rice was purchased through RARC, but they didn't produce those seed rice and just

collected from farmers. The poor quality of seed rice might occur at the farmers' field level, but RARC assured over 98% of germination rate and over 99% of purity with certified labels. Although the responsibility in providing low quality seed in under JICA, RARC should also be responsible for selling seed rice with false information.

As for Pa Kiamp, it is not officially registered or released variety and few varietal characteristics are available. As far as I know, this variety was introduced from Ghana about ten years ago. Therefore, I have contacted the one (1) personnel of Ministry of Agriculture in Ghana to collect the detailed information about this variety, though I have not yet any received response from them. Once I received the information about this variety, I will share any with you.

Chairman: Producing and selling rice for farmers is not their mandate. Only they have to do is to produce and secure foundation seed and seed multiplication is suppose to be done by private sector. They may prioritize business rather than research works, once they have started the money producing works. We should let them stay on their real mandate.

The meeting was adjourned at 14:00 p.m.

End

Attachment 1　List of Attendants

No.	Name	Organization	Designation	Tel.	e-mail
1	Joseph Sam Sesay	MAFFS	Minister		
2	Amara I. Sheriff	MAFFS	Ag. Deputy Director General		
3	Adikali Samura	MAFFS	Deputy Secretary		
4	Ben A. Massaquoi	MAFFS	Director, Extension		
5	James K. Pessima	MAFFS	Director, Crops		
6	B. J. Bangura	MAFFS	Deputy Director, Extension		
7	IMO Shamie	MAFFS	Deputy Director, Crops		
8	Jack A. Jalloh	MAFFS	Assistant Director, Extension		
9	M. A. Sheriff	MAFFS	Assistant Director, M&E		
10	Sid M. Kamara	MAFFS	Head, NACU		
11	Peter Kamara	MAFFS	Focal Point, NRDS		
12	Umaro M. Sankoh	MAFFS	M&E Officer, Kambia		
13	Takashi Kimijima	JICA	Chief Advisor, SRDP		
14	Kazuaki Sato	JICA-SLFO	Resident Representative		
15	Akiko Tatsuta	JICA-SLFO	Project Formulation Advisor		

The Sustainable Rice Development Project in Sierra Leone

Presentation of Progress Report 2

9th December, 2011
MAFFS Conference Room,
Youyi Building

1

Project Purpose and Outputs

- Project Purpose:
  To establish rice production techniques and its extension method which are applicable throughout Sierra Leone
- Outputs:
  - To elaborate the Technical Package on Rice (TP-R) through on-station and on-farm verification
  - To extend the TP-R to small-scale farmers through Farmers Based Organizations (FBOs) in Kambia

2

Approach to the Project 1

(1) Elaboration of TP-R
- To obtain higher yield
- To pursue profitability
- IVS as the main ecology to be focused

(2) Dissemination of TP-R to FBO farmers
- To develop capacity of extension workers (community facilitators and district coordinators) assigned to the FBOs under SCP
- To adopt Farmer Field School (FFS) as extension method
- Develop effective extension tools

3

1. Project Activities during the First Phase (Oct. 2010 – Mar. 2011)

a. Inception meeting
b. Baseline survey
c. Training of CFs and DCs on lowland rice cultivation technique
d. Designing of experiment for improving TP-R
e. Provision of equipment for the Project implementation
f. Preparation of Progress Report 1
g. Joint Coordination Committee Meeting 1

4

2. Project activities during first half of the second phase (Apr. - Aug. 2011)

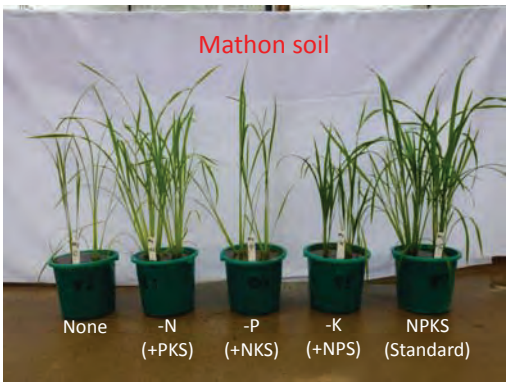
a. Trial for improving the TP-R (page 2 - 8)
b. Dissemination of TP-R (page 8 – 13)
c. Support to the FBOs under SCP (page 14-17)
d. Third country training in Malawi on small scale irrigation (page 18-20)
e. Other activities (page 20-21)

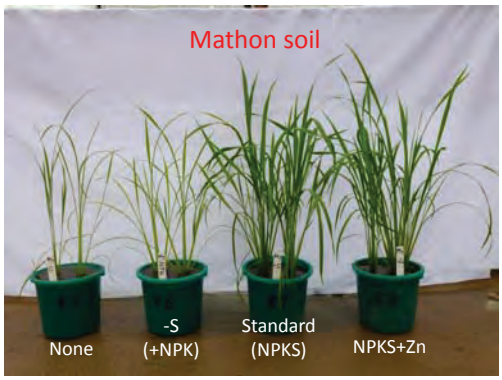
5

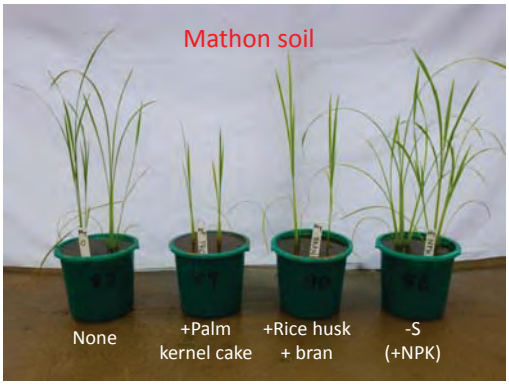
a. Trial for improving the TP-R (1) (page 2-5)

1. Soil fertility assessment trial (pot experiment)
   - Objective: to assess the variation of soil fertility of the lowland rice field in Kambia district
   - Soils used: 11 soils
   - Treatments: nine (0, -N, -P, -K, -S, NPKS (standard), +Zn, palm kernel, rice husk)

6







Shortage level of mineral elements

Agro-ecology	Location	Element (nutrient) N	P	K	S	Zn
IVS	Kamaranka	+	+++	++	+++	+
	Sinbeck	-	+++	++	+	+++
	Karawani	+++	+++	++	++	-
	Robennah	+	+++	++	++	-
	Tholokuray (upper)	++	+++	++	++	+
	Tholokuray (lower)	++	+++	+++	+++	-
	Mathon	++	+++	++	+++	-
Boliland	Kalintin	+	+++	+	++	-
Riverain	Robana	+	+++	+	-	+
Msa	Kibanka	+	++	++	+	-
	Mawirr	++	++	+	-	-

Shortage level (balance of relative DW between treatments in parenthesis):

+++	Highly deficient	(100-70)
++	Considerably deficient	(69-40)
+	Fairly deficient	(39-10)
-	Not deficient	(9 or less)

a. Trial for improving the TP-R (2) (page 5-8)

2. Effect of fertilizer application and water control on rice yield (On-farm experiment)
   - Farmers fields: Sinbeck and Robat
   - Treatments: with bund and without bund
     3 levels of fertilizer dosage
     (0-0-0, 40-40-40, 80-80-80)

Trial at Sinbeck

2. Project activities during first half of the second phase (Apr. - Aug. 2011)

a. Trial for improving the TP-R
b. Dissemination of TP-R (page 8 – 13)
c. Support to the FBOs under SCP
d. Third country training in Malawi on small scale irrigation
e. Other activities

13

b. Dissemination of TP-R (1)

1. Organizing training sessions for community facilitators (CFs) and district coordinators (DCs)
   - One refresher course (May 30 through June 1)
     Life cycle of rice plant, Cultivation technique, fertilizer calculation, yield component, nutrition, post-harvest, etc.
   - Four short sessions

July 7	Basic calculation practice, and observation of pot experiment;
July 26	Establishing experimental plot;
Aug. 10	Designing FFS experiment, and sharing experience of third country training in Malawi;
Aug. 23	Clarification of the present situation of FBO activities, and principles of yield survey

14

b. Dissemination of TP-R (2)

2. Radio extension programme

To disseminate TP-R to wider range of farmers.

Selection of theme → Examination of important messages → Preparation of draft manuscript → Modification of manuscript as necessary → Translation of manuscript in local languages → Recording

June 2011:	Nursery and main field preparation
July 2011:	Uprooting and transplanting
Aug. 2011:	Management of transplanted rice

15

b. Dissemination of TP-R (3)

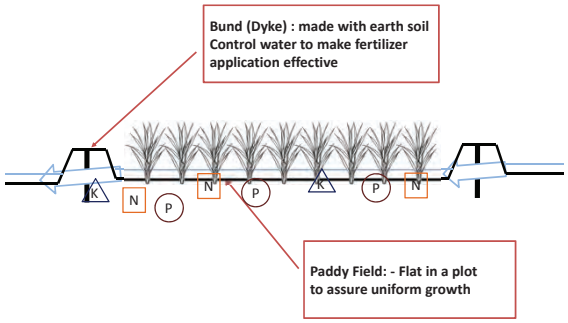
3. Development of extension materials

Necessity to develop more visual extension tools for farmers.

Examples are:

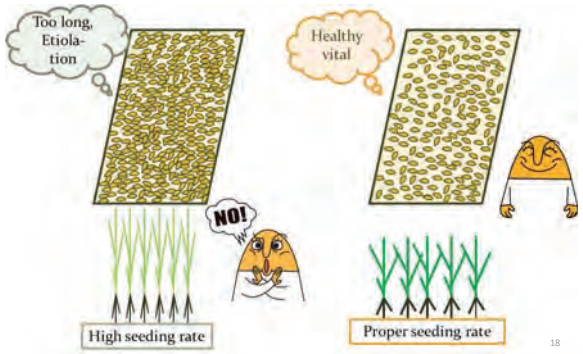
16

Illustration (Bund)

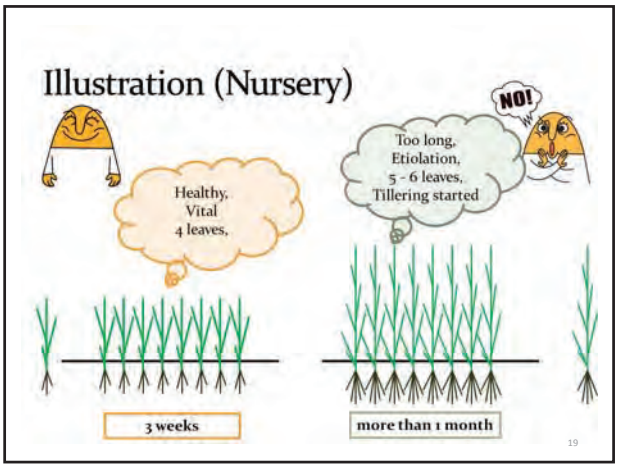


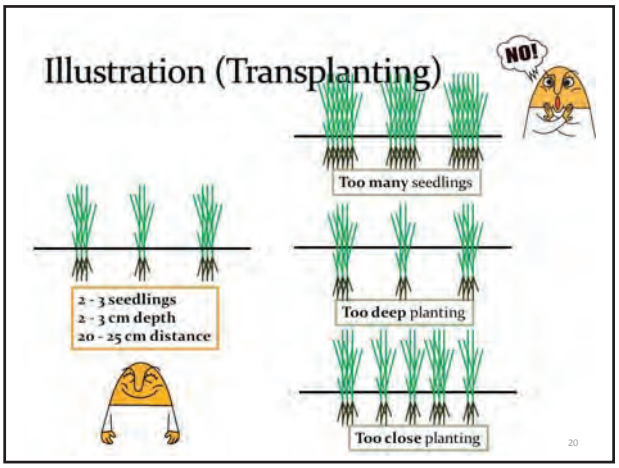
17

Illustration (Nursery)



18





2. Project activities during first half of the second phase (Apr. - Aug. 2011)

a. Trial for improving the TP-R
b. Dissemination of TP-R
c. Support to the FBOs under SCP (page 14-17)
d. Third country training in Malawi on small scale irrigation
e. Other activities

24

c. Support to the FBOs under SCP (1)

1. Several features of the selected FBOs
   - Total of 22 FBOs have been selected for support
   - Swamp area identified totaled 164 ha with average FBO area of 7.5 ha (range: 2.6 – 18 ha).
   - More than 10 FBOs have swamps where water is running for more than 9 months.
   - 11 out of 22 FBOs were formed in 2011.

25

c. Support to the FBOs under SCP (2)

2. Procurement of seeds and fertilizers to FBOs
   - JICA's commitment stated in Record of Discussion of the project
   - Provision of seeds based on the assumed dosage of 62.5 kg per hectare (1 bushel per acre)
   - Four varieties were procured (NERICA L19, ROK 5, ROK 10, and Pa Kiamp) with total amount of some 11 tons
   - Provision of fertilizer based on the assumed cultivation area of 15 ha per FBO
   - Proposed proportion of compound fertilizer (15-15-15) : urea (46-0-0) = 6:1 as recommended nutrition proportion by RARC. Total of 41 ton were procured.

26

c. Support to the FBOs under SCP (3)

3. Assist in preparing memorandum of understanding (MOU) and land agreement (LA)
   - Seeds distributed without MOU or LA due to delayed delivery of seed rice (mid-June, 2011).
   - Delayed preparation and distribution of MOU and LA to FBOs (mid-August, 2011).
   - Delayed distribution of fertilizer.

27

c. Support to the FBOs under SCP (4)

4. Technical support to FBOs by JICA experts
   - Selection of three FBOs for intensive support by JICA team
   - Weekly visit and technical guidance by JICA team (from July 2011)
   - Other 19 FBOs also visited regularly (every two weeks) for monitoring(from September, 2011)
   - FFS experiment conducted through CFs trained by JICA team

28

2. Project activities during first half of the second phase (Apr. - Aug. 2011)

a. Trial for improving the TP-R
b. Dissemination of TP-R
c. Support to the FBOs under SCP
d. Third country training in Malawi on small scale irrigation (page 18-20)
e. Other activities

30

d. Third country training in Malawi on small scale irrigation

- To share the experience of small irrigation development project by JICA in Malawi, where low cost, simple, and quick methods of small irrigation development were introduced.
- Four trainees (one from MAFFS HQ, and three from MAFFS-K) were sent to Malawi for one week (from July 10 to 17, 2011)
- Field visit to irrigation development sites, exchange the development view with Malawian officials, learn the previous JICA project, etc.

31

2. Project activities during first half of the second phase (Apr. - Aug. 2011)

a. Trial for improving the TP-R
b. Dissemination of TP-R
c. Support to the FBOs under SCP
d. Third country training in Malawi on small scale irrigation
e. Other activities (page 20-21)

33

e. Other activities

- Provision of laboratory equipment to RARC
- Preparation of wiring the electric cables and constructing a deep well at RARC

34

3. Inputs (page 21-22)

- Japanese experts (11.8 person-months as of August, 2011)
- Office equipment at RARC (photocopier, PC, printer)
- Spare parts for motorbike (for CFs and DCs at MAFFS-K)
- 10.8 ton of assorted seed rice, and 41.1 ton of fertilizer (compound fertilizer (15-15-15) and urea)
- 1 video editing software and digital camera
- Green house construction and its necessary materials for pot experiment at RARC
- Fuel to MAFFS-K (for generator and motorbike)

35

4. Issues to be addressed (page 21-22)

- Low quality of rice seeds procured from RARC
  Farmers were complaining
  – Low germination rate of Pa Kiamp
  – Not pure seeds
- Inefficient monitoring and extension
  – No monitoring system has been established such as profile of FBOs, swamps, input delivery, procedure, schedule, etc.
  – Low capacity of extension workers with low motivation

36

5. Proposed Activity in the Subsequent Phase (Sep. 2011 – Mar. 2012)

Continuation of the current activities

- Capacity development of extension workers through periodic training sessions and field visits ;
- Capacity development of FBO members supported under SCP through FFS, and through technical guidance in the field as well as training sessions;
- Development of radio extension programmes on rice cultivation technique;
- Development of extension materials; and
- On-station and on-farm trials for improving TP-R

37

5. Proposed Activity in the Subsequent Phase (Sep. 2011 – Mar. 2012)

New activities

- Trial development of IVS;
- Monitoring and evaluation of FFS;
- Monitoring and technical guidance on dry season rice cultivation in IVS;
- Improvement of working environment of RARC : Electric cable network and borehole drilling;
- Procurement of laboratory equipment and accessories for RARC;
- Preparation of Progress Report 3; and
- Joint Coordination Committee Meeting 3.

38

Thank you for your attention.

39

Minutes of the Joint Coordinating Committee Meeting on the Progress Report 3 for the Sustainable Rice Development Project in Sierra Leone

The third Joint Coordinating Committee Meeting (the Meeting) on the Sustainable Rice Development Project in Sierra Leone (the Project) was convened at the conference room of the Ministry of Agriculture, Forestry and Food Security (MAFFS), Youyi Building, at 11:15 a.m. on 19th March, 2012. The attendants are shown in Attachment 1.

The Meeting was chaired by Dr. Joseph Sam Sesay, Minister of MAFFS.

Firstly, chairman asked attendants to review the minutes of the second Joint Coordinating Committee Meeting (the previous Meeting) which was circulated to participants in advance. There was no dispute on the contents of document, except for mistake on one participant's designation. However, chairman pointed out an excessive volume of minutes for review and suggested Mr. Takashi KIMIJIMA, Chief Advisor of the Project (the chief advisor), to prepare matrix-like table including issues, decision, recommendation and responsible people when next review session of minutes is held.

After approval of the minutes of the previous Meeting, the chief advisor made presentations on project progress implemented in the last six (6) months period using a PowerPoint, along with five (5) main components of the Progress Report 3 including (i) collaborative experimental work with RARC to elaborate technical package on rice production (TP-R), (ii) capacity development of extension workers and lowland FBO farmers, (iii) growth monitoring and yield components analysis at FBOs, (iv) monitoring of distributed inputs utilization, and (v) support to FBOs for dry season rice cropping. Presentation materials were distributed to all the participants (Attachment 2).

After the presentation, chairman admired the Project's eye opener results for both research and extension, also emphasized an importance of serious research work since national yield level is still low. Most of participants showed their interests on the progress of the Project and the following discussions were made.

(i) Collaborative experimental work with RARC to elaborate technical package on rice production (TP-R)

Sierra Leonean Participant (MAFFS): In connection with soil fertility trial, we do have comprehensive countrywide land resource study reports by UNDP/FAO.

Chief Advisor, JICA: That's new to us about such kind of reference book. We would like to share it to come up with new output. The more inputs come in, the more output could be come out.

Sierra Leonean Participant (MAFFS): The previous recommendation rate of fertilizer application for rice from RARC is that $N\text{-}P_2O_5\text{-}K_2O$ = 60-40-40 or 80-40-40 kg/ha, I think we had better revise this recommendation based on the results made.

Sierra Leonean Participant (MAFFS): I understood the research results that phosphorus deficiency is most crucial issue in the soil of Kambia district. Do you have any solution for productivity improvement?

Chief Advisor, JICA: Now, we are conducting another set of pot trial to propose recommendation fertilizer rate.

And we are also planning to carry out soil fertility trial by using newly collected soils from other districts. If we can see similar results/tendency from those soils, we may be also able to cover wider range of soils in Sierra Leone with same recommendation.

Sierra Leonean Participant (SLARI): I think the results obtained from the pot experiments your project is conducting are important. This is relevant to revision of recommendable fertilizer application rate since a lot of changes have been taking place after the previous recommendation (N-P_2O_5-K_2O = 60-40-40 or 80-40-40 kg/ha) was made. However, we have to consider soil complexity when we step forward to farmers with these results. The outcome from pot experiment doesn't always bring the same results in the field. Therefore, I (SLARI) agree with the collaboration with JICA. But, I am questioning about involvement and/or participation of staffs in RARC. I understand the Project is supposed to provide to some extent inputs, but who will take care of this kind of experiment when the Project has been phased out. In this sense, how do you arrange to develop capacity of the staffs in RARC?

Chief Advisor, JICA: As for involvement of staffs in RARC, I don't think we neglect them when we started this particular project. Because we had a series of meeting, nearly 10 times, to discuss experimental design towards attainment of our project objectives. Actually, we have been trying to involve them, but we sometimes found it difficult to find them at office. They are sometimes busy with meeting, engagement in Freetown, etc. Therefore, this pot experiment has been mainly conducted by our rice researcher, Dr. Yamaguchi. Of course greenhouse where trial is implementing is located in RARC compound and we'll always welcome those who want to see progress. In addition, Dr. Yamaguchi is going to make presentation at in house meeting which will be held on 26th – 28th March at Njala University on behalf of our project to expose trial and collect comments, so that we will be able to produce better output with you. I'll convey your comments to him.

Sierra Leonean Participant (SCP/MAFFS): Do you think it is possible to carry out soil test as you did for all SCP supported FBOs before we start procurement of inputs?

Chief Advisor, JICA: Unfortunately, it is difficult due to limitation of resources.

Sierra Leonean Participant (MAFFS): What is the observation in mangrove swamp, concerning salinity and sulfur toxicity?

Chief Advisor, JICA: Salinity problem in mangrove swamp is probably caused by poor drainage. Saline normally can be washed away when fresh water from rainfall flow into field. But if drainage is not properly done, saline can retain in soil and it causes some salt injury for rice plants. As for sulfur toxicity, there is alternating process of oxidation and reduction, which produces hydrogen sulfide. As this also damages rice plants, we have to carefully select the site where we cultivate. That's our findings so far.

(ii) Capacity development of extension workers and lowland FBO farmers

Sierra Leonean Participant (MAFFS): In research activities, we have to collaborate under the government initiative and we'd better expose this report result, so that it will be conducive to better production not only for Kambia but also throughout country. I think crop protection from nursery to harvest is also important to secure sufficient yield. Don't you emphasize counter measures for pests and diseases in your project?

Chief Advisor, JICA: We didn't see any serious damages caused by pests and diseases at FBOs we supported, except for one (1) FBO's field at Soribolomia where was destroyed by caterpillars. At that time, we enquired the crop protection officer in Kambia to control them and they just sprayed chemical to eradicate them. Actually, most of diseases found in FBO's fields were associated with nutrient deficiency one. Therefore, we will not go in more detail about crop protection, but we are willing to look into them when serious damage caused by pests and/or diseases.

Sierra Leonean Participant (SCP/MAFFS): According to your report, the Project seems to put many inputs for capacity development in extension area. I think we need to find out the linkage between FAO and JICA since FAO has been mandated capacity building for GAFSP.

Chief Advisor, JICA: We want to have a linkage with FAO since we are part of SCP. However, it's not been realized yet so far due to several constraints like time, distance, etc. We always want to be involved in any capacity development aspect.

(iii) Growth monitoring and yield components analysis at FBOs

Sierra Leonean Participant (MAFFS): As for table7 which compares the yield between two treatments, 2 seedlings and 10 seedlings, I don't know whether it is correct or not.

Chief Advisor, JICA: Each experiment was designed to compare effect of treatments on grain yield with certain assumptions. For example, it was assumed that less number of seedlings would produce more tillers since there is less competition within a hill, which would bring about higher yield. However, results were contrary to our expectations. This make it difficult for us to analyze the data obtained. Now, we suppose this was caused by unfavorable location where test plot established and less number of tillers due to poor growth in initial stage. We also feel the necessity for retest this kind experiment under better or equal field condition.

Sierra Leonean Participant (MAFFS/PEMSD): My interest area is yield assessment. Methodology is almost same approach and findings you have presented here (1.4 – 1.5 ton/ha) is really comparable to what we have done (1.7 ton/ha).

Chief Advisor, JICA: I'm happy to hear about that our results are comparable to your figures. We would like to make more communication to come up with better way for analysis and/or survey.

(iv) Monitoring of distributed inputs utilization

Sierra Leonean Participant (SCP/MAFFS): My concern is low usage of fertilizer we have distributed.

We have to find out the way to ensure proper utilization of inputs given out to FBOs. Should we continue usual way of SCP which fixed amount to be provided to each FBO irrespective of its cultivation area or should we give fertilizer as per area cultivated by FBO?

Chief Advisor, JICA: I would like to rather support your idea that FBO-specific amount of fertilizer provision based on area cultivated than fixed amount provision. Because even if we supply over dosage of fertilizer, each FBO use only small portion for their communal farm and sometimes they sell fertilizer. They should know real value of fertilizer.

(v) Support to FBOs for dry season rice cropping

Sierra Leonean Participant (MAFFS): If you are confronting water shortage for dry season cropping, why don't you introduce borehole or something to secure this season's cropping?

Chief Advisor, JICA: I don't think it is realistic when we grow rice because it's costly. The selling price of rice cannot offset borehole construction and management cost.

Lastly, the chairman emphasized importance of serious collaboration between JICA, SLARI/RARC, FAO, GAFSP, Crop, Agric. Engineering, etc. and also expected more practical works in research and extension.

The meeting was adjourned at 1:20 p.m.

End

A matrix table highlighting main discussion points is presented in Attachment 3.

Attachments 1

List of Attendants

No.	Name	Organization	Designation
1	Joseph Sam Sesay	MAFFS	Minister
2	Francis A. R. Sankoh	MAFFS	Chief Agricultural Officer/Director General
3	B. J. Bangura	MAFFS	Deputy Director, Extension
4	Sid M. Kamara	MAFFS	Head, NACU
5	Robert M. Koroma	MAFFS	Representative Project Coordinator, IFAD
6	Amadu T. Jallow	MAFFS	Assistant Director, Animal health
7	Ben A. Massaquoi	MAFFS	Director, Extension
8	Matthew Gboku	SLARI	Ag. Deputy Director General
9	Mohamed A. Sheriff	MAFFS	Assistant Director, Statistics and Programme
10	Lovell Thomas	MAFFS	Deputy Minister II
11	Prince Kamara	MAFFS	Coordinator, SCP
12	Joseph S. Bangura	MAFFS	Assistant Director, Monitoring and Evaluation
13	Umaru M. Sankoh	MAFFS	M&E officer, Kambia
14	James K. Pessima	MAFFS	Director, Crop
15	S. T. Kamara	MAFFS	Deputy Director, AESD
16	Nelford E. W. Rose	MAFFS	Engineer
17	Sheku A. Mansaray	MAFFS	Ag. Director, Forestry
18	Goelfrey L. Jones	MAFFS	Assistant Director
19	Edward B. Kamara	MAFFS	Chief Accountant
20	Takashi Kimijima	JICA	Chief Advisor, SRDP
21	Mitsuharu Takemura	JICA	Agronomist, SRDP
22	Kazuaki Sato	JICA-SLFO	Resident Representative
23	Akiko Tatsuta	JICA-SLFO	Project Formulation advisor

The Sustainable Rice Development Project (SRDP) in Sierra Leone
Joint Coordination Committee Meeting 3 on Progress Report 3

March 19, 2012
MAFFS Conference Room,
Yuui Building, Freetown
Sierra Leone

SRDP Purpose and Outputs

- Project period: 2010-2014
- Target area: Kambia district
- Project Purpose:

  To establish rice production techniques and its extension method which are applicable throughout Sierra Leone
- Outputs:
  - To elaborate the TP-R
  - To extend the TP-R to small-scale farmers through FBOs in Kambia

Contents of the Progress Report 3

1. Introduction:

   Project background and organization of the report
2. Project Progress
   - Trials for improving TP-R (2.1)
   - Capacity development of extension agents and farmers (2.2)
   - Finding out the barriers to rice yield increase (2.3)
   - Monitoring of the utilization of distributed inputs (2.4)
   - Support to the FBOs for the dry season rice cultivation (2.5)
   - Project inputs (2.6)
   - Issues to be addressed (2.7)
3. Proposed activities in the subsequent period

Appendixes (1-9)

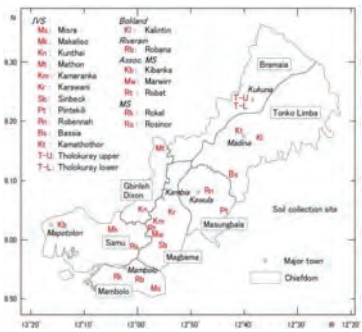
Appendixes

1 Associated data of pot experiment (2.1)
2 Reports on the SRDP short training (2.2.1)
3 Radio extension program (2.2.3)
4 Monitoring results of 22 FBOs (2.3)
5 Farming record and yield of rice at FBO communal farms in 2011 wet season (2.3.1)
6 Record of farming and yield of the experiment in the test plots at FBO farms in 2011 wet season (2.3.2)
7 Results of yield component analysis in the test plot of 9 FBOs (2.3.3)
8 Utilization of FBO communal farm areas by FBOs (2.4)
9 Destination of distributed inputs (2.4)

2.1 Trials for improving TP-R

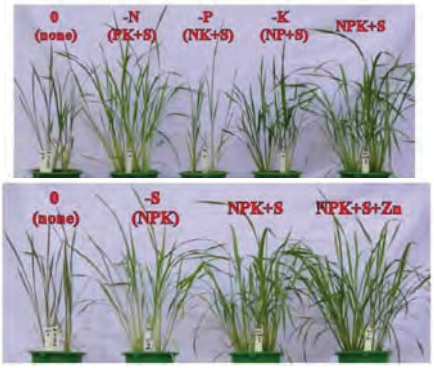
- Soil fertility assessment trials (pot experiment)
- Field trial

2.1.1 Soil fertility assessment trials



Location of the soils used for the fertility assessment trials

2.1.1 Results of the soil fertility assessment trial - Case of Misira soil -



2.1.1 Shortage level of mineral nutrients in various soils in Kambia District

Soil[(a)]	Agro-ecology	Element (nutrient)				
		N	P	K	S	Zn
Ms*	IVS	+	+++	++	++	+
Mk*		-	+++	-	-	+++
Kn*		++	+++	+	-	+
Mt		++	+++	++	+++	-
Km		+	+++	++	+++	+
Kr		+++	+++	++	++	-
Sb		-	+++	++	+	+++
Sb*		-	+++	++	++	-
Pt*		+++	+++	+++	+++	-
Rn		+	+++	++	++	-
Bs*		-	+++	-	+++	-
Kt*		++	+++	++	++	-
T-U		++	+++	++	++	+
T-L		++	+++	+++	+++	-
Kl	Boliland	+	+++	+	++	-
Rb	Riverain	+	+++	+	-	+
Kb	MSa	+	++	++	+	-
Mw		++	++	+	-	-
Rt*		+	+++	+	-	+++
Rk*	MS	+	++	-	-	-
Rs*		+	++	+	+	-

2.1.1 Major findings from soil fertility assessment trials

- P, K and S are generally deficient in the soils of Kambia district for growing rice.
- Deficient level of K and S may be severer in soils of IVS and boliland than those in MSa and MS.
- To determine the optimum level of the deficient elements for rice performance, another set of the experiment is on-going.

2.1.2 Trials for improving TP-R
Field trials

Location	Bund	Fertilizer application rate (N-P_2O_5-K_2O kg/ha)		
		0-0-0	40-40-40	80-80-80
Sinbeck	-	0.7	1.9	2.9
	+	2.0	2.2	2.2
Robat	-	2.0	2.2	2.9
	+	2.2	2.7	3.2

Grain yield adjusted to 14% moisture content.
+ and - of bund treatment: with and without bund
Variety: ROK24

2.1.2 Findings from the field trial

- Bund construction and fertilizer application brought about yield increase (except a Sinbeck farm treatment of high rate of fertilizer with bund)
- Robat farm treatment of high rate of fertilizer with bund attained 3.2 ton/ha.
- However, incremental benefit (or yield increase) is yet enough to recover the fertilizer cost.

2.2.1 Capacity development of extension workers

Nine one-day training sessions were held for extension workers on the following themes

- Designing of FFS test plot
- Present situation of rice farming at 22 FBOs
- Monitoring the FBO farms and activities
- Panicle initiation and top dressing
- Study tour to a FBO farm where bund has been constructed
- Yield survey (theory and practice)
- Use of grain moisture meter
- Judging the time of harvest
- Analysis of yield component

2.2.1 Results from capacity development Extension workers

- Capacity of the extension workers has been built up in general. Two district coordinators have acquired enough knowledge on yield survey by experiencing yield survey practice at various locations.
- It was also realized that the planning capacity of the extension workers was inadequate. FFS test plots were often established at inadequate locations.
- Most extension workers have low numerical calculation ability.

2.2.2 Capacity development of FBO farmers

FBO farms were regularly visited by JICA-SRDP experts to provide necessary farm guidance, among others:

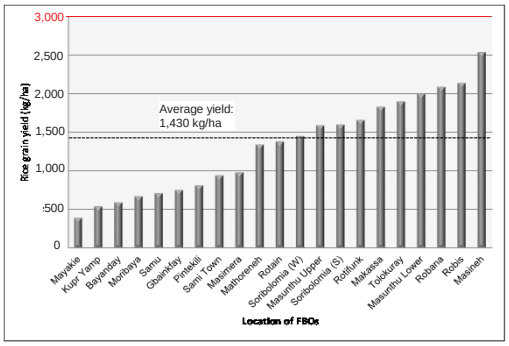
– Fertilizer application (timing, dosage)

– Water management

2.2.2 Results from capacity development FBO farmers

- They tended to believe that fertilizer application always increase yield.
- They do not have an idea of cost and benefit.
- The farms were not equipped with bund for water control.
- In most case, fertilizer applied were ineffective in yield increase.

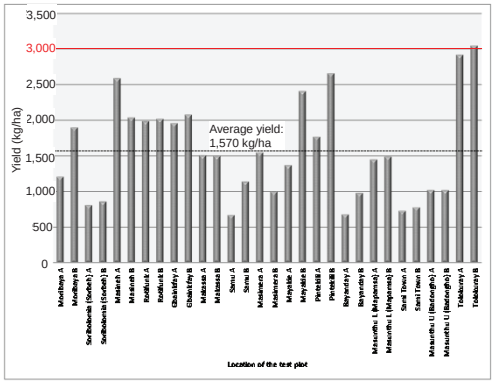
2.3.1 Results of the rice growth monitoring at FBOs



2.3.1 Findings from the rice growth monitoring

- Average yield of 21 FBOs was 1,430 kg/ha, ranging from 390 kg/ha at Mayakie to 2,540 kg/ha at Masineh.
- Nine (9) FBOs yielded less than 1,000 kg/ha even they applied fertilizer.
- Samu, with the highest fertilizer dosage of N-P_2O_5-K_2O= 144-81-81 kg/ha, yielded merely 710 kg/ha, while Masineh with the modest dosage of N-P_2O_5-K_2O= 20-20-20 kg/ha yielded as high as 2,540 kg/ha.
- Several unfavorable farming practices or conditions for better rice growth: deep transplanting, insufficient puddling, transplanting old seedlings, no water control measures, etc. were observed.

2.3.2 Results of FFS experiment



2.3.2 Findings from FFS experiments

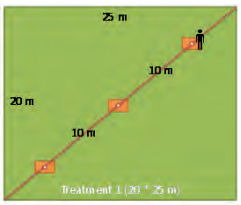
- Average grain yield of all treatments is 1,570 kg/ha, ranging from 670 kg/ha in Samu, treatment A (2 seedlings per hill), to 3,050 kg/ha in Tolokuray, treatment B (5 weeks old seedlings).
- Higher yield in Mayakie treatment B and Pintekili treatment B was likely attributed to the high dosage of fertilizer and their locational advantage of being established in the lower position.
- Higher yield in Tolokuray was realized as a result of respecting recommended farming practices in TP-R and water management.

2.3.3 Yield component analysis

- Grain yield of rice is the product of the following components:
  - Number of hills per unit area;
  - Number of panicles per hill;
  - Number of filled grains per panicle; and
  - 1,000 grain weight.

High grain yield is obtained when the value of any components is improved.

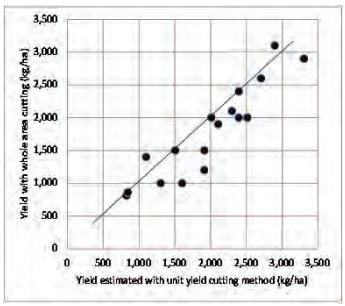
2.3.3 Yield component analysis
Procedure of unit area cutting method



Yield component analysis was made at 9 experiment plots adopting unit area cutting method. Procedure of this method is:

- In each treatment plot, 3 sub-plots with 2 m^2 each were selected along one diagonal of the plot, and all the hills in a sub-plot were harvested separately.
- The number of hills as well as the number of panicles per hill was counted.
- After the average number of panicles per hill was calculated, five hills having the average number of panicles were randomly selected as representative hills.
- Panicles of five representative hills were threshed, winnowed, and the filled grains were weighed and measured moisture content.
- 20 grams of grains were counted to estimate 1,000 grain weight.

2.3.3 Yield component analysis
Comparison of yield between two yield survey methods



Estimated yield obtained from the unit area cutting methods should be identical to actual yield from whole area cutting to make yield component analysis meaningful.

2.3.3 Findings from yield component analysis

- Close positive correlation is observed between grain yield and filled grain number per m^2.
- Positive correlation is observed between grain yield and panicle number per m^2.
- Increase in the number of well filled grain contributes much to the grain yield increase.

Assuring healthy initial growth and grain filling during maturity may be the keys to increase yield.

2.3.3 Important farming practices conducive to the yield increase

- Assuring healthy initial growth to secure enough number of tillers:
  - Proper seedling age at transplanting (2 to 3 weeks)
  - Sufficient puddling and leveling
  - Basal fertilizer application at puddling or transplanting
  - Careful transplanting (uprooting, proper spacing, shallow transplanting, a few seedlings per hill, etc.)
  - Careful water management
- Assuring good grain filling
  - Top dressing at booting stage
  - Sufficient water supply until the dough stage.

2.4 Monitoring of the utilization of distributed inputs to the FBOs (rainy season, 2011)

- Very low utilization rate (19%) of FBO group farm (average cultivated area per FBO = 1.4 ha ranging from).
- Participation of FBO members in group activities is very low in general.
- Distributed seeds and fertilizers were re-distributed among members' private farms.
- Fertilizer did not bring about yield increase.

2.5 Support to the FBOs for the dry season cropping of rice

- 12 FBOs are currently supported to obtain higher rice yield in the second cropping through the provision of fertilizer, food for work, and regular technical guidance by the project.
- FBOs are expected to procure seeds by themselves, respect the current technical package and cropping calendar, water management, and other practices advised by the project.
- Test plots are established to conduct fertilizer experiment at 5 FBO fields.

Examples of good practice - dry season cropping 2012 -

Masineh (Gbinleh Dixon), Yeffin, bund constructed, water management, top dressing at booting stage, respect cropping calendar

Examples of good practice - dry season cropping 2012 -

Mathoraneh (Magbema), NERICA L-19 and Butter cup, puddling, leveling and bund construction made.

Examples of good practice - dry season cropping 2012 -

Robis (Gbinleh Dixon), 13 March, 2012
Test plot; puddled, levelled, careful transplanting, water management, respect cropping calendar, etc.

Examples of good practice - dry season cropping 2012 -

Rotifunk (Gbinleh Dixon), 12 March, 2012
Test plot, NERICA L19, bund constructed, puddling, water management, respect cropping calendar, etc.

Examples of good practice - dry season cropping 2012 -

Masunthu (Tonko Limba), 8 March, 2012
Group work of puddling, removal of organic materials, transplanting the test plots, bund constructed, etc.

2.6 Inputs by JICA

JICA sent eight Japanese experts with 18.0 person-months to execute the project activities. JICA also provided the following inputs to the project.

To MAFFS-K

- Fuel cost for motorbikes for SCP extension and a generator for office of MAFFS-K;
- Spare parts of motorbikes for SCP extension of MAFFS-K;
- Farm tools to 12 FBOs for constructing bund and canals for second cropping;
- Cost for broadcasting radio extension programs (5 times);
- Cost for satellite internet connection (6 months);
- Cost for allowances for the training session to SCP extension workers (9 times).

2.6 Inputs by JICA

To RARC

- Construction of overhead electrical cable network at RARC
- Construction of a borehole at RARC
- Procurement of laboratory equipment
- Construction of a greenhouse (materials and labor)

2.7 Issues to be addressed

- Necessity of strengthening the capacity of FBO farmers as a group in order to realize productivity enhancement
- Efforts to be made towards the profitable rice cultivation
- Double cropping of rice

3. Proposed project activities in the subsequent period (Mar. – Aug. 2012)

- Capacity development of farmers and extension workers;
- Monitoring of dry season rice farming in 12 FBOs;
- Trial low cost development of IVS;
- On-station and on-farm trials for improving TP-R;
- Preparation for the support to the FBOs in rainy season rice cultivation;
- Technical seminar on SRDP;
- Mid-term project evaluation;
- Development of extension materials to disseminate TP-R;
- Training in Japan; and
- Preparation of Progress Report 4.

Thanks so much for your attention.

Attachment 3 Matrix of the discussion

Observation	Issues	Decision or recommendation	Responsible person
1. Minutes on the last JCC too long	• Not easy to understand or consume much time	• Use matrix including issues, decision or recommendation and responsible person	• Person in charge of preparing minutes
2. Soil suitability study exists on 8 crops by FAO/UNDP	• The study was conducted in 1979-81.	• Ask FAO Rome to cross check the original soil test data for 8 traditional crops and 4 new crops conducted during 1978-1981 • FAO to work TCP on country wide soil test	• FAO for TCP • LWDD
3. SLARI has not been involved in SRDP	• SRDP activities have been made based in Kambia, and closely work with RARC which is under SLARI. • It is not so easy to contact directly with SLARI due to the distance between Kambia and Freetown.	• SLARI should be more proactive. • More close communication should be made between SLARI and RARC	• SLARI • RARC
4. The results of SRDP are eye opener.	• Not much collaboration has been made between JICA and MAFFS, FAO, etc.	• All the divisions in MAFFS should collaborate with JICA.	• Extension, Crops, PEMSD, Engineering Divisions in MAFFS, and FAO

Minutes of the Joint Coordinating Committee Meeting on the Progress Report 4 for the Sustainable Rice Development Project (SRDP) in Sierra Leone

The fourth Joint Coordinating Committee Meeting (the Meeting) on the Sustainable Rice Development Project in Sierra Leone (the Project) was convened at the conference room of the Ministry of Agriculture, Forestry and Food Security (MAFFS), Youyi Building, at 10:00 a.m. on 10th January, 2013. The objectives of the Meeting were: (i) to present the contents of the Progress Report 4 of the Project, (ii) to propose the annual work plan for 2013, and (iii) to get approval of the contents of the joint mid-term review report of the project. The attendants are shown in Attachment 1.

The Meeting was held according to the agenda distributed to the participants (Attachment 2). It was firstly chaired by Dr. Joseph Sam. SESAY, Minister of MAFFS, and then by Mr. Lovell Thomas, Deputy Minister of MAFFS, as the Minister left in the middle of the Meeting for unavoidable reason.

Upon the request by Chairman, Mr. Takashi KIMIJIMA, the chief advisor of the project (JICA chief advisor), first made presentations on project activities made and results obtained in the last six (6) months period from March through August 2012, according to the contents of the Progress Report 4, using a PowerPoint. His explanation even included part of recent project activities until December 2012. Presentation materials were distributed to all the participants (Attachment 3).

After the presentation by the JICA chief advisor, chairman asked participants for comments and questions, and the following discussions were made. Main points of discussions were summarized in a matrix as shown in Attachment 4.

Then, the work plan of the Project for 2013 was presented by the JICA chief advisor, and it was approved without any comments.

Lastly, main points of the mid-term review report of the project, including the recommendations made by the joint mid-term review mission and proposed revision of the Project Design Matrix (PDM) were explained by the JICA chief advisor. The contents of the mid-term review report were unanimously approved by the participants.

Mr. Sano, a project formulation advisor of the JICA Sierra Leone Field Office, made a comment that the MAFFS should secure necessary budget for the field extension activities for assuring effective and efficient technology transfer of technical package on rice production down to the farmers, which guarantees the project sustainability.

Attachment 1 Attendants List

No	Name	Organization	Designation	Telephone	e-mail
1	Joseph Sam Sesay	MAFFS	Minister		
2	Lovell Thomas	MAFFS	Deputy Minister		
3	Francis A. R. Sankoh	MAFFS	Chief Agriculture Officer		
4	B.J. Bangura	MAFFS	Deputy Director, Extension		
5	Alie B. Yillah	MAFFS	Acting Deputy Director		
6	J. K. Pessima	MAFFS	Director, Crops		
7	S. T. Kamara	MAFFS	Director of Agric. Engineering		
8	Sorie Bangura	MAFFS-K	DAO Kambia		
9	Denis M. Kamara	MAFFS	Training Officer MAFFS		
10	J. A. Jalloh	MAFFS	Assistant Director, Extension		
11	Umaru M. Sankoh	MAFFS-K	M&E officer, Kambia		
12	Alusine Jah	MAFFS	M&E Specialist, PEMSD		
13	J. E. D. Terry	MAFFS	Deputy Director, Forestry		
14	Sahr J. Kellie	MAFFS	Assistant Conservator, Forestry		
15	Neilford Rose	MAFFS	Acting Assistant Director, Agric. Engineering		
16	John S. Kamara	MAFFS	Assistant Director, Crops		
19	Alhaji Mohamed Sanoh	SLARI	Head of communication		
17	Takashi KIMIJIMA	JICA-SRDP	Chief advisor		
18	Yodai OKUAYAM	JICA-SRDP	JICA expert		
20	Akihira Sano	JICA	Project Formulation Adviser		

Attachment 2 Agenda of the 4th JCC Meeting

Sierra Leone Government

Ministry of Agriculture Forestry and Food Security (MAFFS)

JICA Joint Coordination Committee Meeting

Agenda Programme (1hour 30 mins)

1. Silent Prayer
2. Self Introduction- 5 mins
3. Opening remarks - Chief Agricultural Officer- 5 mins
4. Progress Report no.4 presentation followed with discussions- 30mins
5. Project Annual Work plan for 2013 followed with discussions- 15 mins
6. Brief presentation of first joint project evaluation report followed with discussion and approval by committee members- 20 mins
7. Any other Business (AOB)- 10 mins
8. Closing remarks by the Hon. Minister
9. Lunch

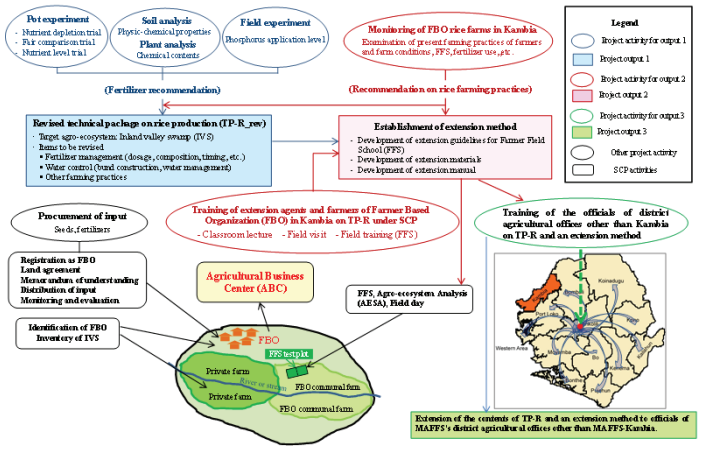
MAFFS – JICA
SUSTAINABLE RICE DEVELOPMENT PROJECT IN SIERRA LEONE
(2010-2014)
Fourth Joint Coordination Committee Meeting

10 January, 2012

at MAFFS conference hall, Youyi Building, Freetown

Project Purpose and Output

- Project period: 2010-2014
- Target area: Mainly Kambia district
- Project Purpose:
  To establish rice production techniques and its extension method which are applicable throughout Sierra Leone
- Output:
  - To revise the present technical package on rice production (TP-R)
  - To extend the TP-R to small-scale farmers through FBOs in Kambia
  - To extend the contents of TP-R and an extension method to officials of MAFFS's district agricultural offices other than MAFFS-Kambia.

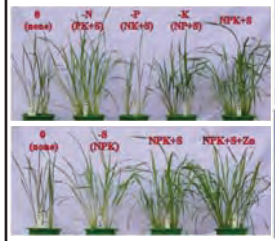


Conceptual chart of JICA-SRDP activities and output in relation to Smallholder Commercialization Programme (SCP)

Progress Report 4
Contents

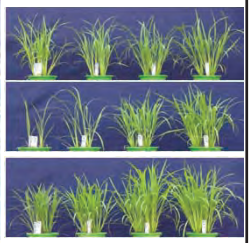
Activities for output 1: Soil fertility assessment in Kambia

Description	Remarks
Soil fertility assessment trials and analysis works (Pot experiment)	1. Phosphorus was found to be the most deficient in soils of Kambia for growing rice, followed by potassium and sulfur. 2. Natural soil fertility varies much among the soils 3. Rice growth was enhanced with double dosage of phosphorus.



An example of the plant response to various nutrient treatments in pot culture (Plants grown with Misra soil, 24 days after transplanting)

Difference of plant growth among soils due to the difference in natural soil fertility.



Above: N response (Misra soil);
Middle: P response (Robennah soil);
Below: K response (Kalintin soil).
Dosage (from left) : 0, 0.25, 1 and 2 unity of the standard (1= 0.5 g/pot)

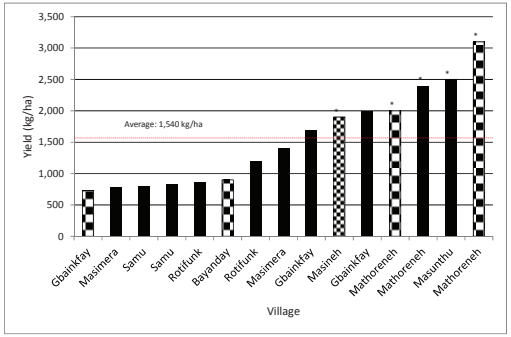
Activities for Output 2 (2012 Dry season cropping)

Description	Unit	Q'ty	Remarks
Planning, technical guidance and growth monitoring of the dry season cropping of rice in the supported FBOS (Jan. – Jun. 2012)	No. FBOs Rice area (ha)	12 7	12 FBOs were supported for the dry season cropping
Distribution of fertilizer and rice (food for work) to the FBOs for the dry season cropping	Fertilizer (kg) Rice (kg)	5,200 2,100	Fertilizers were given for both rice and vegetables
Yield survey of rice grown during the dry season	No. of FBOs	12	Maximum yield with 3.0 ton/ha was recorded (NERICA L19) at Mathoreneh, followed by 2.5 ton/ha (Butter cup) at Masunthu, 2.4 ton/ha at Mathoreneh (Butter cup), etc.
Lessoned learned			See page 17 and 18 of the PR4



Communal farm at Mathoreneh, Magbema, planted with NERICA L19; Left: 03/03/2012; Middle: 14/03/2012 ; Right: 18/05/2012

Yield of rice cultivated at FBO fields in the dry season, 2012 in Kambia district



* shows the plots where water control structures were established.

Variety: Butter cup NERICA L19 Yeffin

Activities for Output 2 (Rainy season 2012)

Description	Unit	Q'ty	Remarks
Procurement of seeds and fertilizer	kg (seeds) Kg (fertilizer)	1,950 12,050	As planned
Sensitization of new FBOs	No. of FBOs	17	Done jointly with MAFFS Kambia
FBO IVS survey	No. of FBOs	17	Done after the determination of FBOs
Training of extension workers (District coordinators and community facilitators)	No. of sessions	4	Various subjects (rice production techniques, FFS planning, extension materials, etc.)
Training of FBO farmers and farmer facilitators	No. of attendants	171	161 FBO farmers trained. 10 farmer facilitators were trained as a part of ASREP training.
Farmers field visit	No Number	3 36	FBO farmers learned how other FBO farmers made efforts to enhance yield.

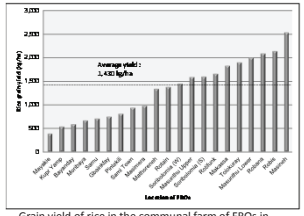
Training of FBO farmers at MAFFS-K (31/05/12)

Farmer-to-farmer extension (bund construction) at Masiaka, Gbinleh Dixon (23/07/2012)

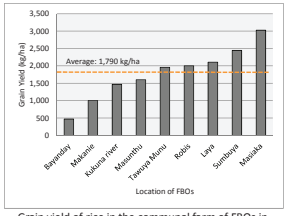
Farmers field visit at Laya, Masungbala (09/11/2012)

Activities for Output 2 (Evolution of the yields by FBOs) :

Description	Unit	Remarks
Analysis of rice growth and productivity of rainy season cropping 2011 in the FBOs	No. (21 FBOs)	Maximum yield of 2.5 ton/ha was obtained at a communal farm of the FBO at Masineh under fertilizer application and controlled water conditions. Inadequate farming practices and no water management limit the yield.
Analysis of growth and yield of rice in the rainy season cropping 2012 at FBOs field	No. (9 FBOs out of 17 supported)	Maximum yield of more than 3 ton/ha was obtained at a communal farm of the FBO at Masiaka under fertilizer application and controlled water conditions. FBO group ties were often very weak.



Grain yield of rice in the communal farm of FBOs in the rainy season, 2011



Grain yield of rice in the communal farm of FBOs in the rainy season, 2012 (data as of 20 December, 2012)

Other activities

Description	Unit	Q'ty	Remarks
Research and development			
Trial development of small irrigation for second cropping with farmers' participation (Apr., 2012)	Canal length(m) person-days	300 100	Trial development was done at two FBO farms.
Reports			
Progress Report 3 (Mar., 2012) Progress Report 4 (Aug., 2012)	No. of copy No. of copy	65 65	between Sep. 2011 and Feb. 2012, Mar. and Aug. 2012
Presentations			
Agricultural Advisory Group (Mar., Aug., 2012)	No.	1	Activities of JICA-SRDP
Joint Coordination Committee (Mar., 2012)	No.	1	On progress report 3
Mid-term review			
Joint mid-term review study (Jul. 2012)	No.	1	Mid-term review report

Trial small irrigation development with farmers' participation (Mar.-Apr. 2012)
1: survey and excavation of canal at Masunthu, Tonko Limba.
2: canal water running at Masunthu, Tonko Limba.
3: construction of a water pit protected with bamboo fence at Robis, G. Dixon

Joint mid-term review team's field survey at Mathoreneh, Magbema (Jul. 2012)

Input for 2012 (Jan. – Dec. 2012)

Description	Unit	Q'ty	Remarks
Japanese experts	Person-months	33.3	As planned
Equipment for RARC Chemical laboratory	set	1	Laboratory environment is not satisfactory for ensuring reliable analysis results; e.g. electricity supply.
Seed rice Fertilizer	kg Kg	1,950 12,050	For FBO support under SCP in Kambia
Fuel for motorbike for securing community facilitators' mobility for Jan. -Feb. 2012, and Jul. - Aug. 2012	Gallons	276	Emergency expense to mobilize community facilitators to conduct periodical monitoring of rice cultivation at FBO farms.
Fuel for the generator at MAFFS-K (Jan. - Feb., May - Jun., and Sep.-Oct. 2012)	gallons	504	Cost sharing with MAFFS-K and RPSDP
Satellite internet connection at MAFFS-K	months	12	

Achievements and challenges

Significant achievements	Challenges
1. Soil fertility analysis to modify the present fertilizer recommendation as a part of the revision of the technical package on rice cultivation	➢ Difficulty in determining the limiting factors on crop growth. ➢ Not only available phosphorus but also soil acidity and phosphorus absorption co-efficient of soils may limit the rice growth.
2. Monitoring of the utilization of seeds and fertilizer distributed to FBOs for the rainy season cropping in 2011	➢ Merely 19% of the targeted land area was actually cultivated. ➢ Very few FBOs recovered the seed rice and fertilizers. ➢ MOU has not been respected.
3. Promising production potential of rice in the dry season when water control is easier and when weather is favourable (3 ton/ha with NERICA L19, and 2.5 ton/ha with Butter cup were attained)	➢ Climate and hydrological data need to be accumulated. ➢ Cultivable area is limited due to water scarcity. ➢ Water management techniques are not well-disseminated. ➢ Damage by birds and rats becomes severer towards the end of the dry season (May and June).
4. Increase in rice yield at farmers field where technical packages were adopted. (More than 3 ton/ha in a FBO farm, and nearly 4 ton/ha in FFS plot were attained in the rainy season 2012)	➢ SCP budget is not released timely, which hampered regular monitoring by extension workers. ➢ Quality seeds are hardly available. ➢ FBOs supported under SCP are not necessarily well-organized.

Mid-term Review of the Project

June – July, 2012

Objectives

(1) To review the progress and achievements of the project activities

(2) To review the Project from the viewpoints of five evaluation criteria (Relevance, Effectiveness, Efficiency, Impact and Sustainability)

(3) To formulate the Joint Mid-term Review Report and make necessary recommendations on the project activities in the remaining period

Evaluation Members

Sierra Leone Side

No.	Field	Name	Present Occupation
1	Leader	Mr. Bakarr J. Bangura	Deputy Director of Extension, Extension Division, Ministry of Agriculture, Forestry and Food Security (MAFFS)
2	Member	Mr. Sayo Tarawalli	District Extension Officer, MAFFS Kambia District Office (MAFFS-K)
3	Member	Mr. Umaru M. Sankoh	District M&E Officer, MAFFS-K

Japanese Side

No.	Field	Name	Present Occupation
1	Leader	Mr. Fuyuki Sagara	Senior Representative, JICA Ghana Office (JICA: Japan International Cooperation Agency)
2	Rice Cultivation	Dr. Yoshimi Sokei	Special Advisor, Arid and Semi-Arid Farming Area Division, Rural Development Department, JICA
3	Project Management	Mr. Takahiro Nakamura	Deputy Director, Arid and Semi-Arid Farming Area Division, Rural Development Department, JICA
4	Evaluation and Analysis	Mr. Isao Dojun	Consultant, Chuo Kaihatsu Corporation

Review results by evaluation criteria - 1

Relevance: High

Smallholder Commercialization Programme (SCP) started in 2010 as national flagship project which has a component "Smallholder Commercialization: production intensification, diversification, value addition and marketing (component 1)".

Government developed National Rice Development Strategy (NRDS) in 2009 whose one of the objectives is "to ensure an increase in the productivity and production of rice in a sustainable way"

Effectiveness:

It is still difficult to prospect whether the indicator of the Project Purpose is achieved by the end of the project period.

Review results by evaluation criteria - 2

Efficiency:

Efficiency of the Project is at a satisfactory level in general

Impacts:

According to interviews with FBO's member farmers, they are realized effectiveness of the techniques transferred under the Project and they expressed to apply learned techniques, such as use of young seedling (age of 3 weeks), transplanting 2-3 seedlings per hill, appropriate puddling and leveling of rice fields, and weeding etc. for rice cultivation in this cropping season (wet season 2012).

Sustainability:

See the recommendation part

Recommended Actions to be taken by the Project - 1

(1) Development of TP-R

While the Project is revising TP-R targeting the yield of 3.0 ton/ha, it is observed certain technical conditions such as component of fertilizer and water control are required to attain the target. Therefore, it is recommended for the Project to clarify those technical conditions and describe them in the TP-R and its manual.

(2) Enhancement of the training of the extension workers

It is the extension workers who deliver the improved rice farming technology to the farmers through FFS.

a) Further enhance the number and quality of the trainings for extension workers

b) Conduct training for district officials including training officer and FFS coordinator and extension officer in the districts other than Kambia before the wet season of 2013

Recommended Actions to be taken by the Project - 2

(3) Arrangement of meeting in Freetown

In order for MAFFS to take actions based on the recommendations, the progress and issues in the Project activities should be shared and discussed at timely manner. Therefore, it is recommended the Project arranges periodical meetings among stakeholders concerned more frequently in Freetown.

(4) Arrangement of field visits

It is recommended that the Project arranges the field visits in Kambia for MAFFS staff in Freetown in order for them to understand the project activities more.

Recommended Actions to be taken by MAFFS - 1

(1) Sustainable utilization of the TP-R

a) RARC researchers take the role as the trainer of extension workers during the remaining Project period since RARC is expected to provide the technical backstop of the TP-R after the termination of the Project.

b) At least one RARC researcher is assigned for laboratory work such as soil analysis and pot experiment since this activity definitely contributes to the capacity building of researcher in this country.

(2) Alignment of extension method (extension guideline and material) to FFS

a) MAFFS officials who have skill on the FFS participate in the project activities in order for the Project stakeholders to further deepen the knowledge on FFS.

b) MAFFS extension division, which has the function to backstop FFS and capacity building of extension workers in Sierra Leone, participate in the process and provide advice on working out extension guideline and materials.

Recommended Actions to be taken by MAFFS - 2

(3) Expansion of outcome of the Project activities

Outcomes of the Project including revised TP-R, extension guideline and materials are expected to be shared and utilized all over the Sierra Leone. Following points are recommended to MAFFS to promote the Project outcomes.

a) Coordinate and give guidance to districts other than Kambia to apply the project's outcomes.

b) Cost sharing of the training for district officials country wide.

c) Officially endorse the revised TP-R, extension guideline and materials.

d) Distribute the revised TP-R, extension guideline and materials to all districts through official channel.

e) Follow up the extension workers in all the districts trained by the Project for sustainability.

Recommended Actions to be taken by MAFFS - 3

(4) Assignment of focal person in Kambia district

The further communication and coordination between the Project in Kambia and MAFFS are strongly required. Therefore, it is recommended MAFFS to assign one focal person in Kambia district who can take responsibility for these arrangements.

(5)Acceleration of IVS development

It is observed that yield of 3.0 ton/ha can be attained through application of revised TP-R where water can be properly controlled. Therefore it is expected MAFFS to accelerate IVS development under the component 2 of SCP.

Modification of Project Design Matrix - 1

Item	Version 1	Proposed revision (Version 2)	Reason for change
Overall goal	To increase production and incomes of small-scale rice farmers in Sierra Leone	To increase rice production in Kambia district To apply the Technical Package on Rice production (TP-R) and extension method all over Sierra Leone	More direct impact by the Project should be set as Overall goal.
Indicator for the Overall Goal	Self sufficiency of Sierra Leone in rice increase to 70-100%	1. Rice production is increased 30 % in Kambia district compared with the rice production in 2014. 2. Extension workers of the district agricultural offices in the country other than Kambia district disseminate revised TP-R using extension method developed under the Project to farmers more than 10,000 persons by the end of 2018	In the case of Kambia, it is expected increase of rice production as effects of the project activities and continuation of extension activities using TP-R and extension method. As for other district, it is expected that extension workers acquire knowledge and skills on TP-R and extension method, and then, carry out technical transfer to farmers.

Modification of Project Design Matrix - 2

Item	Version 1	Proposed revision (Version 2)	Reason for change
First indicator for the Project Purpose		TP-R and extension method are officially endorsed by MAFFS	From the view of sustainability, the outcomes of the Project are expected to be utilized by MAFFS.
Second indicator for the Project Purpose	XX % of MAFFS officials in each district confirms effectiveness of the TP-R and its extension method.	80 % of MAFFS officials who received training in each district confirm effectiveness of the TP-R and its extension method.	Numerical target was set up, therefore, the review team proposes a numerical target. Target persons are specified (officials who received training).
Output 1	To elaborate the Technical Package for Rice (TP-R) through on-station and on-farm verification	To revise the TP-R, which can realize higher yield and profit, through on-farm verification	Word "elaborated" is changed to "revised", because a TP-R was developed in the previous JICA cooperated project and that TP-R is going to be revised. Main purposes of revision of the TP-R are increase of yield and profitability, therefore, these words are added.
First indicator for the Output 1	XX % of trial farms which applied TP-R accomplish production target.	1-1. More than 3.0 Mt/ha of yield is obtained more than 80% of locations of on-farm verification, where revised TP-R is applied, in the cropping seasons by 2013.	More suitable indicator is proposed by indicating a target yield at the locations of on-farm verification.

Modification of Project Design Matrix - 3

Item	Version 1	Proposed revision (Version 2)	Reason for change
Second indicator for the Output 1	XX % of the rice produced in trial farms which applied TP-R satisfy the quality target.	---	Quality improvement of rice is not main aim of the Project. Therefore, This indicator is deleted.
Third indicator for the Output 1	The elaborated TP-R is drawn up.	1-2. Revised TP-R, that includes method on appropriate dosage of fertilizer and profitability, is developed.	Main features of TP-R are explained in order to understand what kind of revision will be done on TP-R.
New indicator for the Output 1	---	1-3. A manual on TP-R for use of extension workers is produced.	The above TP-R is more theoretical material for extension workers. In addition to TP-R, a manual on TP-R for extension workers easily understandable is prepared.
First indicator for the Output 2	XX rice farmers take the trainings on rice production.	2-1. More than 300 FBO farmers receive training on TP-R	Numerical target is set up.
Second indicator for the Output 2	XX % of rice farmers which took trainings applies the technical package.	2-2. More than 50% of the FBO farmers who received training applies several techniques of the TP-R.	Numerical target is set up.

Modification of Project Design Matrix - 4

Item	Version 1	Proposed revision (Version 2)	Reasons for change
New indicator for the Output 2	---	2-3. Extension materials for disseminating revised TP-R are prepared	In order to disseminate TP-R to farmers in the framework of SCP and along with FFS approach, extension materials used at FFS activities are necessary.
New indicator for the Output 2	---	2-4. A guideline on implementation of Farmer Field School (FFS) on rice cultivation based on the TP-R is developed.	In order to implement FFS on specific issues like rice cultivation based on TP-R, a practical guideline is necessary for extension workers for effective implementation of FFS.
Output 3	---	3. To extend the contents of TP-R and an extension method to officials of MAFFS's district agricultural offices other than MAFFS-Kambia.	In order to confirm applicability of TP-R and extension method throughout Sierra Leone, dissemination of TP-R and extension method to the district agricultural offices is necessary.
Indicator for the Output 3	---	3-1. 30 officials acquire knowledge and skills of TP-R and extension method.	New indicator for evaluating degree of achievement of the Output 3. It is expected that at least 2 officials at each district agricultural office participate trainings on TP-R and extension method.
Activities: Activities for the Output 3 were added and several modifications on the activities for Output 1 and 2 were done in accordance with modification of indicators.			
Several means of verifications are revised based on modification of indicators.			

Proposed activities for 2013

1. Strengthening ties with MAFFS HQ and SCP related donor agencies
2. Information sharing and making dialogue with other donors supporting agriculture and rural development fields
3. Trials and chemical analysis for revising TP-R
4. Continuation of monitoring and guidance of rice farming in the FBO fields
5. Development of extension methods on rice cultivation
6. Provision of training to extension workers and farmers
7. Provision of agricultural input to support SCP and their monitoring in Kambia
8. Preparation and submission of PR 5 and PR 6
9. JCC meeting and MC meeting

Attachment 4 Matrix of the discussions

Observation	Issues	Decision or recommendation	Responsible person
1. Revision of Technical package	How to disseminate the technical package	Demonstration plot should be established	MAFFS, JICA-SRDP
	Iron toxicity is a problem	Promotion of drainage is the prime recommendation	AESD
2. FBO group activities under SCP	Weak ties among FBO members	Social survey should be made in selecting FBOs	SCP, MAFFS District office
3. Involvement of SLARI in SRDP	Insufficient information sharing of the project with SLARI	SLARI should be more proactive. More close communication should be made between SLARI and RARC	SLARI, RARC
4. Dissemination of technical package nationwide	Kambia should be put priority as it is a rice bowl	JICA-SRDP's activities are Kambia based. Nationwide dissemination is one of the project results to be attained.	MAFFS, JICA-SRDP
5. Productivity improvement under SRDP	Yield increase is still low	Further efforts be made.	MAFFS, JICA-SRDP
6. Technology transfer to extension workers	Dissemination of technical package to the FBO farmers has been limited because of no disbursement of the cost for the field work	Careful planning and timely disbursement of the budget	SCP, MAFFS, JICA-SRDP

Minutes of the 5th Joint Coordinating Committee Meeting on the Progress Report 5 for the Sustainable Rice Development Project (SRDP) in Sierra Leone

The fifth Joint Coordinating Committee Meeting (the Meeting) on the Sustainable Rice Development Project in Sierra Leone (the Project) was convened at the conference hall of the Rokupr Agricultural Research Centre (RARC), Rokupr, Kambia, at 11:30 a.m. on 19th April, 2013, after visiting rice fields of two Farmer Based Organizations (FBO) supported by JICA-SRDP under the Smallholder Commercialisation Programme (SCP). The objective of the Meeting was to present the contents of the Progress Report 5 and discuss about them. The attendants are shown in Attachment 1.

The meeting was chaired by Mr. Ben Massaquoi, Director of the Extension Division of MAFFS. Following the welcome speech by Dr. Taylor, a senior researcher of RARC, Mr. Prince Kamara, SCP coordinator made a speech. He, while appreciating the JICA's support, mentioned that the JICA's activity was well aligned with SCP, and that he wished the further extension of the JICA's support. Then, the Minister of MAFFS made another statement. He was impressed with the FBO farmers acquiring appropriate farming practices the JICA disseminated to enhance yield and profit. He expected JICA to scale up the activities in the next phase. He also expected JICA's intervention for FBO farmers to be private enterprises.

The contents of the progress report 5 of SRDP were explained by Mr. Umaro Sankoh, District Agricultural Officer of MAFFS Kambia, using PowerPoint. The presentation materials were distributed to the participants (Attachment 2). After his explanation on the report, question and answer sessions followed. Main concern expressed among the participants was the fertilizer and soil fertility issues. The JICA-SRDP chief advisor answered to several questions that JICA-SRDP has not concluded about the recommended dosage of fertilizers, that pot experiment has been conducted to find out the most critically deficient nutrients in the soils, that the results of pot experiment did not necessarily show the necessary amount of nutrients for crop growth, and that field experiment will continue to come up with the fertilizer recommendation.

Other comments from the participants included the necessity of more coordination between MAFFS HQ and district offices, inclusion of improved farming practices into technical package aside from fertilizer recommendation, the necessity of more training sessions to extension workers and farmers, etc.

Towards the end, the Minister requested SRDP and RARC to cooperate each other, so that RARC could continue research work after JICA's support has finished. He further requested SRDP to propose recommended cropping calendar for disseminating double cropping of rice as well as maximizing the profit, and conduct cost – benefit analysis for rice production. Chairman wrapped up the session by requesting the followings to SRDP: (i) detailed

explanation of the on-farm fertilizer experiment results, (ii) cost-benefit analysis of the rice production, (iii) translation of pot experiment results into technical package (fertilizer recommendation), (iv) necessity of MAFFS-SLARI-JICA joint meeting, (v) coordination with extension office with regards to TP-R training guide preparation, (vi) continuance of soil survey in the next phase, (vii) necessity of analytical equipment for soil chemical analysis, and (viii)necessity of district coordination meeting.

Main points of discussions were summarized in a matrix as shown in Attachment 3.

The JCC meeting was closed at 1:00 p.m.

Attachment 1 MAFFS/JICA-SRDP Joint Coordination Committee Meeting 5
Attendants List (1/3)

Date: 19/04/2013
Place: Conference Hall, Rokupr Agricultural Research Centre, Rokupr, Kambia

#	Name	Designation	Institution	Mobile phone no.	e-mail address
1	Joseph S. Sesay	Minister	MAFFS		
2	Francis A-R Sankoh	Chief agricultural officer	MAFFS		
3	Prince Kamara	SCP coordinator	SCP/MAFF		
4	Ibrahim Shamie	Director, crops	MAFFS		
5	Ben Massaquoi	Director, extension	MAFFS		
6	Henry Kargbo	Deputy director, crops	MAFFS		
7	B.J.Bangura	Deputy director, Extension	MAFFS		
8	Willem Bangura	Deputy director, forestry	MAFFS		
9	Joseph S. Bangura	Assistant director, PEMSD	MAFFS		
10	Mohamed Conteh	Head, Agricultural Information Communication Unit	MAFFS		
11	Samuel D. Johnson	System Administrator	MAFFS		
12	Bernard Kamara	Personal assistant to the Minister	MAFFS		
13	Yumetta Beysolow	Personal assistance to Deputy Minister 1	MAFFS		
14	Neilford Rose	Assistant director, agricultural engineering	MAFFS		
15	Josse Olu John	President	NaFFSL		
16	Mohamed S. Kabiru	Secretary general	NaFFSL		
17	Festus Kamara	Financial secretary	NaFFSL		
18	Foday B. Kamara	Assistant secretary	NaFFSL		
19	Sheik	District coordinator, Kambia	NaFFSL		

Attachment 1 MAFFS/JICA-SRDP Joint Coordination Committee Meeting 5
Attendants List (2/3)

Date: 19/04/2013
Place: Conference Hall, Rokupr Agricultural Research Centre, Rokupr, Kambia

#	Name	Designation	Institution	Mobile phone no.	e-mail address
20	Umaru Sankoh	District agricultural officer, Kambia	MAFFS Kambia		
21	John A. Lakkoh	AESD officer	MAFFS-Kambia		
22	Andrew Mambu	FFS supervisor	MAFFS Kambia		
23	John B. Kamara	FFS supervisor	MAFFS-Kambia		
24	Daniel M. Kamara	Block extension supervisor	MAFFS Kambia		
25	Asmana Kabbia	Crop protection officer	MAFFS Kambia		
26	James R. Kanu	Project coordinator	ASREP		
27	Abu Bakarr Sesay	Field controller	ASREP		
28	Samuel Conteh	Monitoring and evaluation	ASREP		
29	Daniel S. Fornah	PDMO	SLARI		
30	Alimamy Fornah	Research officer	SLARI		
31	Samuel S. Harding	Research officer	SLARI		
32	D. R. Taylor	Senior research officer	RARC		
33	B.A.K. Kamara	Research officer	RARC		
34	Foday Suma	Research officer	RARC		
35	David Abass Kamara	Research officer	RARC		
36	Abdulai Bangura	Research officer	RARC		
37	Kattingu J. Charles	Research officer	RARC		
38	Juliana M. Vangahun	Research officer	RARC		

Attachment 1 MAFFS/JICA-SRDP Joint Coordination Committee Meeting 5
Attendants List (3/3)

Date: 19/04/2013
Place: Conference Hall, Rokupr Agricultural Research Centre, Rokupr, Kambia

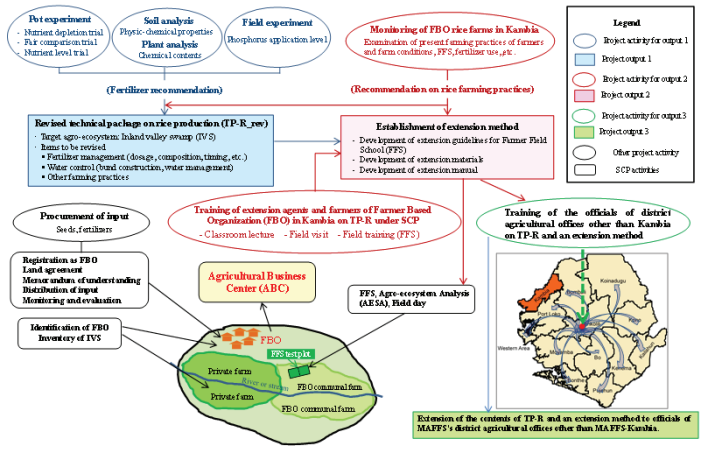
#	Name	Designation	Institution	Mobile phone no.	e-mail address
39	Nabieu Kamara	Research assistant	RARC		
40	Moses J. Tucker	Research assistant	RARC		
41	Moses Daramy	Research assistant	RARC		
42	Sayo Sesay	Research assistant	RARC		
43	Musa Swaray	Research assistant	RARC		
44	Fatmata A. Kamara	Technical secretary	RARC		
45	Alpha B. Jalloh	Rice breeder	RARC		
46	Nazir Mohamed	Agro-economist	RARC		
47	Fonda B. Jenkens	Social scientist	RARC		
48	Teo Kaifineh	Senior mechanical superintendent	RARC		
49	Momoh L. Kamara	Acting admin. officer	RARC		
50	Kazuaki Sato	Representative, Sierra Leone Field Office	JICA		
51	Takashi Kimijima	Chief advisor	JICA-SRDP		
52	Maiko Nakamura	Expert	JICA-SRDP		
53	Junichi Yamaguchi	Expert	JICA-SRDP		
54	E.E.Bangura	Senior staff	JICA-SRDP		
55	Abdul Sam Sesay	Senior reporter	SLBC		
56	Lansana Kabba	Senior mobile projectnist	SLBC		

MAFFS – JICA
SUSTAINABLE RICE DEVELOPMENT PROJECT IN SIERRA LEONE
(2010-2014)
Fifth Joint Coordination Committee Meeting

19 April, 2013
at RARC conference hall, Rokupr, Kambia

Project Purpose and Output

- Project period: 2010-2014
- Target area: Mainly Kambia district
- Project Purpose:
  To establish rice production techniques and its extension method which are applicable throughout Sierra Leone
- Output:
  1) To revise the present technical package on rice production (TP-R)
  2) To extend the TP-R to small-scale farmers through FBOs in Kambia
  3) To extend the contents of TP-R and an extension method to officials of MAFFS's district agricultural offices other than MAFFS-Kambia.



Conceptual chart of JICA-SRDP activities and output in relation to Smallholder Commercialization Programme (SCP)

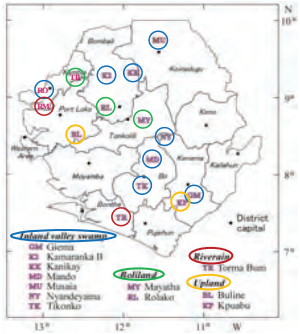
Progress Report 5
Contents

1. Introduction
2. Project Progress during the Last Six Months (Oct. 2012-Mar. 2013)
   - 2.1 Trials for improving Technical Package on Rice Production
   - 2.2 Rice cultivation by FBOs in the rainy season 2012
   - 2.3 Rice cultivation by FBOs in the dry season 2012/13
   - 2.4 Capacity development of FBO farmers and extension workers
   - 2.5 Input by JICA
   - 2.6 Issues to be addressed
3. Proposed Activities in the Subsequent Project Period

2-5-6

Activities for output 1: Soil fertility assessment in Kambia and outside Kambia

Description	Remarks
Comparison of the fertility in soils of Kambia with those outside Kambia (Pot experiment)	1. Phosphorus was found to be the most deficient in soils of both Kambia and outside Kambia, followed by sulfur and potassium. 2. No much difference in soil fertility was observed between inside and outside Kambia.



Location map of soils collected from other districts than Kambia for pot experiment

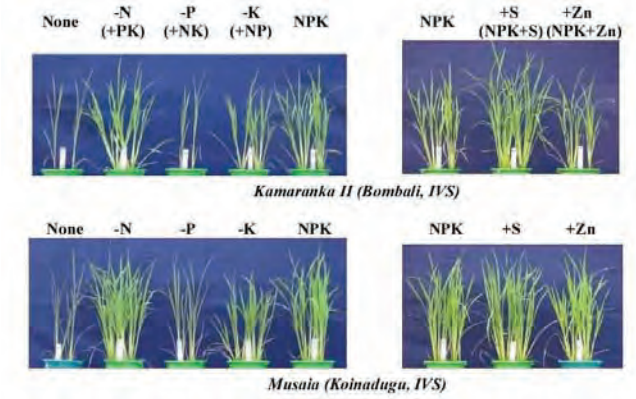
Nutrient deficiency level in various soils

Location of soil taken	Soil abbreviation	Agro-ecology	Nutrient N	P	K	S	Zn
Rokon	RO	IVS	-	++	-	-	-
Tambi	TB	Boliland	-	+	+/-	++	+/-
Robis	RM	Riverain	-	++	+/-	-	+/-
Kamaranka II	K2	IVS	-	+	-	+++	-
Musaia	MU	IVS	-	+	+/-	+/-	-
Tikonko	TK	IVS	-	-	-	++	-
Rolako	RL	Boliland	+/-	++	+/-	+	-
Mayatha	MY	Boliland	-	++	+/-	-	-
Torma Bum	TR	Riverain	-	+/-	+/-	+	-

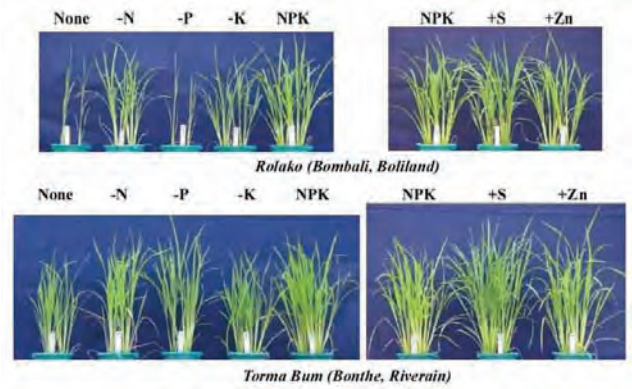
No. 1 - 3: Soils in Kambia district

Deficient level as the balance of relative DMP

Deficient level	Symbol
Extremely high deficient	+++
Highly deficient	++
Considerably deficient	+
Fairly deficient	+/-
Not deficient	-



Plant response to nutrient treatments in selected soils
(27 days after transplanting)



Plant response to nutrient treatments in selected soils
(27 days after transplanting)

Activities for output 1: Soil chemical analysis guidance

Transfer of Technologies on Soil Chemical Analysis

1. Based on the recommendation made by the joint mid-term review mission, a JICA expert was assigned to transfer the technologies for analysing soils.
2. A Sierra Leonean counterpart was appointed by RARC to work with the JICA expert.
3. Joint analytical works started in February, 2013 for transferring the technologies including: (i) handling of utensils and reagents, (ii) handling and maintenance of laboratory equipment, and (iii) soil analysis procedure, precautions in analysis, (iv) presentation methods, (v) interpretation of the results, etc.
4. Soil pH (H_2O, H_2O_2, KCl), Exchangeable acidity, Electro-conductivity (EC), and available P (Bray 1 and Truog methods) have been analysed using 38 samples as of mid-March 2013.

Activities for output 1: On-farm verification

Grain yield by treatments in the phosphorus application trial at three locations

Treatment (N-P_2O_5-K_2O kg/ha)		Yield (ton/ha)			
		Masineh	Robat		Tolokuray
		with band	with bund	without bund	with band
None	(0-0-0)	2.3	-	-	2.6
P0	(40-0-40)	2.0	1.5	1.9	2.6
P30	(40-30-40)	3.0	2.4	4.0	2.5
P100	(40-100-40)	3.0	3.7	3.4	2.3
P200	(40-200-40)	2.7	2.2	3.3	2.0

The highest yield of 2.5 to 4.0 ton/ha was obtained from the treatment with the modest phosphorus dosage of 40-30-40 kg/ha. Unlike what was observed in the pot experiment, yield was not increased with the increased phosphorus dosage in the farmer's field conditions. Complex causes could be considered for explaining the results.

Activities for output 1: On-farm verification

Yield components by treatments in the P application trial at Masineh

	P rate [a] (P_2O_5 kg/ha)				
	None	P0	P30	P100	P200
Yield components					
- Number of hills per m^2	-	27.5	25.0	21.3	23.3
- Number of panicles per hill	-	5.5 <	6.7 =	6.5	6.5
- Number of filled grains per panicle	-	48.0 <	65.2	84.8	75.6
- Thousand grain weight [b] (g)	-	29.2	29.0	28.3	29.1
Estimated yield (ton/ha)	-	2.1 <	3.2 =	3.3	3.3
Yield with whole area cutting [b] (ton/ha)	2.3	2.0 <	3.0 =	3.0	2.7

[a] 40kg/ha of N and K_2O are commonly applied to all the treatment plots. All the fertilizers are applied at puddling as basal.
b Expressed at 14% moisture content

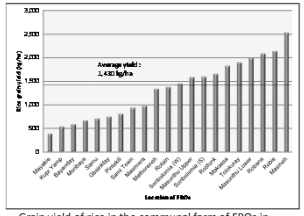
Actual yield at P30 significantly increased by about 50% compared to P0. The number of panicles per unit area and the number of filled grains per panicle are the main components to increase yield.

However, increase in the number of tillers as we have seen in pot experiment was not observed in higher dosage of phosphorus application treatments (P100 and P200) at on-farm verification.

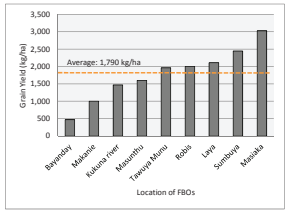
Complex causes could be considered for explaining the results.

Activities for Output 2: Support of FBOs in rice cultivation (evolution of the grain yields)

Description	Unit	Remarks
Analysis of rice growth and productivity of rainy season cropping 2011 in the FBOs	No. (21 FBOs)	Maximum yield of 2.5 ton/ha was obtained at a communal farm of the FBO at Masineh under fertilizer application and controlled water conditions. Inadequate farming practices and no water management limited the yield even with fertilizer application.
Analysis of growth and yield of rice in the rainy season cropping 2012 at FBOs field	No. (9 FBOs out of 17 supported)	Maximum yield of more than 3 ton/ha was obtained at a communal farm of the FBO at Masiaka under fertilizer application and controlled water conditions. FBO group ties were often very weak.



Grain yield of rice in the communal farm of FBOs in the rainy season, 2011



Grain yield of rice in the communal farm of FBOs in the rainy season, 2012 (data as of 20 December, 2012)

Activities for Output 2 : Capacity development of FBO farmers and extension workers of MAFFS-K

Description	Unit	Q'ty	Remarks
Training session for FBO farmers before the dry season cropping			
Refresh the memories on rice cultivation techniques before dry season cropping Learn the features of early maturing varieties	No. farmers (No. FBOs)	154 (11)	Done at Masiaka, Tawuya Munu and Masunthu
Training sessions for the extension workers of MAFFS-K			
1. Visit to good practice FBO fields	No. of participants	7	3 FBOs visited
2. Yield survey (incl. yield component analysis)		6	At Masineh's exp. Plots
3. Study tour of pot experiment		8	Soil fertility assessment
Development of extension method on TP-R			
Preparation of extension guide and materials to fit FFS	set	1	Under preparation
Level of adoption of TP-R techniques by FBO farmers			
Interview survey to FBO farmers	No. farmers	50	Yield increase with high adoption rate of the recommended farming practices confirmed.

Input to the project by JICA for the last 6 months Oct. 2012 – Mar. 2013

Description	Unit	Q'ty	Remarks
Japanese experts	Person-months	16.1	As planned
Seed rice (butter cup) Fertilizer (15-15-15) for the dry season cropping 2012/2013	bushel kg	11.1 2,325	Distributed to 8 FBOs on locan Distributed to 9 FBOs according to the cultivation area (400kg per ha)
Farm input (shovel, hoes) Fertilizer for P application experiment	No. kg	5 each 170kg	For FBO support under SCP in Kambia N: 96kg, P2O5: 46kg, K2O: 26kg
Cost for allowances for the training session to SCP extension workers and FBO farmers (incl. farmers' field visit)	Le.		
Fuel for motorbike for SCP extension	gallons	276	Emergency expense to mobilize community facilitators to conduct periodical monitoring of rice cultivation at FBO farms in the both rainy and dry seasons.
Fuel for the generator at MAFFS-K (Oct. 2012, Jan.-Feb. 2013)	gallons	378	Cost sharing with MAFFS-K and RPSDP
Satellite internet connection at MAFFS-K	months	6	

Photos of the FBO field at Masiaka in the dry season cropping of rice in 2012/13


Transplanting 19 days seedlings (23 /01/13)


Active tillering stage (15/02/13)


Heading stage (16 /03/13)


Maturity stage (30 /03/13)

Photos of the FBO field at Masineh in the dry season cropping of rice in 2012/13


4 days after transplanting (12/01/13)


Active tillering stage (01/02/13)


Booting stage (01/03/13)


Maturity stage (23/03/13)

Photos of the FBO field at Laya in the dry season cropping of rice in 2012/13


Land preparation (30/01/13)


Transplanting (06/02/13)


Panicle initiation stage (15/03/13)


Maturity stage (17/04/13)

Issues to be addressed

Significant achievements	Issues
1. Transfer of technology of soil chemical analysis from the Japanese expert to the RARC counterparts	➢ Environment of RARC laboratory does not allow to conduct full scale soil analysis. Unstable water supply, unstable electricity supply, unrepaired analytical equipment, etc.
2. Support of 17 FBOs in providing farm input and guidance with FFS experiment, which resulted in the yield increase	➢ How to avoid the duplication of FFS plots happened at 17 FBOs supported by JICA-SRDP after the intervention of ASREP under SCP ➢ Average group farming area of 17 FBOs supported by the project under SCP was merely 1.5 ha. How to secure the substantial volume of rice for marketing should be seriously thought. ➢ The component 1 of SCP including support to the FBO farmers should be implemented timely to disseminate the rice cultivation techniques and assure the farmers to respect cropping calendar, which are necessary conditions to increase rice yield.

Proposed activities for the next 6 months

(1) Strengthening of ties with MAFFS Headquarters and SCP related donor agencies
(2) Information sharing and making dialogue with other donors supporting agriculture and rural development fields
(3) Trials and chemical analysis for revising TP-R;
(4) Field monitoring and guidance of rice farming in the FBO fields in Kambia district;
(5) Provision of training sessions to disseminate TP-R to extension workers and FBO farmers in Kambia;
(6) Development of extension methods on rice cultivation for SCP;
(7) Provision of training course on TP-R to extension workers outside Kambia district;
(8) Preparation of Progress Report 6; and
(9) Holding JCC meeting and MC meetings

Attachment 3 Matrix of the discussions

Observation	Issues	Decision or recommendation	Responsible person
1. Contradictory results are shown between pot experiment and on-farm experiment	Recommended dosage of fertilizer is not seen	Detailed explanation of the on-farm fertilizer experiment results should be presented.	SRDP, RARC
2. Dry season rice cropping is going well.	How to realize double cropping of rice or multiple cropping for maximizing profit.	Recommendation on cropping calendar on double cropping of rice and multiple cropping should be made.	SRDP
3. Dosage of fertilizer used in FBO support seems higher	Can th cost of fertilizer be recovered by the incremental benefit?	Cost-benefit analysis of the rice production should be presented	SRDP, RARC
4. The results of pot experiment are complicated.	Recommended dosage of fertilizer is not seen.	The results of the pot experiment should be translated into technical package (fertilizer recommendation)	MAFFS, SRDP, RARC
5. Direction of the research on soil fertility is not consistent among the stakeholders.	Dosage of fertlizer to be recommended under SCP is not determined.	A joint meeting between MAFFS, SLARI and JICA should be held.	MAFFS, SRDP
6. JICA-SRDP is going to develop extension method.	No detailed information on this is not shared.	MAFFS extension division should be involved in the preparation of TP-R extension guide.	SRDP, MAFFS
7. Importance of soil fertility assessment is recognized.	Survey extent is not deep enough.	The soil survey should be continued in the next phase of the JICA project.	MAFFS
8. Soil chemical analysis is conducted in Japan.	Why not the analysis work done in Sierra Leone?	Analytical equipment necessary for soil chemical analysis should be procured.	MAFFS, SLARI, RARC
9. Overlapped activities are observed in the field by JICA-SRDP and ASREP.	No coordination or communication has been made	District coordination meeting should be organized.	MAFFS, MAFFS-K

MUNITES OF THE SIXTH JOINT COORDINATING COMMITTEE MEETING ON THE MAFFS-JICA SUSTAINABLE RICE DEVELOPMENT PROJECT IN SIERRA LEONE

The sixth joint coordinating committee meeting on the Sustainable Rice Development Project (SRDP) in Sierra Leone was convened at 10:00 a.m. on 10th December, 2013 at the conference hall of the Ministry of Agriculture, Forestry and Food Security (MAFFS), Youyi Building, Freetown.

The meeting was chaired by Dr. Joseph Sam Sesay, Minister of MAFFS (the Chairman). The attendants of the meeting are shown on Attachment 1. The Agenda of the meeting and presentation materials distributed to the attendants are presented on Attachments 2 and 3, respectively.

After giving brief background on the activities of the SRDP and expressing expectation for the next phase, the Chairman called for JICA-SRDP to explain the progress of the work discussed in the previous JCC (the fifth JCC) meeting.

Action points from Progress Report No. 5

The action points from the Progress Report 5 were explained by Takashi Kimijima, Chief Advisor of SRDP. Main points of the explanation are in the following.

1) SRDP continue fertilizer trial in the field to come up with the new fertilizer recommendation.
2) SRDP continues testing double cropping in Kambia district. Recommended cropping pattern for double cropping of rice will be presented.
3) Cost-benefit analysis of the rice production is a very important issue to the project which will be presented later.
4) Technical package will be revised by the end of the project incorporating fertilizer recommendation.
5) We presented soil fertility analysis results and idea on new fertilizer recommendation in the policy orientation meeting in May 2013. However, we have not yet come to consensus on the recommended fertilizer dosage with RARC.
6) JICA-SRDP is preparing extension guide for TP-R dissemination. A draft of the extension guide was distributed to the extension division of MAFFS for comments and contributions.
7) Although it is ideal if we could conduct soil chemical analysis in the country, still basic infrastructure especially unstable electricity supply does not allow us to conduct detailed analysis.
8) We are closely collaborating with MAFFS-K so that no overlapping activities with other donors are occurred.

After confirming the action points, the Chairman raised the concern that there was little collaboration and/or communication among organizations involved in rice development.

The Chairman then urged SRDP to present Progress Report 6 and cost-benefit analysis on rice production.

Presentation of Progress Report No.6 and cost-benefit analysis

Contents of Progress Report No. 6 were presented by Mitsuo Nishiya, Deputy Chief Advisor of JICA-SRDP, using a PowerPoint followed by the presentation of cost-benefit analysis on rice production and cropping pattern for double cropping of rice by Takashi Kimijima.

The following discussions on the presentation were made.

1) The Chairman was concerned about the result of cost benefit analysis which JICA-SRDP presented, showing that the rice production is not a profitable business at the moment. According to the Chairman, since 1970, none of the reports which analyzed cost-benefit of rice concluded that rice production was not profitable. The Chairman asked JICA-SRDP to review the assumptions used in the analysis and make comparison with the Japanese rice production. He also asked JICA-SRDP to make analysis on the effect of introducing small agro-machinery (power tiller) and herbicide on cost-benefit.

2) The Chairman insisted the necessity for having a session to discuss about the issues on rice production. Francis A-R Sankoh, Chief Agricultural Officer, suggested that the session be held at the occasion of National Agricultural Retreat.

3) While expressing that rice farming is very difficult business, Sheku T. Kamara, Assistant Chief Agricultural Officer, emphasized the use of short duration varieties with at least ninety (90) days, to have standing crops in the rainy season so that triple cropping a year is possible. The next phase of JICA project should also target / address the farmer's capacity in constructing bunds and other agricultural activities. He added that it is important to determine the combination of fertilizers, so that specific chemicals would be supplemented.

4) Joseph S. Bangura, Assistant Director of PEMSD supported the SRDP's position that rice production is not profitable, due to the recent competitive labor market because of the boom in the mining sector. As many youths are absorbed in the mining sector, the available labor is scarce in the agriculture. When employed in agriculture, they do not work as hard as expected while demanding high wage. He also said that subsidy in input is not a solution to boost agricultural production. Instead, it is better to use best practices in farming. He added that rice performs better in the dry season than the rainy season as the climate condition is more favorable and as the fertilizer is more effective in the dry season. He also mentioned that far more investment has been laid in Japanese faming than that of Sierra Leone.

5) Another contribution was made by Henry Kargbo, Deputy Director of Crops that rice production being unprofitable was not true, because Rokupr Agricultural Research Centre gave their experience in rice research which was very contrary to the assumptions presented by the JICA-SRDP team. He added that to be break-even the rice yield should be around four (4) ton/ha. He observed that the major part of the production cost is covered by labor, which means that the farmers are paying

themselves. If one factors the labor cost then rice production will be profitable. He believed that the crops division has to be engaged and involved in production issues. Also, he added the use of herbicides brings about profit because the cost of herbicides offset the labor requirement in weeding. He ended his comments by inviting JICA- SRDP to an engagement, since they are presently working on seed production.

6) B. J. Bangura, Deputy Director of Extension commented on the issue of cost-benefit analysis. According to him, the issue of rice production not bearing profit in Sierra Leone should be a challenge to the Ministry. One should not make it personal, instead, the Ministry should find possible means to overcome the issues surrounding production and farmers activities to enhance better rice yield and move to commercialization which at the same time will make rice farming profitable.

7) Alfred Kamara, Crop Officer of Kabala district also contributed on the area of varieties. He said that the local farmers know the varieties they use, and that those varieties are well adapted to the local environment. He advised then it is better to compare the new varieties with those old varieties in their performance before introducing the new varieties.

Responses of Chief Advisor of JICA-SRDP to the comments and contributions from the participants

Takashi Kimijima responded to the comments from the participants. He promised to re-examine the assumptions set for the cost-benefit analysis, and the efficiency of introducing small scale agro-machinery. Meanwhile, he did not agree to introduce herbicide in the rainy season, as it is too risky for the farmers to make it effective. He also reminded the participants of the high cost of labors as one of the factors increasing the total cost of production. He also opposed the idea of introducing triple cropping of rice using short duration varieties, in which one cropping is to be harvested in July when rainy season starts. While he admitted that the JICA-SRDP team has been working with crops and extension divisions at district level, the team would try to improve in their cordiality in future.

Comments from Head of JICA Sierra Leone Field Office

Toshihisa Hasegawa, Head of JICA Sierra Leone Field Office (SLFO), made few comments after his introduction about JICA-SLFO activities in Sierra Leone. He expressed his gratitude to the participants in collaborating with the JICA-SRDP team, and assured them that the team will continue to work hard in order to contribute meaningfully to the rice productivity increase in the Country. While explaining that JICA's assistance policy to Sierra Leone set the agricultural sector as one of the three core pillars, he mentioned that the implementation of the project in the next phase has yet been determined and that the decision will be made by the Japanese Government based on the outcome of the terminal evaluation study for the current JICA-SRDP, the study of which will be carried out in January, 2014. He also commented that as JICA's resources are limited to deal with wider scope, it is wise to collaborate with other donors in bearing synergy.

Experience sharing of training in Japan

To the end, a brief presentation using PowerPoint was made by B.J. Bangura, on behalf of the five MAFFS staff that went to Japan for training under JICA with special reference on the Job Improvement Plan (JIPs) for implementation. According to B.J. Bangura, the training was very educative and comprehensive which is very timely for the training of trainers. He wants to encourage JICA to continue to provide such opportunity to MAFFS staff especially for the engineering department. He also requested financial support from the Ministry to the trainees to enable them facilitate their assignment as required by the training process. He also advised colleagues that it will be very much useful if they can put the Job Improvement Plan together and apply what they were thought during the training in their work place. After his presentation, one of the trainees Alfred Kamara submitted his training report published by JICA to the Minister as gift from the training center.

The Chairman of the meeting thanked JICA and the trainees and hoped that the training contents they have acquired will make a positive difference in their work place and promised to make possible provision for finance to facilitate their activities.

Closing

The Chairman wrapped up the session by summarizing main points of discussion, which are tabulated in attachment 4.

The meeting was closed at 13:00.

MAFFS/JICA-SRDP Joint Coordinating Committee Meeting 6

List of Attendants (1/2)

Date: 10/12/2013

Place: Conference Hall, MAFFS, Youyi Bldg., Freetown

#	Name	Designation	Organization	Mobile phone no.	e-mail address
1	Joseph Sam Sesay	Minister	MAFFS		
2	Fatmata Jarai Jalloh	Extension Officer	MAFFS		
3	B.J.Bangura	Deputy Director, Extension	MAFFS		
4	Alfred Kamara	Crops Officer	MAFFS		
5	Joseph S. Bangura	Assistant Director M&E	PEMSD / MAFFS		
6	Toshihisa Hasegawa	Head, Sierra Leone Field Office	JICA		
7	Akihira Sano	Project Formulation Advisor	JICA		
8	Alie B. Yillah	Deputy Director, Agric. Engineering	MAFFS		
9	Neilford Rose	Assistant Director Ag. Engineering	MAFFS		
10	Francis A.R. Sankoh	Chief Agricultural Officer	MAFFS		
11	Henry Kargbo	Deputy Director Crops	MAFFS		
12	Kate N.B. Garnett	Ag. Director Forestry	MAFFS		
13	Umaru M. Sankoh	DAO MAFFS Kambia	MAFFS		
14	Sheku T. Kamara	ACAO MAFFS	MAFFS		
15	Joseph D. Ganda	Asst. Director, Ag. Engineering	MAFFS		

MAFFS/JICA-SRDP Joint Coordinating Committee Meeting 6

List of Attendants (2/2)

Date: 10/12/2013

Place: Conference Hall, MAFFS, Youyi Bldg., Freetown

#	Name	Designation	Organization	Mobile phone no.	e-mail address
16	Takashi Kimijima	Chief Advisor	JICA		
17	Mitsuo Nishiya	Deputy Chief Advisor	JICA		
18	Umaru Fofanah	Project Officer	JICA		
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					

Agenda of the Sixth Joint Coordination Committee Meeting (JCC) for the Sustainable Rice Development Project (SRDP) in Sierra Leone

Venue: Conference Hall, MAFFS, Youyi Bldg.
Date: 10 December, 2013
Time: 10:00 – 12:00

Agenda

1. Silent prayers
2. Self-introduction
3. Chairman's opening remarks
4. Action points from Progress Report 5
5. Presentation and discussion of Progress Report 6
6. Cost-benefit analysis on rice production following discussion
7. Recommended cropping pattern for double cropping of rice
8. Experience sharing of 2013 MAFFS staff trainees (5) from Japan under JICA with special reference to the Job Improvement Plan (JIPs) for implementation

MAFFS – JICA
SUSTAINABLE RICE DEVELOPMENT PROJECT
IN SIERRA LEONE
(2010-2014)
Sixth Joint Coordinating Committee Meeting

10 December, 2013
MAFFS conference hall, Youyi Bldg., Freetown

Agenda

1. Silent prayers
2. Self introduction
3. Chairman's opening remarks
4. Action points from Progress Report No.5
5. Presentation and discussion of Progress Report No.6
6. Cost-benefit analysis on rice production following discussion
7. Recommended cropping pattern for double cropping of rice
8. Experience sharing of 2013 MAFFS staff trainees(5) from Japan under JICA with special reference on the Job Improvement Plans (JIPs) for implementation

Matrix of discussion results in the 5th JCC

	Observation	Issues	Decision or recommendation	Responsible person
1	Contradictory results are shown between pot experiment and experiment.	Recommended dosage of fertilizer is not seen.	Detailed explanation of the on-farm fertilizer experiment results should be presented.	SRDP, RARC
2	Dry season rice cropping is going well.	How to realize double cropping rice or multiple cropping maximizing profit.	**Recommendation on cropping calendar on double cropping of rice and multiple cropping should be made.**	SRDP
3	Dosage of fertilizer used in FBO support seems higher	Can the cost of fertilizer be recovered by the incremental benefit?	**Cost-benefit analysis of the rice production should be presented**	SRDP, RARC
4	The results of pot experiment are complicated.	Recommended dosage of fertilizer is not seen.	The results of the pot experiment should be translated into technical package (fertilizer recommendation)	MAFFS, SRDP, RARC
5	Direction of the research on soil fertility is not consistent among the stakeholders.	Dosage of fertilizer to be recommended under SCP is not determined.	A joint meeting between MAFFS, SLARI and JICA should be held.	MAFFS, SRDP
6	JICA-SRDP is going to develop extension method.	No detailed information on this is not shared.	MAFFS extension division should be involved in the preparation of TP-R extension guide.	SRDP, MAFFS
7	Importance of soil fertility assessment is recognized.	Survey extent is not deep enough.	The soil survey should be continued in the next phase of the JICA project.	MAFFS
8	Soil chemical analysis is conducted in Japan.	Why not the analysis work done in Sierra Leone?	Analytical equipment necessary for soil chemical analysis should be procured.	MAFFS, SLARI, RARC
9	Overlapped activities are observed in the field by JICA-SRDP and ASREP.	No coordination or communication has been made	District coordination meeting should be organized.	MAFFS, MAFFS-K

3

Project Purpose and Output

- Project period: 2010-2014
- Target area: Mainly Kambia district

Project Purpose:
To establish rice production techniques and its extension method which are applicable throughout Sierra Leone

Output 1
To revise the present technical package on rice production (TP-R)

Output 2
To extend the TP-R to small-scale farmers through FBOs in Kambia

Output 3
To extend the contents of TP-R and an extension method to officials of MAFFS's district agricultural offices other than MAFFS-Kambia.

4

Progress Report 6 - Contents

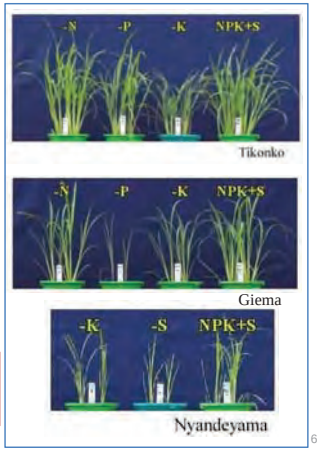
1. Introduction
2. Project Progress during the Last Six Months (Mar.-Aug. 2013)
   1. Trials for improving Technical Package on Rice Production
   2. Rice cultivation by FBOs in the dry season 2012/13
   3. Rice cultivation by FBOs in the rainy season 2013
   4. Capacity development of FBO farmers and extension workers
   5. Project operation
3. Proposed Activities in the Subsequent Project Period

5

Trials for improving TP-R (Soil fertility evaluation) (1)

Soil	Abbr.	Element N	P	K	S	Zn
Robennah-U	RU					
Masineh	MH					
Kpuabu	KP					?
Buline	BL					
Nyandeyama	NY					
Giema	GM					
Kanikay	KK					
Mandu	MD					

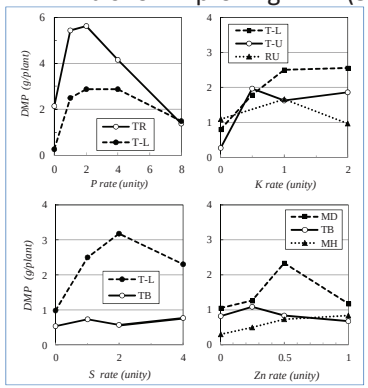
Very severe
Severe
High
Fair
Less

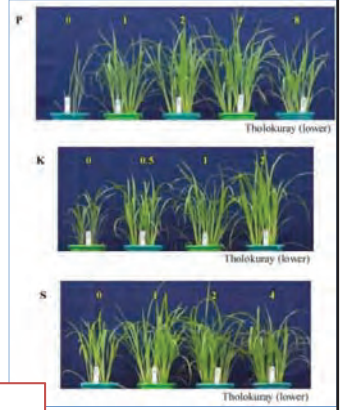


Deficiency of P and S was widely distributed.
Deficiency of N and K also appeared in several soils, but deficiency of Zn was site specific

6

Trials for improving TP-R (Soil fertility evaluation) (2)





Over-doses of nutrients retard the growth.
Plants would respond to 100-200 kg P_2O_5/ha.
20% of N amount would be optimum for S application.

7

Trials for improving TP-R (On-farm verification) (1)

- To examine the effect of **level of P** on growth and yield of rice plants at lowland, on-farm trials were carried out at a FBO farmers' rice field during the dry season 2013.

Treatment (N-P_2O_5-K_2O kg/ha)	Yield (ton/ha)
P0 (60-0-40)	2.4
P30 (60-30-40)	4.2
P100 (60-100-40)	3.6
P0-residual (60-0-40)	3.0

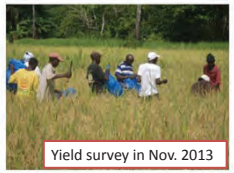
8

Trials for improving TP-R (On-farm verification) (2)

- On-farm fertilizer trial has been set at 5 locations in the rainy season 2013. This time, the effect of graded **level of N, P, and S** on the rice growth and yield is tested.


Fertilizer Trial at Masineh (1 week after transplanting)

Treatment	Fertilizer application rate: N-P_2O_5-K_2O-S (kg/ha)
1: Control	0-0-0-0
2: Standard	60-40-40-0
3: Low N, -S	20-40-40-0
4: Low N, + S	20-40-40-10
5: Low N, High P, +S	20-100-40-10


Yield survey in Nov. 2013

9

Rice cultivation by FBOs in the dry season 2012/13 (1)

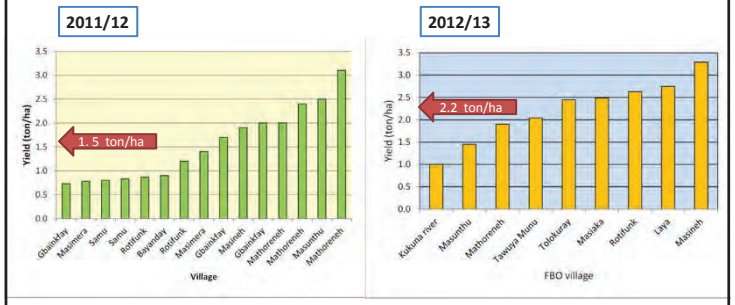
- SRDP supported **10 FBOs** in the dry season cropping 2012/13.
  - Average yield: **2.2 ton/ha** (1.5 ton/ha in 2011/12)
  - Maximum yield: **3.3 ton/ha**
  - Those FBOs having produced rice with 2 ton/ha or more constructed bunds with a drainage canal.
  - Proper farming practices such as weeding, water management and timely fertilizer application are necessary.


Harvest at Masiaka


Threshing at Laya

10

Rice cultivation by FBOs in the dry season 2012/13 (2)



Comparison of the grain yield of rice in the FBO fields between the last two dry seasons

11

Rice cultivation by FBOs in the rainy season 2013

- **19 FBOs**, including 14 FBOs which had been given support before, were selected for support in 2013.
  - **300 kg/ha of NPK 15-15-15** were distributed.
  - 8 FBOs were supported construction of drainage canal, peripheral canals and internal bunds by ASREP/GAFSP, while the other FBOs constructed them by themselves.
  - Small-scale **seed production** is going on at 4 FBO fields.


Rotifunk


Masiaka

12

Capacity development (Training for FBO farmers)

- In the end of the dry season, a **wrap up training** session for the member farmers (59 in total) of 10 FBOs who received support by the project were held in May 2013.
- Prior to the start of the rainy season cropping, farmers of 19 FBOs (65 in total) were provided **training on rice cultivation technique** in June 2013.

Drama: cost-benefit on fertilizer

Exercise: cropping calendar

13

Capacity development (extension method, Training)

- The **extension guideline and materials** (the Guide) has been under preparation in consultation with the Extension Division of MAFFS-HQ, MAFFS-K and FAO, with the objective of disseminating TP-R down to the farmers through FFS under SCP.
- Training: To share the contents of the Guide with the extension workers of MAFFS-K, and obtain the feedback from them, a series of training session was provided to them in July, 2013.

14

Manual on soil chemical analysis

- **Manual on soil chemical analysis** is under preparation.
  - 17 analysis methods
  - Description:
    1) principle 2) apparatus, 3) reagents, 4) procedure, and 5) calculation.

15

Proposed activities (Sept. 2013 - March 2014)

1. On-farm trials for revising TP-R and utilization of the results in the extension activities
2. Strengthening of coordination with MAFFS/SCP, and procurement of agricultural input for FBOs and monitoring of its utilization
3. Coordination of the dissemination of TP-R
4. Survey on the adoption level of farming techniques in TP-R by FBO farmers
5. Cooperation with the **terminal evaluation** mission
6. Provision of guidance on TP-R and its extension method to extension workers outside Kambia
7. Preparation and submission of Progress Report 7
8. Holding JCC meeting and MC meetings
9. Communication with other donors/NGOs active in agriculture and rural development sector

16

TOPICS

1. Cost-benefit analysis of rice production
2. Recommended cropping pattern for double cropping of rice

Cost-benefit analysis
- Assumption for the analysis 1 -

Cost items:

– Production cost of paddy (rough rice) is defined as the cost necessary for farmers to cultivate rice, and is composed of labor, input, and tools. Cost for land development (bund construction, drainage construction, and terracing work) is not counted.

Benefit:

– Benefit comes from the quantity of paddy produced. Without fertilizer application condition, 1,200 kg of rough rice is assumed to be produced.

Cost-benefit analysis
- Assumption for the analysis 2 -

Unit price:

– Labor cost is Le 7,000 per man-day.

– Fertilizer cost consists of wholesale price + sales margin + transportation cost (Le 108,500 per 25kg)

– Seed cost is Le 2,000 per kg.

– Cost for tools and materials is calculated as the depreciation based on the assumption of economic life of 3 to 8 years.

– Farm gate price of paddy is Le 1,200 per kg (Le 30,000 per 25kg).

Cost-benefit analysis
- Assumption for the analysis 3 -

- Labor requirement (man-days/ha): 438

		Without fertilizer
1	Brushing	63
2	Digging	75
3	Puddling/leveling	63
3	Uprooting	32
4	Transplanting	44
5	Weeding	75
6	Harvest	47
7	Threshing	28
8	Winnowing	13

Source:
JICA-SRDP based on the interview with FBO farmers (2013)

Cost-benefit analysis

- Assumption for the analysis 4 -

- Seed amount: 40 kg/ha
- Tools :
  - Hoe (8 years) 10 units (Le 40,000/unit)
  - Sickle (5 years) 10 units (Le 20,000/unit)
  - Tarpaulin (3 years) 2 sheets (Le 90,000/sheet)
  - Winnower (5 years) 5 units (Le 7,000/unit)

Cost-benefit analysis

- Cost per hectare (Le)

	Unit	Quantity	Unit cost	Total
1. Labor	man-day	438	7,000	3,066,000
2. Seed	kg	40	2,000	80,000
3. Fertilizer	25 kg bag	0	108,500	0
4. Tools and materials				
- Hoe	unit	10	5,000	50,000
- Sickle	unit	10	4,000	40,000
- Winnower	unit	5	1,400	7,000
5. Material				
- Tarpauline	unit	2	30,000	60,000
- Rice bag		24	1,000	24,000
TOTAL				3,327,000

Cost-benefit analysis

- Gross benefit per hectare (Le)

  Le 1,200/kg x 1,200 kg/ha = Le 1,440,000

- Net benefit per hectare (without fertilizer)

  Le 1,440,000 – Le 3,327,000 = - Le 1,887,000

Rice farming is not a profitable business at present. If half of the labor requirement is covered by family labor, financial benefit will be close to break even.

Cost-benefit analysis

- How to improve the farmers' economy -

What are the alternative ways to improve profitability?

- Fertilizer application to increase yield ?
- Spraying herbicides to reduce weeding cost ?
- Mechanization to reduce cost for land preparation ?

Cost-benefit analysis
Fertilizer use

- Benefit per ha: 3,200 x 1,200 = **Le 3,840,000**
  - Incremental benefit (3,200 – 1,200) * 1,200 = Le 2,400,000
- Cost of fertilizer per ha: Le 108,500 x 12 = **Le 1,302,000**
- Increase in cost (labor in harvest, threshing, and winnowing, and rice bags)

  32 man-days x Le 7,000 + Le 40,000 = **Le 264,000**
- Net Benefit per ha (with fertilizer)

  Le 3,840,000 – (Le 3,327,000 + Le 1,566,000) = - Le 1,053,000

Fertilizer improve profitability but not enough.

Cost-benefit analysis
- Herbicide use -

- Herbicide cost per ha
  - Propanil (for broadleaf) : Le 360,000 (4L x Le 90,000/L)
  - 2,4-D (for Graminae) : Le 90,000 (1L x Le 90,000)

  Total : Le 450,000 (Labor cost for weeding: Le 525,000)

Herbicide may reduce the weeding cost a little, but strict water control is necessary to bear the effect.

Hand weeding is unavoidable even after the herbicide spray.

Considering possible negative environmental impact, it is not recommended to use herbicides at present.

Cost-benefit analysis
- Mechanization (tentative values) -

- Cost of tractor service
  - Price of a tractor (50 PS) with attachment : USD40,000 (equivalent to Le 174,000,000)
  - Economic life: 8 years (=Le 21,750,000/year)
  - Cultivation area: 125 ha per year (= Le 174,000/ha)
  - Maintenance cost (repair and spare parts): 5% of the price (= Le 174,000,000 x 0.05 / 125 = Le 69,600/ha)
  - Fuel (20L/ha): Le 4,500 x 20 = Le 90,000
  - Operator (Le 50,000/ha)

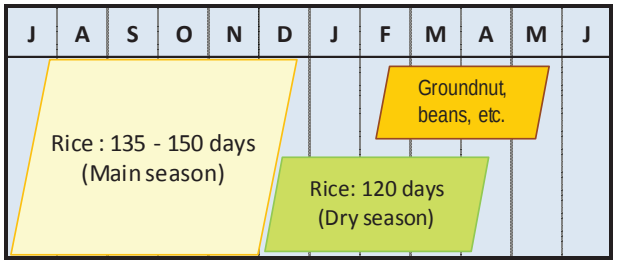
Total : Le (174,000 + 69,600 + 90,000 + 50,000) = Le 383,600

Digging by labor : Le 525,000

Cropping pattern for double cropping 1

- Double cropping of rice is possible at inland valley swamp from the experience of JICA-SRDP.
- Necessary condition is to secure water throughout the growth period.
- Higher yield is expected in the dry season under more manageable water condition and more solar radiation than in the rainy season.

Examples of cropping pattern (rice-rice-vegetable)



Cautions in preparing cropping pattern 1

Rainy season cropping of rice

- Varieties to be used may better be medium to long duration (135 to 150 days) and harvested by the middle of December at latest.
- Transplanting should be done before peak rainy season (middle of August).
- Fertilizer should be applied at the time of transplanting to avoid intensive rainfall.
- Do not irrigate the field but drain water from the field.

Cautions in preparing cropping pattern 2

Dry season cropping of rice

- Nursery preparation should be started in December, and transplanting be done until mid-January.
- Medium duration varieties (eg. NERICA L19) are better be planted considering scarce water resources and rodents/birds.
- In case nursery preparation is delayed in January, short duration varieties should be used.
- Fertilizer should be applied with good water management.

Matrix of the discussion (Action points) at the 6th JCC meeting

Observation	Issues	Decision or recommendation	Responsible person
The need to re-examine the assumptions used for cost-benefit analysis of rice production.	The results of the analysis showed the negative profit.	To re-examine these assumptions by comparing with other countries including Japan; To examine the profitability of introducing small agro-machinery (power tiller) and herbicide	MAFFS, SRDP
Activities made by the stakeholders in the rice sector have not been coordinated or collaborated.	Information has not been shared or development efforts were not harmonized.	Have a session to discuss about the issues of the rice sector (at the occasion of National Retreat)	MAFFS
Fertilizer application is risky in bringing about profit when used in the rainy season.	How to make fertilizer application effective in the rainy season.	To examine the cropping pattern and varieties so that rainfall will not bring about negative impact on fertilizer application.	MAFFS, SRDP
Joint terminal evaluation study will commence soon on JICA-SRDP activities.	MAFFS need to appoint evaluation team members to undergo the process.	MAFFS to appoint joint evaluation team members to work with the Japanese team.	MAFFS
MAFFS trainees sent to Japan under the JICA programme prepared the Job Improvement Plan (JIPs)	They lack financial support to implement the JIPs	While the MAFFS makes efforts to secure funds, the trainees make their best efforts to implement the JIPs under the constraints.	MAFFS