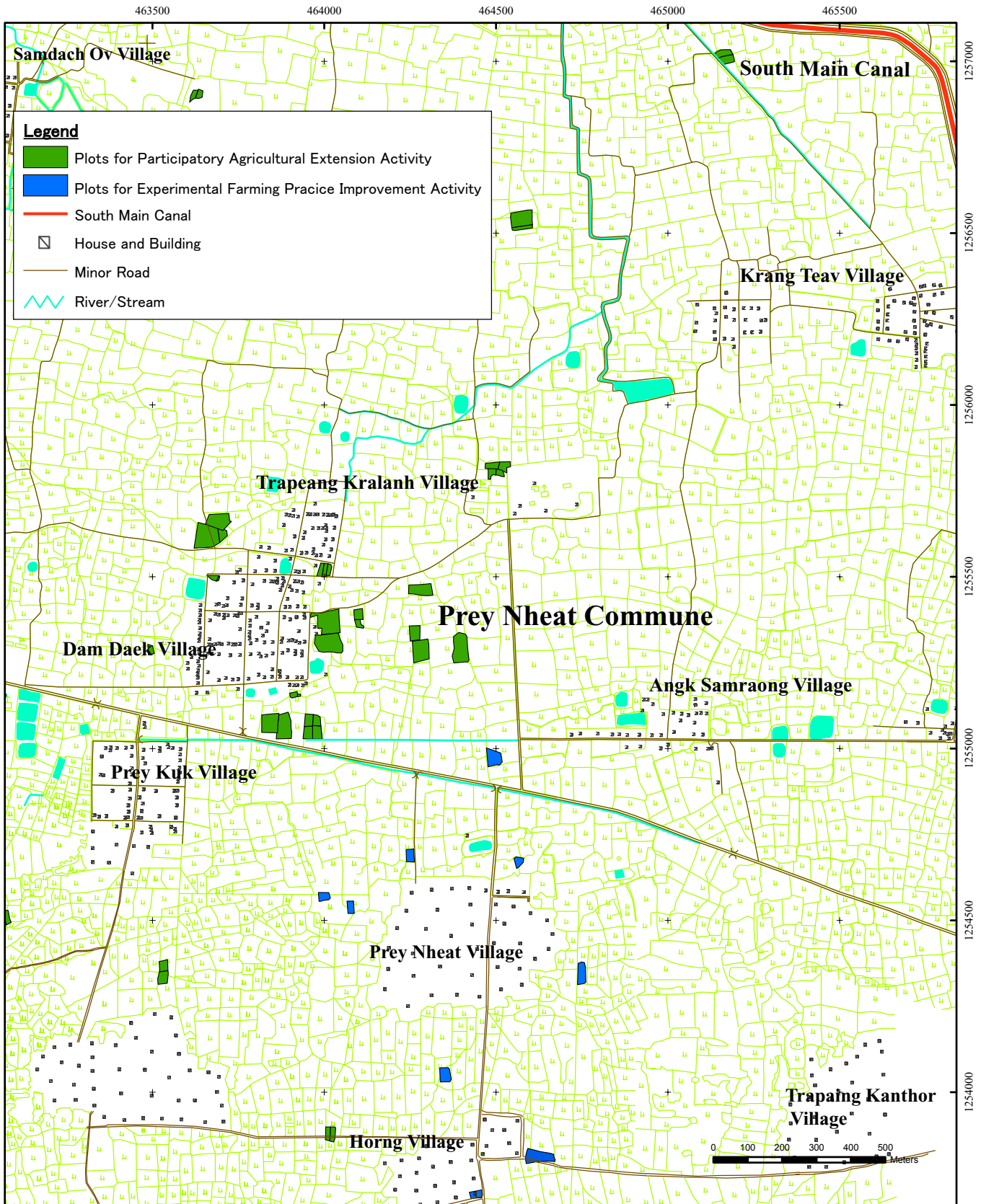


PART-C
PILOT PROJECTS (2007/2008)

Section-III
Rainfed Agriculture Improvement
Pilot Project in Zone-4



*SRI dissemination activities in Dam Daek Village
(Participatory Agricultural Extension Activity in Zone-4)*



The Study on Comprehensive Agricultural Development of Prek Thnot River Basin in the Kingdom of Cambodia

Japan International Cooperation Agency

Location Map of Zone-4 Pilot Project

PART-C: PILOT PROJECTS (2007/2008)

Section-III

Rainfed Agriculture Improvement Pilot Project in Zone-4

Chapter CIII-1 Framework of the Project

CIII-1.1 Objective

This is mentioned in section BIII-1.1.

CIII-1.2 Project Area

Locations of the project area are mentioned below. They are also shown in the attached location map for Zone-4.

CIII-1.2.1 Area for Participatory Agricultural Extension Activities

In 2007/08, participatory agricultural extension activities were carried out in Dam Daek, Prey Kuk, Trapaing Konthor, Trapaing Kralanh, and Horng villages, Prey Nheat commune in Kong Pisei district

CIII-1.2.2 Area for Experimental Farming Practice Improvement Activities

Similarly, the Prey Nheat village, Prey Nheat commune in Kong Pisei district was selected as a pilot project area for experimental farming practice improvement activities.

CIII-1.3 Schedule

The two activities under the pilot project were carried out by February 2008, although the major field activities were finished by January 2007. This section describes the pilot project activities in Zone-4 conducted from May 2007 to January 2008.

Implementation Schedule of Pilot Project in Zone-4

Activities	2006												2007												2008		
	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3			
(1) Baseline Survey			■																								
(2) Kick-off Seminar			■																								
(3) Participatory Agriculture Extension																											
(4) Experimental Farming Practice Improvement																											
(5) Evaluation																											■

CIII-1.4 Project Design Matrix (PDM), Version 2

Based on the results of the pilot project activities in Zone-1 conducted from June 2006 to February 2008, the Project Design Matrix (PDM) was modified. The modified matters are as follows:

Activities

- “2-3 To conduct farmers’ acceptability survey for confirming the possibility to introduce the improved farming practices by seeing the results of the first year from technical and economical viewpoints” should be added since the farmers’ response to the pilot project activities should be known.

Important Assumptions, Outputs

- “Responsibility of each stakeholder in water management is not changed within the project period” should be deleted since the water management could not be made under rainfed agriculture.

Objectively Verifiable Indicators, Project Purpose and Outputs

- “1-1 Result ofby year 2007”and “1-1 Fifty farmers....by year 2007” should be changed into “1-1 Result ofby February 2008” and “Fifty farmers....by February 2008” since some activities such as interview of farmers on improved farming practices were postponed until February 2008.

Project Design Matrix (PDM), Version 2

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal Agricultural productivity centering on rice is improved in the target area	1-1 Agricultural productivity in the target area is improved as proposed in the master plan by year 2015	1-1 Agricultural statistics	
Project Purpose Good model of rain fed agriculture improvement in Zone-4 is established	1-1 Result of the pilot project is evaluated as applicable model for Zone-4 by stakeholders by February 2008	1-1 Questionnaire to the stakeholders	- All the proposed activities in the master plan in post-project stage are implemented as scheduled - No significant climatic change
Outputs 1 Low inputs SRI information is disseminated by farmer-to-farmer extension 2 Target yields of the master plan are achieved by applying SRI based improved farming practice	1-1 Fifty farmers in the model villages apply low inputs SRI by farmer-to-farmer extension by February 2008. 2-1 Yields of improved SRI in experimental plots is higher than the target yields of the master plan	1-1 Monitoring surveys 2-1 Crop yield surveys	
Activities (1. Participatory agriculture extension) 1-1 To organize study tours 1-2 To conduct village training 1-3 To carry out inter-village training 1-4 To hold farmers’ field days (2. Experimental farming practice improvement) 2-1 To conduct verification tests to confirm effectiveness of SRI based improved farming practices 2-2 To conduct small scale adaptability trials for further improvement of the farming practices 2-3 To conduct farmers’ acceptability survey for confirming the possibility to introduce the improved farming practices by seeing the results of the first year from technical and economical viewpoints.	Input Donors Experts Transportation Cost of study tours	Cambodia <u>Provincial government</u> Counterparts from PDA <u>Central government</u> Counterparts from MAFF <u>NGO</u> Facilitators	- Continuous involvement of related government agencies and model farmers during the project period - No severe natural disaster within the project period Precondition - High need for rainfed agriculture in the target area

Chapter CIII-2 Participatory Agricultural Extension Activities

CIII-2.1 Objective

This is mentioned in section BIII-2.1.

CIII-2.2 Institutional Set-up

This is mentioned in section BIII-2.2.

CIII-2.3 Situation before Starting Pilot Project Activities

Participatory agricultural activities covered five target villages of Prey Nheat commune, Kong Pisey district, Kampong Speu province such as Dam Daek, Prey Kuk, Trapaing Konthor, Trapaing Kralanh, and Horng villages. “Method of Baseline Surveys”, and “Agriculture” for target villages are similar as mentioned in sub-section BIII-2.3.2 and -2.3.3. The community organization is as follows:

Dam Daek, Prey Kuk, Trapaing Konthor, Trapaing Kralanh, and Horng villages are located in Prey Nheat Commune, Kong Pisei District. The latest election of the commune council was conducted in 2002, according to the village chiefs of the Commune. There were seven commune council members and all of them were males. Its main roles were i) dissemination of information on village development, and ii) intermediation with donor agencies.

CIII-2.4 Identified Constraints on Agricultural Extension Activities

Identified constraints on agricultural extension activities for target villages are similar as mentioned in section BIII-2.4.

CIII-2.5 Activities Conducted for Improvement

CIII-2.5.1 Preparation of Improvement Plan

This is mentioned in sub-section BIII-2.5.1.

CIII-2.5.2 Farmer-to-farmer Low Inputs SRI Extension Practice

CIII-2.5.2.1 Initial Guidance in 2007/08

Initial guidance on SRI extensions were held at five villages on June 01, 07, 12 and 13, 2007. In total, five guidance meetings were organized with the participation of 145 farmers including 98 women (it should be noted that in five villages, there were a total of 406 families, according to the baseline survey in 2007). There might be several reasons for the poor attendance rate: (i). miscommunication between village chiefs and villagers, (ii). farmers were busy in starting wet season rice, and (iii). farmers were busy doing personal work.. In guidance, 12 principles of SRI were explained to all villagers by the staff and also by the farmer promoter coming from Dam Daek village. The farmers who were interested in SRI were motivated to apply principles by considering their field situations.

Information on Farmers who Attended the Guidance Meetings in Zone-4

No.	Villages	Population (families)	date of guidance	Participants		Interested farmers	Experimental farmers
				Total	Women		
1	Dam Daek	149	June 01, 2007	43	19	11	4
2	Tropaing Konthor	73	June 12, 2007	25	22	6	3
3	Tropaing Krolanh	61	June 07, 2007	18	12	7	3
4	Horng	62	June 07, 2007	34	25	5	3
5	Prey Kuk	61	June 13, 2007	25	20	9	2
	Total	406		145	98	38	15

As a result, all participants were interested in SRI innovation and 38 of them said that they volunteered to apply SRI in this season and 15 farmers showed strong interest as experimental farmers.

CIII-2.5.2.2 Study Tour

The study tour of Andong Rorveang Village and Stok Kavas Village, Bor Re Bor and Rolear Baear District, Kampong Chhnang province was organized by CEDAC on July 9 and 10, 2007 for the purpose of learning SRI practice on site, the advantages of a saving group, and ecological chicken raising. From eleven pilot project target villages, 31 farmers who were interested in SRI practice joined the tour. Out of these, 15 farmers attended the tour at Zone-4. For details of the study tour, see clause CI-3.5.2.2.



Host village farmer explained a harvest of water melon to participants of study tour.

CIII-2.5.2.3 Village Training

Village training was given to farmers' groups of Trapaing Kanthor, Prey Kuk, Dom Dek, Trapaing Kralanh and Horng village at their villages basically once a month. The following activities related to SRI were conducted in the village training:

Major Issues about SRI in Village Training

No.	Date	Major Activities	Nos. of Participants
1	August 6, 29 and 30, 2007	- Share information of the study tour - Prepare experimental plots	70
2	September 5, 13 and 24, 2007	- Discuss emergent problems and explain the resolution of problems	46
3	October 3, and 14, 2007	- Share experiences related to SRI practice and progress of SRI	33
4	November 5, 14, 28 and 29, 2007	- Share experiences related to SRI practice and progress of SRI - Discuss benefits of pure rice seeds and methods of selecting pure rice seed - Explain how to select and keep pure rice seeds	36
2	December 17, 2007	- Conduct evaluation of pilot project - Remind last training and the principles of SRI - Summarize the progress of farmer's activities - Discuss problems and solution - Reflect activities conducted by farmers	24

Major concerns for the farmers were the damage of young seedlings by crabs and the method of selecting rice seeds. The method of selecting good rice seeds, as explained by CEDAC, was easily understood by the farmers. They told that they would try the method during the next cultivation. They expected to obtain high yield by applying the method of selecting rice seeds and would disseminate the method to other villages' farmers.



Explaining the method of selecting good rice seeds to farmers



Discussing traditional method of selecting rice seeds

CIII-2.5.2.4 Inter-village Workshops

An inter-village workshop related to SRI was held four times. Major activities conducted about SRI in the inter-village workshop were given in the table below.

In the inter-village workshop in October 17, 2007, farmers were concerned with diseases of rice such as dwarf disease and damage from mice. CEDAC explained how to reduce damages caused by dwarf disease and mice as follows:

Causes of Damages	Countermeasures against Damages
1) Dwarf disease	Pull out damaged stalks.
	Transplant again after pulling them out.
2) damage by mice	Transplant the same variety of rice to avoid intensive damages.

Major Issues on SRI in Inter-village Workshop

No.	Date	Major Activities	Nos. of Participants
1	June 22, 2007	<ul style="list-style-type: none"> - Share experiences, problems and solutions related to SRI practice (ex. Selection of rice seed, preparation of nursery, uprooting of rice seed, transplanting) - Analyze traditional agricultural practice - Discuss SRI techniques based on 12 principles of SRI 	21
2	August 13, 2007	<ul style="list-style-type: none"> - Share experiences of study tour conducted in Kampong Chhnang province - Share experiences, problems and solutions related to SRI practice 	17
3	October 17, 2007	<ul style="list-style-type: none"> - Share information related to SRI practice and progress - Discuss emergency problems and their solutions 	23
4	December 17, 2007	<ul style="list-style-type: none"> - Evaluate the results of the pilot project 	24

Experimental farmers prepared weeding tools according to advice by CEDAC. Thereafter they conducted weeding with the tool based on the instructions of CEDAC. The results were accepted by them.

CIII-2.5.2.5 Farmers' Field Day

Farmers' field day was held at Dom Dek village to disseminate the techniques and show the effectiveness of SRI to other villages' farmers who did not apply SRI. In the farmers' field day on December 18, 2007, farmers who tried to apply SRI for two years introduced their experiences and effectiveness of SRI to farmers



Participants conducted crop cutting.

who did not apply SRI. It was so effective that all participants could directly learn many experiences of SRI practice from farmers who applied SRI. Major issues discussed in the farmers' field day were as follows.

Major Activities about SRI in the Farmers' Field Day

No.	Date	Major Activities	Nos. of Participants
1	December 18, 2007	<ul style="list-style-type: none"> - Share experiences of applying SRI for two years - Explain SRI techniques to participants - Conduct crop cutting and compare the result of harvests between SRI and traditional farming 	15

CIII-2.5.2.6 Supporting and Monitoring of Experimental Farmers

Supporting and Monitoring of Experimental Farmers were conducted on 13 experimental farmers from five villages. Major activities conducted in the above mentioned monitoring were as follows:

Major Issues about Supporting and Monitoring of Experimental Farmers

No.	Date	Major Activities
1	June 6, 12, 13, 18, 19 and 26, 2007	- Measure the land area of experimental farmers
2	July 3, 5, 12, 16, 18 and 30, 2007	<ul style="list-style-type: none"> - Measure the land area of experimental farmers - Help farmers to prepare the experimental plots - Advise how to prepare plots and find emergent problems and solutions
3	August 9, 20, 21, 30, 2007	<ul style="list-style-type: none"> - Monitor and support emergent problems on experimental plots - Collect data of experimental plots
4	September 5, 6, 13, 14, 20, 24 and 27, 2007	<ul style="list-style-type: none"> - Monitor and support emergent problems on experimental plots - Collect data of experimental plots
5	October 2, 16, 22 and 23, 2007	<ul style="list-style-type: none"> - Monitor and support emergent problems on experimental plots - Collect data of experimental plots - Hear measures which experimental farmers took against problems
6	November 2, 14, and 20, 2007	<ul style="list-style-type: none"> - Monitor and support emergent problems on experimental plots - Collect data of experimental plots - Discuss water management at their plots
7	December 4 and 31, 2007	- Remind how to select rice seeds

Farmers were concerned with diseases. Some of the stalks of experimental plots were damaged by brown hoppers. Advice and solution of problems to farmers which were given by CEDAC were to apply a botanical pesticide which was made by mixing fresh water in which cut bamboo shoot was soaked with soap powder.

CIII-2.5.2.7 Village General Meeting

A village general meeting was conducted at the end of the farmers' activities in target villages. In the meeting, the progress of the pilot project was confirmed. Participants shared the results and experiences which farmers had obtained.

Major Issues at Village General Meeting

No.	Date	Major Activities	Nos. of Participants
2	January 12, 16, 23, 24, 2008	<ul style="list-style-type: none"> - Confirm the progress of the pilot project - Share the results and the experiences with farmers applying SRI, ecological chicken raising and join saving group 	92

CIII-2.5.2.8 Results

As mentioned in clause CI-3.5.2.7, the indicators of the result could be summarized as

follows.

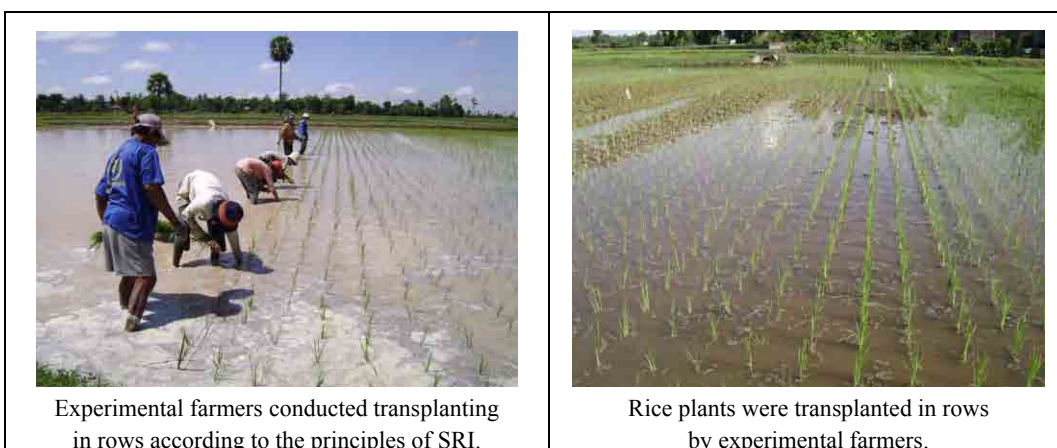
- Number of farmers who applied SRI (the most important indicator)
- Number of cooperative farmers or members of farmers' group (indicator for possibility of future dissemination of the innovation)
- Participatory yield comparison between SRI and traditional farming

(1) Number of farmers who applied SRI

In the previous year, 18 farmers (there were 137 families in the village in the year 2004 according to SEILA Commune Database) including three experimental farmers applied low inputs SRI in Dam Daek village. 46 farmers in f villages applied SRI. The number of farmers applying SRI highly increased due to the successful participatory agricultural extension activities. Details of the number of farmers applying SRI were given below.

Number of Farmers Applying SRI and Total Area

Village	Nos. of Total Farmers Applying SRI	Total Area Applying SRI
Dam Daek	11	4.61 ha
Prey Kuk	14	6.46 ha
Trapaing Kanthor	6	2.45 ha
Trapaing Kralanh	8	1.73 ha
Horng	7	1.57 ha
Total	46	16.82 ha



Experimental farmers conducted transplanting in rows according to the principles of SRI.

Rice plants were transplanted in rows by experimental farmers.

The number of farmers applying SRI attained at about 90% (50 farmers) of the target.

(2) Total Area of SRI Applied Paddy Plots

The areas of SRI-applied paddy plots were surveyed beforehand by handheld GPS under the assistance of the JICA study team. In Dam Daek village, SRI was applied on a total of 2.99 ha for 17 paddy plots in 2006. In 2007, total area of plots applying SRI reached 16.82 ha which was described in the above table. The total area of plots applying SRI in 2007 was greater than the total in 2006. It means that participatory agricultural extension activities were conducted successfully.

(3) Farmer-based Yield Comparison of Traditional Farming with SRI

The project implementation team instructed the experimental farmers to divide their paddy plot into two and compare SRI and traditional farming methods. When the farmers harvested the paddy, they were requested to compare the yields of the two methods. As a result, the yields of SRI were higher than those of traditional



Farmer-based Yield Comparison

farming as shown in the following table.

Farmer-based Yield Comparison of Traditional Farming with SRI in Zone-4

Village	Number of farmers	Yield (ton/ha)		Balance
		SRI	Traditional	
Dom Dek	4	3.6	2.8	+0.8
Trapaing Kralanh	2	3.3	2.8	+0.5
Prey Kuk	2	4.4	3.4	+1.0
Trapaing Kanthor	1	3.2	2.9	+0.3
Horng	2	3.7	3.6	+0.1
Average		3.6	3.1	+0.51

CIII-2.5.3 Farmer-to-farmer Ecological Chicken Raising Extension Practice

CIII-2.5.3.1 Study Tour

For the purpose of understanding chicken raising and other activities on site, a study tour of Andong Rorveang Vilage and Stok Kavas Village, Bor Re Bor and Rolear Baear District, Kampong Chhnang province was organized by NGO (CEDAC) on July 9 and 10, 2007. From Zone-4, 15 farmers took part in the tour.

During the two-day tour, the participants visited two villages and learned advanced activities. The host village farmer who was successfully executing ecological chicken raising explained the technical methods and his experiences. After the discussions, all participants were requested to ask questions on the discussions, if any. For details of the study tour, see clause CI-3.5.3.2.



Participants discussing their experiences obtained through the study tour

CIII-2.5.3.2 Village Training

A village training was given to the farmers' group of Dam Daek, Prey Kuk, Trapaing Kanthor, Trapaing Kralanh and Horng village in 2007/08. The following activities were conducted in the village training:

Major Activities on Chicken Raising in Village Training

No.	Date	Major Activities	Nos. of Participants
1	August 7 and 29, 2007	- Analyze traditional chicken raising and bad habits which should be improved	70
2	September 6, 14 and 30, 2007	- Share emergent problems with ecological chicken raising - Explain methods of selection of chicken parents, preparation of cages and yards, feeding, and so on	46
3	October 15 and 16, 2007	- Explain methods of selection of chicken parents, preparation of cages and yards, feeding, and so on	33
4	November 5, 14, 17, 28 and 29, 2007	- Share information of progress of ecological chicken raising	36

CIII-2.5.3.3 Inter-village Workshop

An inter-village workshop was held by inviting farmers who were interested in ecological chicken raising. Participants at the inter-village meeting came from the five target villages mentioned previously. Major activities conducted for ecological chicken raising in the inter-village workshop were as follows.

Major Activities about Ecological Chicken Raising in Inter-village Workshop

No.	Date	Major Activities	Nos. of Participants
1	October 17, 2007	<ul style="list-style-type: none"> - Share experiences of study tour conducted in Kampong Chhnang province - Review traditional methods of chicken raising - Explain how to give feed and water, select parents and so on. 	23

In the inter-village workshop conducted on October 17, 2007, participants discussed their experiences on the causes of deaths of chicken. CEDAC offered solutions on how to cure the chicken considering the causes. In particular, participants were concerned with the methods of giving feed and water to chicken. They understood that the best solutions to avoid getting diseases from the neighbors' chicken were as follows.

- To build cages and yards with bamboo in order to isolate their chicken
- To improve the methods of giving feed and water to chicken

Some of the participants expressed their desire to try the method which they learned in the inter-village workshop.

CIII-2.5.3.4 Supporting and Monitoring of Experimental Farmers

Supporting and Monitoring of Experimental Farmers were conducted on 13 experimental farmers of five villages. Major activities conducted in the aforementioned monitoring were as follows:

Major Issues on Supporting and Monitoring of Experimental Farmers (10 farmers)

No.	Date	Major Activities
1	September 5, 6, 13, 14, 20, 24 and 27, 2007	- Explain how to prepare feed and drinking water for chicken
2	October 2, 16, 22 and 23, 2007	- Explain how to give feed and water to chicken
3	November 2, 14 and 20, 2007	- Explain how to give feed and water to chicken

In Zone-4, some farmers were eager to apply ecological chicken raising because of the information they got from the farmer who had succeeded in applying the method as well as the rise in the prices of the chicken.

CIII-2.5.3.5 Village General Meeting

A village general meeting was conducted at the end of the farmers' activities in the target villages. For details of the village general meeting, see clause CIII-2.5.2.7.

CIII-2.5.3.6 Result

There were five farmers who already built cages, yards, and houses for ecological chicken raising. They started to raise chicken according to the principles of ecological chicken raising. The other four farmers were not ready to build chicken's cages or yards but they already applied some principles of ecological chicken raising.

Village	No. of farmer applying the ecological chicken raising
Prey Kuk	3
Trapaing Kralanh	3
Trapaing Kanthor	2
Dam Dek	1
Horng	0
Total Zone-4	9

CIII-2.5.4 Farmers' Group Strengthening Practice

CIII-2.5.4.1 Importance of Farmers' Group

An active farmers' group is the key to a successful farmer-to-farmer agricultural extension. It is also important to strengthen the farmers' capacity on planning and management on their farming methods and various social activities. For a summary of the benefits of an active farmer's group and rural development, see clause CI-3.5.4.1.

CIII-2.5.4.2 Study Tour

The study tour of Andong Rorveang Village and Stok Kavas Village, Bor Re Bor and Rolear Baeat District, Kampong Chhnang province was organized by CEDAC on July 9 and 10, 2007 for the purpose of learning SRI practice on site, the advantages of saving group, and ecological chicken raising. From Zone-4, 15 farmers joined the tour. During the two study tours, the host village farmer explained their process of establishing the agriculture associations and its present status. Participants were impressed with the advanced farmers' group activities in the host village. For details of the study tour, see clause CI-3.5.4.2.

CIII-2.5.4.3 Village Training

A village training was given at least once in a month to the farmers' group of Trapaing Kanthor, Prey Kuk, Dom Dek, Trapaing Kralanh and Horng village at their village. The following activities related to the farmers' group were conducted in the village training:

Major Activities on Farmers' Group in Village Training

No.	Date	Major Activities	Nos. of Participants
1	August 6 and 7, 2007	- Discuss concept of establishing a saving group based on the following four questions: i) What is the purpose of establishing a saving group? ii) Why do we need to form a saving group? iii) What is a benefit of establishing a saving group? iv) What is analysis of cash flow? v) What is the difference between a bank and a saving group? vi) What is analysis of poverty cycle?	70
2	September 5, 6, 14 and 30, 2007	- Establish saving group - Prepare regulations of saving groups - Elect four committees of saving group - Save money - Share problems related to rice and water melon - Explain how to grow water melon (selecting seeds, land arrangement and so on)	46
3	October 3, 14, 15 and 16, 2007	- Review and revise regulations of saving group which were made by farmers - Save money	33

CIII-2.5.4.4 Village General Meeting

A village general meeting was conducted at the end of the farmer's activities in target villages. For details of the village general meeting, see clause CIII-2.5.2.7.

CIII-2.5.4.5 Results

- (1) Formation of Farmers' Group

As a result, five farmers' groups were organized as a saving group in Zone-4 with 39 farmers as members. The total amount of deposit attained was Riel 24,837,800. As an activity of saving group, they were expected not only to share information related to saving money but to also to discuss SRI techniques. If farmers can strengthen their unity through the activities of the saving group, it can be expected that SRI techniques can be disseminated. Many farmers considered the activities of the saving group as very significant in helping each other in their village. They were willing to conduct activities of SRI in their village because they could easily access and share information related to SRI. In Zone-4, they got used to sharing information with each other through their activities. Therefore, it was expected that information and experiences of their activities such as SRI or ecological chicken raising were disseminated from farmer to farmer.

Number of Saving Group and Saving Amount in Zone-4

Village	Saving group			
	No. of Group	No. of Member	No. of Female	Saving Amount (Riel)
Prey Kuk	1	10	5	2,575,900
Trapaing Kralanh	1	7	4	129,000
Trapaing Kanthor	1	8	6	139,300
Dam Daek	1	6	2	201,300
Hornng	1	8	1	-
Total Zone-4	5	39	18	24,837,800

(2) Formation of Saving Sub-group

In Zone-4, farmers who joined the saving group were interested not only in saving money but also in SRI and raising chicken. They enthusiastically worked on the activities of the saving group in order to save enough money to introduce ecological chicken raising. The farmers were eager to apply ecological chicken raising because of the information they got from the farmer who had succeeded in applying the method as well as the rise in the prices of the chicken.

CIII-2.6 Baseline Survey

On July 27, 2007, a baseline survey was conducted to collect data related to agricultural production, especially rice production, chicken production and vegetable production. In this survey, it was asked whether natural fertilizer was used. For details of the baseline survey, see sub-clause BII-3.6.

CIII-2.7 Specific Findings in Zone-4 Participatory Agriculture Extension Activities

The following are the findings obtained in the participatory agricultural extension activity in Zone-4.

(1) Necessity of Activity of Farmer's Group for Helping Each Other

In Zone-4, most farmers who attended the activities of the pilot project considered that cooperation among farmers was significant to their livelihood. They were keenly impressed that they learned and shared techniques and innovations related to SRI or ecological chicken raising from the host village's farmers in the study tour. From this impression, it was recognized that they had an expectation to help each other by establishing a farmer's group.

(2) Importance of Circumstance Accessible to Experienced Farmers

Most farmers preferred to learn SRI or ecological chicken raising from farmers who successfully applied them since it was easy for them to ask experienced farmers new techniques or information. As a result, some farmers already applied ecological chicken raising. The reason why farmers applied ecological chicken raising was that the prices of

chicken increased. This information was obtained from the successful farmer which indicated that they easily received the experienced farmers' suggestions. Therefore, it was important that experienced farmers be accessible to the farmers so that they can advise them on new techniques or innovations.

Chapter CIII-3 Experimental Farming Practice Improvement Activities

CIII-3.1 Program Descriptions and Objectives

The programs of the pilot project in 2007/08 and their objectives are shown in brief below.

Descriptions of Programs in 2007/08

Verification on	Program	Objectives	Target Area
	Verification test on medium variety	Verification/demonstration of improved farming practices	Zone 3
Improved rainfed rice farming practices	Small scale adaptability test on rainfed rice	Simple trial on alternative farming practices	Zone 4
	Verification test on rainfed rice	Verification/demonstration of improved farming practices	Zone 4
Training/extension	Workshop & mass guidance, extension activities (by PDA etc.)		All zones

1/: Verification tests were conducted nearly under rainfed conditions

CIII-3.2 Implementation Arrangement

The demonstrators, operators, provision of farm inputs, and other arrangements for the implementation of the programs under the agricultural pilot project were similar to those employed in 2006/07 except for land preparation cost borne by farmers in 2007/08.

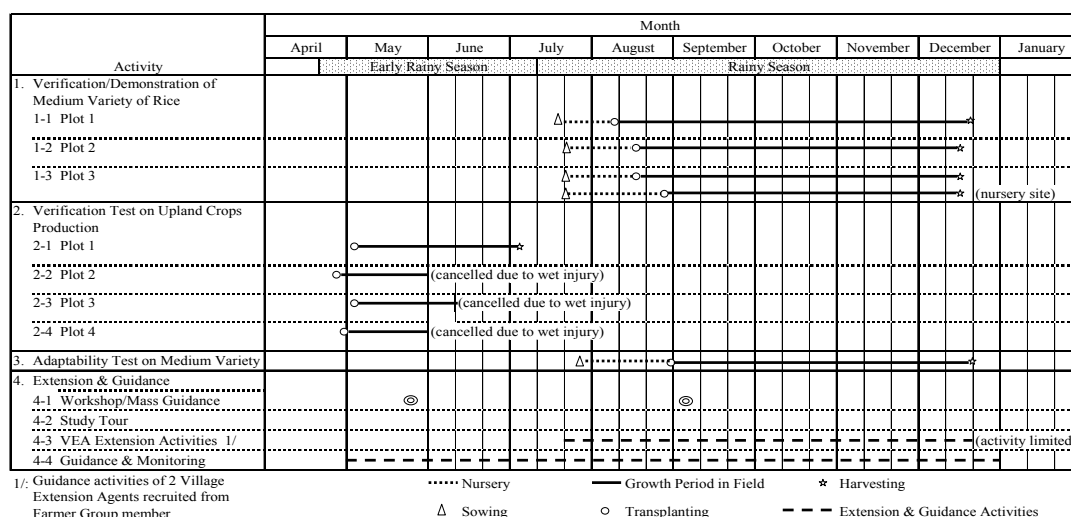
Arrangements for Programs Implementation

Program	Operator	Seed Supply 1/	Fertilizer Supply 1/	Land Prep. 1/
Verification test	Farmer	Improved variety: by project Local variety: by farmer	Compost: by farmer Fertilizer: by project	By farmer
Adaptability test	IP Team	By project	By project	By project

1/: By whom costs are borne

CIII-3.3 Pilot Project Activities in 2007/08

The farming pilot project activities in 2007/08 in Zone-4 were composed of: verification tests during the early rainy and rainy season, ii) small scale adaptability test (simple trial) during the rainy season, iii) farmers' acceptability survey and iv) field guidance activities. The overall features and schedules of the activities are illustrated in the following figure:



CIII-3.3.1 Verification Test

The purpose of the verification test was to confirm that the target yields and cropping patterns of the master plan was achievable by introducing improved farming practices.

The proposed rice farming practices for verification in 2007/08 had been formulated based on the results and findings of the verification tests in 2006/07 and drafted as “Proposed Rice Farming Practices for Verification/Demonstration in 2007/08, PDA & the JICA study team, February, 2007”. Required agricultural inputs such as fertilizers and seeds were supported by the project, whereas demonstrators were requested to adopt the improved farming practices.

The verification tests conducted in 2007/08 are summarized as follows;

Verification Tests Implemented in 2007/08 in Zone-4

Season/Activities	No.	Period	Remarks
Early rainy season - Verification test on upland crops	4 plots	Apr. ~ July	Mungbeans
Rainy season rice - Verification test on medium variety	3 plots	Aug. ~ Dec.	Joint nursery prepared

CIII-3.3.2 Small Scale Adaptability Test

The trial activity carried out in the zone includes a small scale adaptability test (simple trial) on medium variety of rice as shown in the following table.

Trial Activities Implemented in 2007/08 in Zone-4

Activities/ Trial Components	Period	Implementation by
Small scale adaptability test on medium variety - Variety trial - Planting density - Planting method - Direct sowing - Dry seedbed (upland nursery)	July ~ Dec. Aug.	Implementation team for Zone 4

CIII-3.3.3 Farmers’ Acceptability Survey

For the preliminary assessment of the adaptability of the proposed farming practices introduced in the verification plots, simple interview surveys with the demonstrators and the farmer group members were carried out.

CIII-3.3.4 Field Guidance Activities

The field guidance activities provided to demonstrators and farmer group members under the pilot project include: i) field guidance, ii) OJT on farming practices and iii) field visits by the implementation team and the JICA study team.

(1) Field Guidance

The field guidance was conducted twice for demonstrators and farmer’s group members: 1st guidance during the early rainy season and 2nd during the rainy season. The objectives, activities, and topics/subjects are as shown in the following table:



Objectives, Activities and Materials Used in Field Guidance

Guidance	Objectives/Subject Farming Practices	Activities
1 st Guidance (May 23)	- Monitoring on early rainy season activities (mungbeans)	- Monitoring growth of mungbeans
	- Technical guidance on: land preparation for mungbeans cultivation, vegetable cultivation	- Selection of demonstrators for rainy season - Field check of target fields - Field visit & guidance
	- Selection of target farmers/fields for rainy season activities	- Provision of vegetable & corn seeds
2nd Guidance (Sep. 5)	- Progress reporting on rainy season activities	- Reporting on progress of rainy season activities

- Explanation of simple trial activities	- Explanation of simple trial plots & objectives of trials
- Guidance on newly introduced transplanting method (simple line planting)	- Providing guidance on: simple line planting, regular planting using line marker
- Insect outbreak in Kp. Speu	- Reporting insect outbreak in Kp. Speu

The time schedules and number of participants of the guidance are as follows:

Schedule and Participants of Field Guidance

Guidance	Date	Participants
1st Guidance	May 23	Group members 18 out of 21 (male 7 & female 11)
2nd Guidance	Sep. 5	Group members 18 out of 21 (male 7 & female 11)

(2) OJT on Farming Practices

OJT on farming practices carried out consists of OJT on mungbeans cultivation, group nursery preparation, raised seed bed preparation, simple line planting and fertilization. The activities of the implementation team consisted of practical training of demonstrators on the main proposed farming practices.



Objectives and Activities of OJT on Farming Practices

Guidance	Objectives/Subject Farming Practices	Activities
OJT on mungbeans cultivation	- Providing practical guidance on: - land preparation & ridge formation - fertilization & planting	- Providing guidance to demonstrators & assisting their practices
OJT on raised seed bed preparation	- Providing practical guidance on: - seed selection with salt water - preparation of raised seed bed - seeding density for nursery & sowing	- Providing guidance to demonstrators & assisting their practices
OJT on simple planting	- Providing practical guidance on: - uprooting seedlings by shovel - simple line planting	- Providing guidance to demonstrators & assisting their practices

The time schedules of the guidance are as shown in the following table:

Schedule of OJT on Farming Practices

OJT	Early Rainy Season	Rainy Season
On mungbeans cultivation	Apr. 24 ~ May 31	-
On raised seed bed preparation	-	July 19 ~ July 21
On simple line planting	-	Aug. 9 ~ Aug. 17

(3) Field Visit by the Implementation Team and the JICA Study Team

Provisions of field guidance to demonstrators were carried out from May to December by the implementation team members during their visits to verification fields. Furthermore, the JICA study team also provided guidance during their visits to the verification fields.



CIII-3.3.5 Implementation Team Technical Meeting

The technical meetings of the implementation team were held nine times at PDA. The objectives of the meetings include: i) sharing information on the pilot project activities, ii) providing technical guidance, iii) exchanging opinions, iv) having technical discussions and v) to supervising the activities of the team members.

CIII-3.4 Verification Tests in Early Rainy Season

CIII-3.4.1 Objective

The objective of the verification test during the early rainy season was the verification of the possibility of upland crops (mungbeans) production in the season. The target yield set in the master plan is as follows;

Early rainy season upland crop	Mungbeans: 0.7 ton/ha
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CIII-3.4.2 Verification Plots

The verification tests on upland crops (mungbeans) were carried out in four plots during the early rainy season as shown in the following table:

Verification Test Plots in Early Rainy Season in 2007/08

Activity	Plot No.	Plot Size	Variety	Demonstrator
Verification test on mungbeans	Plot 1	10.0 a	KK2	Luy Pao (F)
	Plot 2	10.0 a	KK2	Touch Chamreon (M)
	Plot 3	10.0 a	KK2	Luy On (F)
	Plot 4	10.0 a	KK2	So Khom (F)

CIII-3.4.3 Growth History and Key Farming Practices

(1) Overall Features

The progress report on the verification test plots is presented in the following table.

Rice Farming Records in Verification Test Plots (Early Rainy Season)

Practice	Time	Remarks
Land preparation	Apr. 27 ~ May 3	By draft animal
Basal dressing	Apr. 27 ~ May 3	15-15-15 50 kg/ha
Planting	Apr. 27 ~ May 3	20 x 50 cm; 2-3 grains/hole & broadcasting
Flowering	Early June	1 plot (Plot 1)
Harvesting	End June to early July	1 plot (Plot 1)

Note: Dates indicate: date in the earliest plot - date in the last plot

(2) Growth History and Key Farming Practices

The growth of mungbeans in the verification and voluntary plots suffered from excessive rainfall, inundation of short periods, and occasional water shortage during the growth periods. Most of the plots, except for Plot 1, were plowed for land preparation for rice cultivation due to poor growth or dying from wet injury or moisture deficiency. The rainfall distribution in the growth period of May to June in Kong Pisei District, where the pilot project area was located, was higher at 404 mm in 2007 compared with that of 156 mm from 2004 to 2006 as shown below.



Rainfall Distribution in Kong Pisei District

Year	May	June	Total
2007	90 mm	223 mm	404 mm
Average of 2004 to 2006	95 mm	61 mm	156 mm

Source: Kampung Speu PDOWRAM

Flowering started at around 40 days after planting and harvesting was carried out from the end of June to early July in Plot 1.

Farming practices applied in the tests were similar to those adopted in the zone 1 and 3

and at low input level as no upland crops were cultivated in paddy fields in the pilot project area. Key farming practices adopted are as shown in the following table:

Key Farming Practices

Practices	Practices Adopted
Land preparation	- 1 plowing & harrowing by draft animal
Variety	- KK2 (seeds multiplied by Kbal Koh Exp. Station, DAALI)
Seeding rate	- 35 kg/ha
Planting method	- Line planting on ridge prepared by draft animal (partly)
Planting method	- Broadcasting followed by harrowing (mostly)
Fertilization	- 15-15-15 50 kg/ha



Land preparation



Line planting



48 days after planting

CIII-3.4.4 Results

The yield level of the Plot 1 is estimated at 0.5 to 0.6 ton/ha compared with the master plan target of 0.7 ton/ha. The lower yield might be attributed mainly to wet injury due to heavy rains, inundation for short periods, and occasional water shortage during the growth period.

Since the use of paddy fields in the early rainy season is essential for the improvement of land use intensity and crop diversification in the zone, the introduction of upland crops in the season should better be envisaged. For the successful introduction of upland crops in the season, improved farming practices discussed in sub-clause CI-4.4.4.2 should be adopted. Further trials for technology development and dissemination of upland crops cultivation in the season should be continued by both the PDA and CARDI.

CIII-3.5 Verification Test in Rainy Season

CIII-3.5.1 Objective

The objective of the verification tests during the season is the verification and demonstration of the improved farming practices of medium variety of rice. The target yield set in the master plan is as follows;

Rainy season rice	Medium variety: 2.0 ton/ha
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CIII-3.5.2 Verification Plots

The verification tests on medium rice were carried out in three plots during the rainy season (see location map for Zone-4 pilot project area) as shown below.

Verification Test Plots for Rainy Season Rice in 2007/08

Activity	Plot No.	Plot Size	Variety	Demonstrator
Verification test on medium variety	Plot 1	6.6 a	Riang Chey	Kheov Kom (M)
	Plot 2	24.0 a	Chma Prom	Touch Chamren (M)
	Plot 3	21.0 a	Chma Prom	Vong Som (M)

CIII-3.5.3 Growth History and Key Farming Practices

(1) Overall Features

The progress report on the verification test plots is presented in the following table:

Rice Farming Records in Verification Test Plots

Practice	Time or No. of Practices	Practice	Time/No. of Practices
Nursery (joint nursery)		Fertilization	
- Seedbed preparation	July 19 & July 21	- Basal dressing	Aug. 9 - Aug. 28
- Sowing	July 19 & July 21	- 1st top dressing	Sep. 11 & Sep. 17
Final land preparation	Aug. 9 - Aug. 28	- 2nd top dressing	Oct. 16 - Oct. 21
Transplanting	Aug. 9 - Aug. 28	Panicle initiation	± Oct. 14 - Oct. 16
Irrigation in field	Rainfed field	Flowering	± Nov. 19 - Nov. 21
Weeding	2 ~ 3 times	Harvesting	Dec. 15 - Dec. 19

Note: Dates indicate: date in the earliest plot - date in the last plot

(2) Growth History

The rainfall distribution in 2007 in Zone-4 was better than that in Zone-3 as was the case in 2006. However, the rainfall distribution in 2007 was somewhat less favorable compared with the same in 2006. The total rainfall from July 14 to November in the project village was 802 mm and 703 mm, respectively in 2006 and 2007.

Monthly Rainfalls in 2006 and 2007 in Zone-4

Year	May	June	July 1/	August	September	October	November	Total 2/
2006	-	-	60	309	325	88	20	802
2007	61	167	135	103	156	203	106	703

1/: Rainfall from July 14 to July 31 2/: Total of July 14 to November Source: JICA study team

A good crop of paddy was attained in 2007/08 in Prey Neheat village and the performance of the three verification plots was mostly satisfactory. The dates of transplanting were delayed, however, due to the infestation of insects (leaf ticks) in the joint nurseries of Plots 1 and 2. The growth performances differed among plots. The growth was fairly good in Plots 2 and 3. The growth was only fair in Plot 3 due to the delay in transplanting for about 20 days waiting for the rain. Harvesting was carried out in the middle of December.

(a) Plot 1

Variety	Sowing	Transplanting	Panicle Initiation	Flowering	Harvesting (DAS)
Riang Chey	July 19	Aug. 9	± Oct. 16	± Nov. 21	Dec. 19 (154 days)

The plot had good and uniform growth throughout the growth period without experiencing any serious problems. Harvesting was carried out at around 150 days after sowing or 130 days after transplanting.



(b) Plot 2

Variety	Sowing	Transplanting	Panicle Initiation	Flowering	Harvesting (DAS)
Chma Prom	July 21	Aug. 17	± Oct. 14	± Nov. 19	Dec. 15~18 (148~151 days)

The transplanting in the plot was delayed for about a week because of the infestation of insects (leaf ticks) in the joint nursery. However, the growth of rice after transplanting to maturing was



uniform and satisfactory without experiencing any serious problems. Harvesting was carried out at around 150 days after sowing or 120 days after transplanting.

(c) Plot 3

Variety	Sowing	Transplanting	Panicle Initiation	Flowering	Harvesting (DAS)
Chma Prom	July 21	Aug. 16 & 28	± Oct. 14	± Nov. 19	Dec. 15~18 (148~151 days)

The transplanting in about a half of the plot was delayed for about a week because of the infestation of insects in the nursery. The transplanting was delayed for about 20 days in the remaining half used for a joint nursery. The growth of rice after transplanting to maturing in the former was fairly uniform and mostly satisfactory without experiencing any serious problems. However, the growth in the latter was fair to poor. Harvesting was carried out at around 150 days after sowing or 120 days after transplanting.



(3) Key Farming Practices

The improved farming practices adopted in the verification tests were similar to those adopted in the verification tests in 2006/07 as presented in the following table:

Practices	Farming Practices Adopted	Current Prevailing Practices in the Zone 1/
1. Nursery		
- Seed/variety	- medium variety (demonstrators option)	- medium variety (local) - medium variety (improved)
- Seed source	- self multiplied seed - commercial seed	- self multiplied seed
- Seed selection	- selection with salt water	- not practiced
- Incubation	- 1 day	- 1 - 2 days
- Seedbed preparation	- raised semi-dry bed	- flat semi-dry bed
- Seeding rate	- 30 kg/ha	- 84 kg/ha
- Seeding density	- 40 g/m ²	- denser than 60 g/m ² 2/
2. Land Preparation	- 2 times 2 plows + 2 harrowing/leveling	- 2 times 2 plows + 2 harrowing/leveling 2 plows + 1 harrowing/leveling
3. Transplanting		
- Planting density	- 25 x 25 cm	- 25 x 25 cm ~ 20 x 20 cm
- No. of plants/hill	- 3 plants/hill	- 5.7 plants/hill
- Age of seedling	- ±20 days	- 52 days
- Planting method	- simple line planting	- random planting
4. Fertilization		
- Basal: compost/manure	- applied (depending on farmers practice)	- applied
- Basal: chemical fertilizer	- 15-15-15 & DAP (15-15-15 75kg & DAP 25kg)	- urea, DAP & 16-16-8
- 1st top dressing	- applied: urea (40 kg)	- urea, DAP & 16-16-8
- 2nd top dressing	- applied: urea (30 kg)	- applied: urea
- Total doses (kg/ha)	- Basic:170 kg/ha	- depending (avg. 293; 88 ~ 500kg/ha)
5. Weeding	- 2 times/season	- 2 times/season
6. Irrigation	- no irrigation	- in fields close to ponds, pumping is done when water shortage is serious
7. Harvesting/post harvesting		
- Harvesting	- demonstrators current practices	- manual
- Threshing	- demonstrators current practices	- manual threshing (threshing board or table)
- Winnowing	- demonstrators current practices	- engine winnower/manual
- Drying	- demonstrators current practices	- drying in field

1/: Interview survey with Agricultural Pilot Project Farmer Group members (20 farmers) in the zone
2/: Field observation

Among the practices, key farming practices of nursery preparation, transplanting and fertilization adopted in the verification tests are explained below:

(a) Nursery

In Zone-4, the preparation of a joint nursery of demonstrators of Plots 1 and 2 was introduced. The main improved methods for nursery adopted in the test plots were similar to those adopted in the verification tests in 2006/07 as shown in comparison with current prevailing practices as follows:

Improved Farming Practices Adopted in Verification Test Plots

Practices	Practices Adopted	Current Prevailing Practices
Variety & seed source	Commercial or self-multiplied seed 1/	Self-multiplied improved seed
Seed bed	Raised semi-wet/dry seed bed	Flat semi-wet to wet seed bed
Seeding rate/density	30 kg/ha & 40 g/m ²	60 kg/ha & > 60 g/m ²

1/: Plot 1 improved commercial seed & Plot 2 & 3 self-multiplied seed

		
Preparation of seedbed	Infestation of insects	Seedlings recovered for transplanting (27 DAS)

The joint nursery suffered from the serious infestation of insects (leaf ticks) at around 10 days after sowing and water shortage in the initial growth stage. To control insect infestation, chemical spray (BASSAN 50 EC) was carried out at 18 days after sowing. The nursery started to recover from the infestation at around 26 days after sowing. Because of the insect infestation, transplanting was postponed for one week in Plot 2. In Plot 3, transplanting was delayed for about 20 days for about half of the plot used for a joint nursery waiting for rainfall. Transplanting was delayed for one week for the rest of the plot due to the infestation of the insects. The main cause of the infestation might be attributed to the complete inundation of the nursery which occurred after germination.

(b) Transplanting

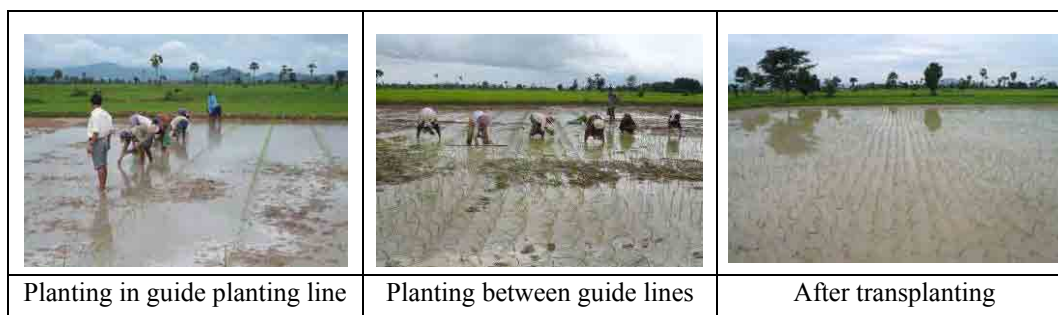
To improve the efficiency of transplanting, simple line planting was adopted in all the verification plots in the rainy season as is the case in Zone-3 as follows;

Transplanting Method Adopted in Verification Test Plots

Practices Adopted	Current Prevailing Practices
Planting density: 25 x 25cm	Random planting
Simple line planting	
3 plants/hill & 22 ~ 39 days seedling 1/	2-5 plants/hill & 20 ~ 25 days seedling

1/: Transplanting delayed due to infestation of insects

The adoption of simple line planting was accepted by all the demonstrators because of its improved transplanting efficiency. Farmers soon became accustomed to the simple line planting.



(c) Fertilization

Fertilizer doses were basically determined in accordance with the proposed farming practices and the application of basal dressing and two top dressings were practiced. However, based on reported volumes of manure applied by demonstrators and farmers' fertilization doses in the previous year, some modifications in fertilizer volumes were made. According to the results of interviews with the demonstrators, all of them reported similar doses of fertilization in the previous year. The fertilizer doses applied in the plots are indicated in the following table:

Fertilizer Doses in Pilot Projects and Comparison with Farmers Practices

Plot	Fertilizer Doses (kg/ha)				Elements (kg/ha)			Changes 1/
	15-15-15	DAP	Urea	Total	N	P ₂ O ₅	K ₂ O	
1	75	25	70	170	48	23	11	decreased
2	75	25	70	170	48	23	11	decreased
3	75	25	70	170	48	23	11	decreased

1/: Results of interviews with demonstrators by asking: increased, decreased & almost same

The basal dressing of chemical fertilizers and the top dressing of urea at about 30 days after transplanting and at the panicle formation stage were carried out. All demonstrators reported the application of substantial volumes of manure.

The total volume of fertilizers in elements was increased to about 10% compared with those applied in 2006 as shown below because all the demonstrators in 2006 reported that volumes of fertilizers applied in the verification plots were lower than their practices.

Comparison of Fertilizer Amount in the Rainy Season in 2006/07 and 2007/08

Variety	Fertilizer	2006/07 1/	2007/08 2/
Medium variety	NPK (in elements)	73 kg/ha	82 kg/ha
	Manure	applied	Applied

1/: 2006/07: average of four plots; manure applied in all plots

2/: 2007/08: average of three plots; manure applied in all plots

CIII-3.5.4 Yield and Production of Verification Plots

In the zone, the rice production in the verification plots were considered satisfactory, although the yield levels attained were lower than those in 2006/07, which might be attributed to the differences in rainfall distribution during the growth period as stated earlier. The results of crop cut surveys and yield surveys of whole plots are presented in Table CIII-3.1 and are discussed by plot below:

(a) Plot 1

Variety	Crop Cut Survey (t/ha)		Whole Plot		Demonstrators Assessment 1/	
	Range	Average	Field Yield	Production	Yield	Assessment
Riang Chey	-	-	3.3 t/ha	219 kg	2.5 t/ha	Increased

1/: Assessment by a demonstrator; rough estimate of yield of last year

The growth of rice plants in the plot was fairly uniform and well throughout the growth period without any serious problems encountered except for the water shortage experienced in August after transplanting. The yield level attained under rainfed conditions is considered satisfactory.



(b) Plot 2

Variety	Crop Cut Survey (t/ha)		Whole Plot		Demonstrators Assessment	
	Range	Average	Field Yield	Production	Yield	Assessment
Chma Prom	3.5 ~ 4.1	3.8	3.2 t/ha	778 kg	2.3 t/ha	increased

Despite the delay in transplanting and planting of aged seedlings,, the growth of rice plants in the plot was fairly uniform and well throughout the growth period without any serious problems encountered except for water shortage experienced in August after transplanting. The yield level attained under rainfed conditions is considered satisfactory.



(c) Plot 3

Variety	Crop Cut Survey (t/ha)		Whole Plot		Demonstrators Assessment	
	Range	Average	Field Yield	Production	Yield	Assessment
Chma Prom	3.6 ~ 5.0	4.4	2.9 t/ha	599 kg	2.8 t/ha	no change

Despite the delay in transplanting and planting of aged seedlings,, the growth of rice plants in the plot was fairly uniform and fair throughout the growth period without any serious problems encountered except for the water shortage experienced in August. The yield level was lower than other plots because 39-day old seedlings were planted in the joint nursery site (about half of the plot).



CIII-3.5.5 Results

(1) Target Yields

Yields of 3 verification plots are presented in comparison with the target yield of the master plan as shown in the following table:

Yield Comparison with the Master Plan Target (ton/ha)

Variety	Variety	Plot No.	Target Yield	Verification Yield	Difference
Medium variety	Riang Chey	Plot 1	2.0	3.3	+1.3
	Chma Prom	Plot 2	2.0	3.2	+1.2
	Chma Prom	Plot 3	2.0	2.9	+0.9
Average			2.0	3.1	+1.1
Farmers field 1/	Chung Kong Mon	3 plots	-	2.3	-

1/: Crop cut survey (2x2m) results of fields showing average growth around the verification plots

As shown in the table, all the verification plots attained yield levels substantially higher than the target of the master plan. However, the average yield decreased by 0.6 ton/ha from that of 3.7 ton/ha in the verification plots in 2006. This decrease might be attributed to the unfavorable rainfall distribution in 2007 as stated earlier in Section CIII-3.5.3.

The results of crop cut surveys in farmers fields around the verification plots indicate that the yield level of the fields of average growth was around 2.3 ton/ha as shown in Table CIII-3.1.

CIII-3.6 Small Scale Adaptability Test

CIII-3.6.1 Objective

The general objective is to establish a trial field for the implementation team members to carry out trials on alternative farming practices. Another important side objective is to demonstrate alternative farming practices and responses of rice growth to the alternatives to farmers as discussed in sub-section CI-4.6.1.

Individual objectives of the tests are explained as follows:

Objectives of Adaptability Test in Zone-4 in 2007/08

Trial	Objective
- Variety trial	- Variety adaptability test - Demonstration of growth differences among varieties
- Planting density	- To test effects of planting density on growth & yield
- Planting method	- To test effects of number of plants/hill on growth & yield
- Direct sowing	- To test adaptability of direct sowing under rainfed conditions - Demonstration of line planting for direct sowing
- Dry seedbed	- To test adaptability of dry seedbed under rainfed conditions

CIII-3.6.2 Trial Design

The trial designs of the test are as shown in the following table:

Design of Adaptability Test in Zone -4 in 2007/08

Trial	Treatment
Variety trial	4 varieties: Phka Rumduol, Rieng Chey, Chma Prom, Nieng Om
Planting density	3 treatments (variety: Rieng Chey) - 20 x 20, 25 x 25 & 30 x 30cm
Planting method	5 treatments (variety: Rieng Chey) - 1 plant/hill ~ 5 plants/hill
Direct sowing	Variety: Rieng Chey
Dry seedbed (upland nursery)	Conducted in upland field; 1 variety (variety: Rieng Chey)

CIII-3.6.3 Key Farming Practices and Growth History

Key farming practices adopted in the individual trials were basically similar to those adopted in the verification plots as explained in the trial design.

Similar to the joint nursery for the verification plots, the nursery for the trial suffered from the infestation of insects (leaf ticks) and the date of transplanting was about two weeks behind schedule due to the wait for rainfall for land preparation and transplanting. The harvesting was carried out from the middle of November to the end of December intermittently depending on the varieties cultivated. The growth histories of the individual plots are summarized in the following table:

Variety	Sowing	Transplanting	Panicle Initiation	Flowering	Harvesting (DAS)
Riang Chey	July 26	Aug. 30	± Oct. 15	± Nov. 20	Dec. 21~22 (149~150 days)
Variety Trial	July 26	Aug. 30	± Sep.10~Oct. 20	± 10/10~11/ 20	Nov. 21 ~ Dec. 22

Note: Rieng Chey: planting method & planting density trials

CIII-3.6.4 Results

Despite the delay in transplanting, rice plants in all the trial plots, except for the direct sowing plot, had fairly uniform and satisfactory growth throughout the growth periods without experiencing any noticeable problems. The direct sowing plot suffered from inundation after



germination and water shortage in the later growth stage because it was located in the higher part of the trial field. The results of the tests are presented in Table CIII-3.1 and summarized as follows;

Results of Trial for Medium Variety in Zone-4

Trial/Variety	Treatment/ Variety	Crop Cut Yield	Whole Plot Yield
Variety Trial	Phka Rumduol	4.2 t/ha	-
	Riang Chey	3.6 t/ha	3.6 t/ha
	Chma Prom	3.6 t/ha	-
	Nieng Om	5.3 t/ha	-
Planting Density (Riang Chey)	20 x 20 cm	3.1 t/ha	3.2 t/ha
	25 x 25 cm	4.1 t/ha	3.1 t/ha
	30 x 30 cm	2.6 t/ha	3.4 t/ha
Planting Method (Riang Chey)	1 plant/hill	4.3 t/ha	2.9 t/ha
	2 plants/hill	3.9 t/ha	3.0 t/ha
	3 plants/hill	3.4 t/ha	3.6 t/ha
	4 plants/hill	3.2 t/ha	2.8 t/ha
	5 plants/hill	4.0 t/ha	4.2 t/ha
Direct Sowing	Riang Chey	-	2.0 t/ha

Crop cut survey: 1 sample per treatment; random sampling of 1m² (16 hills)

(1) Variety Trial

All the varieties showed uniform and favorable growth throughout a growing period despite the planting of aged seedlings which were 36 days old. Nieng Om and Phka Rumduol matured earlier at around 130 days after sowing than Riang Chey and Chma Prom which matured at around 140 days after sowing.



The satisfactory growth and high potential yield (5.3 ton/ha) of Nieng Om was attained in the test. Further trials and demonstrations will have to be carried out to promote the cultivation of the varieties in the zone.

The potential yield levels of other varieties were moderate but were substantially lower compared with that of Nieng Om. Chma Prom is the most common variety grown in the zone. This indicates the variety's adaptability to the zone.

(2) Planting Density Trial

All the treatments showed uniform and favorable growth throughout the growth period despite the planting of aged seedlings. However, no clear differences among treatments were observed. Further tests on planting densities of photosensitive varieties should be carried out to examine the effects of planting densities and dates of sowing to the growths and yields of rice plants.



(3) Planting Method Trial

All the treatments showed fairly uniform and favorable growth throughout the growth period despite the planting of aged seedlings.



The whole plot yield was highest in the sub-plot of 5 plants/hill. The result indicates the necessity of further tests on photosensitive varieties as discussed earlier.

(4) Direct Sowing Trial

The sub-plot suffered from inundation just after germination and occasional water shortage during the growth period. In areas where favorable rainfall distribution is expected during a growth period similar to Zone 4, the introduction of direct sowing will not be justified because satisfactory yields could be attained under the transplanting method.



(5) Dry Seedbed (Upland Nursery)

The nursery trial was conducted to test the adaptability of dry seedbeds or upland nurseries and seedlings were raised under rainfed condition in upland field located close to a small reservoir. Dry seeds were sown and the seedbed was covered with dry soils for the nursery preparation. Watering was implemented to avoid the drying up of the seedbed. The growth of seedlings in the nursery was uniform and satisfactory up to around 20 days after sowing. The preparation of the upland nursery was successfully demonstrated to farmers. However, the infestation of leaf blasts occurred at around 25 days under drought conditions after watering was discontinued.



CIII-3.7 Farmers' Acceptability Survey

CIII-3.7.1 Objective

The farmers' acceptability survey was carried out with the objective of having a preliminary assessment of the adoptability of improved farming practices introduced in the verification plots by farmers through the simple interview surveys with the demonstrators and the farmers' group members.

CIII-3.7.2 Methodology

The acceptability survey was carried out by employing the same methodology discussed in Section CI-4.7. Major inquiries made to the interviewees were as follows;

Major Inquiries for Farmers Acceptability Survey

Subject	Inquiry	Target Group
Improved farming practices	- Assessment, reasons, comments on elements improved farming practices	Demonstrators
	- Comparison of paddy production in verification plot	
Mungbeans cultivation	- Reasons for failure in mungbeans cultivation	Demonstrators
	- Intention to grow upland crops in paddy field	
Farmers' farming practices	Changes in farming practices (before/after pilot project) - Planting method & density, method of transplanting, age of seedlings, seedbed preparation, seeding rate & etc.	Farmer group members

The interview surveys were carried out by the implementation team members during the following schedules:

Implementation Schedules of Farmers Acceptability Survey

Activity/Subject	Schedule	Target Group
Verification test in early rainy season - Verification test on upland crops (mungbeans)	January, 2008	4 demonstrator
Verification test in rainy season - Verification test on medium variety	January, 2008	3 demonstrators
Farmers' farming practices	January, 2008	16 group members

CIII-3.7.3 Results

(1) Rice Demonstrators Interview

All the demonstrators (three demonstrators) assessed as “good” or “proper rate” the improved farming practices adopted, except for seeding rate and fertilization. The demonstrators' major comments on such practices assessed unfavorably were: i) excessive seeding rate of 30 kg/ha (1 farmer) ii) insufficient basal dressing (one farmer). All the demonstrators assessed positively the simple line planting newly introduced in the season.

Two demonstrators reported a yield increase of paddy from the previous year. Their reasoning for yield increase include: *improved farming practices and proper timing of top dressing*. One demonstrator reported a similar yield level during the previous year because of infestation of diseases & insects and poor weeding.

When asked whether they will follow the proposed practices in the next season, all the demonstrators reported that they will follow variety, seed selection, raised seedbed preparation, seeding density in nursery, number of seedlings/hill, planting density and fertilization. However, negative responses to simple line planting were raised because of the labor requirements in the method.

(2) Farmers' Group Members Interview

The interview was carried out to assess the extension effects of the pilot project activities to non-demonstrator group members by asking them the changes they implemented in their farming practices before and after the pilot project operation. The findings of the survey indicate the substantial extension effects of the pilot project for the adoption of improved farming practices by the group members as follows;

- All the target members (16 members) reported that they reduced number of plants/hill, age of seedlings and seeding rate/ha in their farming practices in 2007 as follows;

Results of Farmers Acceptability Survey

Practices	Before (2005)	After (2007)
No. of plants/hill	5.4 ~ 8.6	2.6 ~ 3.6
Age of seedlings for transplanting (days)	56.7	35.9
Seeding rate/ha (kg/ha)	93.0	48.0

- However, efforts to introduce line planting and raised seedbed were limited in the zone because of more labor requirements in the method compared with the traditional ones.
- Some changes adopted in fertilization practices after the pilot project (2007) were reported by eight members (50%).
- Among the extension programs of PDA expected by the farmers were technical training and demonstrations on crops other than rice and training on livestock raising.

The findings indicated that farmers' intentions for improving rice productivity through the adoption of improved farming practices appear to be high in the project area. The same also indicated that practices such as reduced number of seedlings/hill, planting of younger seedlings, and reduced seeding rate were easily accepted by the farmers and will be disseminated quickly through demonstrations and timely provisions of guidance as evidenced in the zone. To meet such farmers' expectations, the deployment of extension

staff having sufficient practical skills should be envisaged and the operation of field programs as the pilot project should be continued.

CIII-3.8 Evaluation and Proposed Approaches for Improvement of Rice Farming

CIII-3.8.1 Evaluation of Verification Tests

The evaluation of the overall results of the verification tests on the adaptability of the agricultural development plans of the master plan was made by zone on target yields, cropping patterns and net farm incomes from paddy fields set in the plan.

(1) Target Yields

The yields of 14 verification plots operated in 2006/07 and 2007/08 in Zone-1 are presented in comparison with the target yields of the master plan as shown in the following table:

Yield Comparison with the Master Plan Target (ton/ha)

Variety		Target Yield	No. of Plots	Yield Range	Average Yield	Difference
Medium	Riang Chey	3.0	6	3.1 ~ 4.8	3.8	+ 0.8
Early	IR 66	3.3	4	3.8 ~ 4.8	4.4	+ 1.1
	Sen Pidao	3.3	4	3.4 ~ 4.0	3.9	+ 0.6
	Average	3.3	8	3.4 ~ 4.8	4.1	+ 0.8

Target yield: Master plan target yield for rainy season

As shown in the table, all the verification plots attained yield levels higher than the targets of the master plan. Both the average yields of the medium and early varieties were 0.8 ton/ha higher than the targets set in the master plan. The results verify that the target yields of the plan are attainable through the adoption of improved farming practices employed in the verification tests.

(2) Cropping Pattern

The adoptability of the proposed cropping pattern for Zone-4 in the master plan was verified through the implementation of the verification tests in 2007/08. In addition, the possibility of introducing upland crops cultivation during the early rainy season was confirmed. However, further technology developments and guidance activities on the same are essential for the extension of such farming activities in the zone.

(3) Net Farm Income from Paddy Field

The possibility to attain the net farm income from paddy fields estimated in the master plan was examined by crop budget analyses on rice production in the verification plots as shown in the following tables:

Results of Crop Budget Analysis: Net Farm Income from 1 Ha of Paddy Field

Condition	Production Cost (1,000 riel)	Income per Ha (1,000 riel)
Master plan estimate		
1. Without project condition	513	747
2. With project condition	724	956
Verification tests results		
3. Improved farming practices	954	1,986
Balance (3 – 2)	230	1,030

Note: Costs & prices are updated to 2007/08 level

Financial Crop Budget of Rice per Ha under Master Plan and Results of Verification Tests: Zone 4 1/

Items	Unit	Unit Price (Riel 1000)	Master Plan Estimates 2/				Results of Verification Tests	
			Without Project Medium Variety		With Project Medium Variety		Medium Variety 3/	
			Q'ty	Value (Riel 1000)	Q'ty	Value (Riel 1000)	Q'ty	Value (Riel 1000)
1. Gross Return								
Unit Yield	(ton/ha)		1.50		2.00		3.50	
Unit Price	(Riel.000/t)			800		800		800
Gross Return of Paddy	(Riel.000)			1,200		1,600		2,800
By Product (straw) 4/	(Riel.000)			60		80		140
Gross Return	(Riel.000)			1,260		1,680		2,940
2. Production cost				513		724		954
2-1. Farm Inputs				196		306		372
Seed 5/	(kg)	1.60	80	64	40	64	30	48
Fertilizers				132		242		324
- Urea	(kg)	1.60	35	56	50	80	60	96
- DAP	(kg)	1.80	35	63	50	90	25	45
- KCl	(kg)	1.55		0	30	47		0
- 15-15-15	(kg)	1.60		0		0	75	120
- Compost 6/	(ton)	25.0	0.5	13	1.0	25	2.5	63
Agro-chemicals				0		0		0
- Agro-chemicals	(lit)	10.0		0		0		0
2-2. Labor Costs				128		144		192
Labor Requirements 7/								
- Hired Labor	(man-day)	8.0	16	128	18	144	24	192
- Family Labor	(man-day)		62		72		91	
Total	(man-day)		78		90		115	
2-3. Land Preparation								
- Draft Animal	(per ha)		1	120	1	180	1	240
2-4. Transportation	(Riel.000/t)	30	1.50	45	2.00	60	3.50	105
- By Ox Cart								
2-5. Miscellaneous Expenses (2-1 ~ 2-4 x 5%)	(L.S.)			24		34		45
3. Net Return	Riel 1000 %			747 59		956 57		1,986 68

1/: Results of verification tests in 2006 & 2007

4/: By products/straw: assumed to be 5% of gross return of paddy

6/: Recommended doses in case of verification tests

2/: Crop budgets estimated under the M3/: Average yields of 8 verification test plots

5/: Commercial seeds for with project & verification tests

7/: Hired Labor Requirements --- assumed to be 20% of total labor requirements

The results indicated that the anticipated farm income estimated from the results of the verification tests was substantially higher than the same estimated for the with-project condition in the Plan as summarized below:

CIII-3.8.2 Proposed Approaches for Improvement of Rice Farming

(1) Proposed Approaches for Improvement of Rice farming

Based on the results and findings of the pilot project and the preliminary assessment of adaptability discussed in Section CIII-3.7, the approaches for improving rice farming are proposed in two steps as presented in the following table:

Proposed Approaches for Improving Rice Farming

1st Step	To attain uniform growth of rice plants in an entire field: <ul style="list-style-type: none"> - To make a field flat before cultivation (land leveling) - To keep soil fertility in a field uniform (manure/fertilizer) - To plant uniform & healthy seedlings (strong & stout seedlings) To adopt improved practices acceptable without increase of cash input or with limited increase of cash input <ul style="list-style-type: none"> - Younger seedling, fewer number of seedling/hill & other practices
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Practice	Improved Practices
Land leveling	Gradual land leveling works year by year during off-season
Nursery	Pure seed
- Seed	Full and heavy grains (seed selection with salt water)
- Seeding rate	Reduced seeding rate
- Seeding density	40 g/m ² (in seedbed)
Transplanting	
- Planting density	Early: 20 x 20 cm Medium: 25 x 25 cm
- No. plants/hill	Reduced number of plants/hill: 2 ~ 3 plants/hill
- Uprooting	To avoid damages to roots of seedlings (use shovel for uprooting)
- Transplanting	Simple line planting (or initially random line planting & gradually adopt simple line planting)
	Planting uniform & healthy seedlings (strong & stout seedlings)
	Shallow planting to promote tillering
Fertilization	No change in fertilizer doses
	- Improve application method
	- Proper kind
	- Proper timing
- Manure application	Spread evenly and every year
	Apply more in part where rice growth poor and top soils removed in land leveling
- Fertilizer application	
Basal Dressing	Before plowing & mixed well with soils
	In case when volume limited, apply after taking root
1st top dressing	Urea (not DAP)
	Early: at panicle formation stage
	Medium: about 30 days after transplanting
2nd top dressing	Urea (Not DAP)
	Medium: at panicle formation stage
Weeding	Timely weeding
	(when weeding delay, need more labor & result in poor weeding)
	- To use weeding rake at proper timing
Water Management	Shallow irrigation (irrigated field)

2nd Step:	To envisage increase in yield & productivity through intensification of farming To introduce practices you can afford and gradually after simple test; - through simple field testing such as done in the verification plots in 2006
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Practice	Improved Practices
Fertilization	
- Manure application	Increase as basal dressing, if available
- Fertilizer application	Increase as basal dressing and/or top dressing
Weeding	Intensify weeding
Water Management	Shallow irrigation
	Flooded & drained field surface intermittently
Harvesting	Improvement of harvest & post-harvest practices
	- timely harvesting
	- threshing in paddy fields to reduce grain losses during transportation
	- proper sun drying & winnowing

(2) Technology Development Required

One of the development strategies of the master plan was the improvement of land use intensity and crop diversification in paddy fields and the introduction of upland crops (mungbeans) during the early rainy season.

For the successful introduction of upland crops in the season, improved farming practices of: i) cultivation in elevated fields without inflow of drainage water from surrounding fields, ii) planting as early as possible after the commence of the early rainy season, iii) planting on ridges prepared by draft animals, iv) proper fertilization including application of manure and v) introduction of variety tolerant to wet jury and drought; should be adopted. Further trials for technology development and dissemination of upland crops cultivation during the season should be continued by PDA and CARDI.

The technology development required for rice production includes the purification of promising local varieties popular among farmers and the multiplication of improved or pure seeds.

PART-C
PILOT PROJECTS (2007/2008)

Section-IV

***Technology Transfer, Sharing of Experiences
and Lessons Learned***



Technology transfer under the study

PART-C: PILOT PROJECTS (2007/2008)

Section-IV

Technology Transfer, Sharing of Experiences and Lessons Learned

Chapter CIV-1 Technology Transfer

CIV-1.1 Importance of Technology Transfer in Pilot Project

It is obvious that achievement of the targets for the pilot projects is not the goal of development. Knowledge obtained and accumulated through execution of the pilot projects should be disseminated to other areas, which was duly the purpose of pilot projects. The entities most expected to carry out this dissemination were PDOWRAM and PDA. One of their duties was to support the farmers in Kampong Speu province continuously. In this regard, it was so important for the pilot projects to heighten the capabilities of the PDOWRAM and PDA staff, so that they can continue their duties even after the pilot projects end.

CVI-1.2 Technology Transfer to PDOWRAM Staff

CV-1.2.1 General Problems of PDOWRAM before Starting Pilot Project Activities

Actual situations and problems of PDOWRAM were surveyed by the JICA study team. The following general problems were found as results of the survey.

- Most of the PDOWRAM staff were lowly motivated and did not have any incentive for their work. The main cause of this situation was the low salary; for example, the minimum was R 53,100 (about US\$ 13)/ month for a high school graduate. Therefore, they were constantly obliged to seek for better posts and working environments. They made a living through having a side job such as a motorbike taxi driver or a farmer.
- The budget provided to PDOWRAM was so limited that it was hard for them to complete their duties such as regular monitoring of irrigation facilities.
- The PDOWRAM staff had strong intentions to build capacity for technical matters and/or administration management of their entity, but they did not have much opportunity to do so through training, study tours or “on-the-job-training”.

CIV-1.2.2 Technology Transferred to PDOWRAM Staff

Throughout the pilot project period in the second season, the following technologies were transferred to PDOWRAM staff by the JICA study team.

- Use of handheld GPS and GIS for map preparation
- Application of rotational irrigation method
- Preparation of H-Q curve for intake gate at RT-2
- Determination of size of watercourses
- Simple survey for preparation of H-V curve for reservoir
- Formation of WUG and Sub-FWUG
- Empowerment of WUG leaders
- Methodology of collection of ISF

The technology transfer was mainly carried out through “on-the-job-training” except for the use of handheld GPS and GIS. As for the use of handheld GPS and GIS, a three-day seminar was conducted twice for staff of PDOWRAM and PDA.

In the technology transfer, not only “how to do” but also “why the work is necessary” and “how to use the data” were carefully explained. Without such explanations, PDOWRAM staff could learn the technology only in fragments without understanding the overall

picture.

Among the above, in particular, application of rotational irrigation is the important issue for PDOWRAM staff as this is a main task for PDOWRAM in supporting the Ou Veang FWUC so as to realize proper water distribution to the pilot project area. In technology transfer, the JICA study team took the following procedures:

- Explain the present improper situation wherein downstream farmers could not receive sufficient water.
- Explain the effectiveness of rotational irrigation to cope with present improper situation on water distribution.
- Explain the formation of rotational block and the time of water supply to each block on a per area basis.

The PDOWRAM staff fully understood these explanations. The PDOWRAM staff also expounded the Ou Veang FWUC committee on the need for the application of rotational irrigation. The Ou Veang FWUC committee thus accepted the application of rotational irrigation.



JICA study team trained simple survey for reservoir to prepare H-V curve



Check of size of watercourse by PDOWRAM staff



Seminar on use of handheld GPS and GIS for map preparation



PDOWRAM staff expounded FWUC committee on need of application of rotational irrigation

CIV-1.3 Technology Transfer to PDA Staff

CIV-1.3.1 General Problems of PDA before Starting Pilot Project Activities

Prior to the commencement of pilot project activities, the JICA study team surveyed the actual situation and problems facing the PDA. The following general problems were found as the results of the survey.

- Some PDA officers who held Bachelor's or Master's degrees worked as full-time staff of NGOs. They would feel that they had sacrificed themselves to the government but, most of them would be reinstated in PDA due to their reputations and social status.
- The middle-level officers who stayed at the offices were in charge of several

agricultural and rural development projects sponsored by the government and/or donors simultaneously. Therefore, they were always busily occupied. Nevertheless, many of them were highly motivated and contributed to the success of the projects.

- It should be noted that many of the low-level officers would have already lost their incentive to devote themselves to their work because of their low salary and unstable working schedule.

CIV-1.3.2 Technology Transferred to PDA Staff

Throughout the pilot project period in the second season as well as the first season, the following technologies were transferred to the PDA pilot project implementation team members by the JICA study team. The technology transfer to the PDA was conducted by a series of technical meetings in addition to the “on-the-job-training”.

- Improved farming practices: learning through doing from seed bed preparation to transplanting & fertilization
- Water management at on-farm level
- Upland crop cultivation at onset of rainy season
- Seed selection with salt water
- Seeding rate and sowing
- Variety trial
- Harvesting and yield surveys
- Farmers’ acceptability surveys

The PDA staff sincerely worked on supporting farmers, even though they were still suffering from many problems. Their efforts in supporting the farmers were highly appreciated.

 <p>JICA study team trained use of Land Maker as one of improved farming practice</p>	 <p>Technical guidance to PDA by JICA study team</p>
 <p>Water management at on-farm level controlled by PDA</p>	 <p>Crop yield survey by PDA under direction of JICA study team</p>

Chapter CIV-2 Sharing of Experiences and Lessons Learned

CIV-2.1 Joint Meetings

As in the first year, the joint meetings were held in the second year, following the basic strategy for pilot project implementation, which was “Strategy-3: Government agencies collaborating in irrigated agriculture related activities”.

Joint Meetings Conducted in 2007

No.	Date	Location	Experiences Shared by Participants	Organizations Attending
1	June 29	PDA office	<ul style="list-style-type: none"> - Upland crop cultivation at onset of rainy season - Protection of insect injure 	PDOWRAM PDA Prey Pda experimental station MOWRAM MAFF JICA study team CEDAC
2	September 25	PDOWRAM office	<ul style="list-style-type: none"> - Problems on water management - Protection against insect injury - Application of biological treatment against insect injury - Need of cooperation by PDOWRAM and PDA on dissemination of proper water management 	PDOWRAM PDA Prey Pda experimental station JICA study team CEDAC
3	October 22	PDA office	<ul style="list-style-type: none"> - Construction of watercourses - Execution of water management - Regulation for FWUC - Irrigation service plan - Application of top-dressing - Countermeasure against insect injury - Monitoring and promotion of SRI - Promotion of saving group - Raising of eco-chicken 	PDOWRAM PDA MOWRAM Prey Pda experimental station JICA study team CEDAC
4	November 30	PDOWRAM office	<ul style="list-style-type: none"> - Preparatory works for collection of ISF - Application of rotational irrigation - Installation of plastic trap to catch mouse - Monitoring of rice growing - Results of crop yield survey - Report on saving group numbers and saved amount - Report on number of eco-chicken raising farmers 	PDOWRAM PDA Prey Pda experimental station MOWRAM JICA study team CEDAC
5	December 20	PDA office	<ul style="list-style-type: none"> - Installation of pipes on watercourses - Construction of FWUC office - Monitoring of ISF collection - Preparation of crop cut survey - Execution of on-farm level water management - Execution of village general meeting and field day - Monitoring and supporting of experimental farmers 	PDOWRAM PDA Prey Pda experimental station MOWRAM JICA study team CEDAC

In the joint meetings organized by the JICA study team, the experiences of each entity were shared by all. Sharing of much valuable experiences was made among them. For example, in water management, farmers did not show much interest because they did not know that proper water management was closely linked with crop production. Therefore,

the PDOWRAM requested the PDA to disseminate this matter to the farmers. The CEDAC reported the results of the crop cut survey conducted for some plots. Since the reported yields seemed to be higher than common ones, therefore PDA raised the question on the survey method applied. The JICA study team explained how to survey and calculate the crop yield.

The joint meeting among PDOWRAM, PDA, and CEDAC under the management of the JICA study team was deemed to be so effective for successful coordination works. Such joint meetings should be regularly held when irrigated agriculture development is conducted.



Joint meeting at PDA office
on June 29, 2007



Joint meeting at PDOWRAM office
on September 25, 2007



Joint meeting at PDA office
on October 22, 2007



Joint meeting at PDOWRAM office
on November 30, 2007



Joint meeting at PDA office
on December 20, 2007

CIV-2.2 Lessons Learned

CIV-2.2.1 General

As mentioned in the previous chapters, various activities were taken in the two pilot projects: Irrigated Agriculture On-farm Technology Improvement Pilot Project and Rainfed Agriculture Improvement Pilot Project. Through these activities, many lessons learned were obtained. The “lessons learned” obtained were reported for three activities in consideration of six categories, that is, five basic strategies and others.

CIV-2.2.2 Participatory Irrigation Management and Development

(1) Strategy-1: Learning from good farmers’ practices in Cambodia

(a) Application of experienced procedure for ISF collection in other projects

Before the commencement of participatory irrigation management and development activities, the Ou Veang FWUC suffered from a low collection rate of ISF of about 10% only. Although insufficient irrigation facilities was one of the reasons for such a low collection rate of ISF, the Ou Veang FWUC did not know how to collect ISF from the member farmers systematically. The JICA study team employed the local expert who was successful in the collection of ISF in the Sdau Kaong irrigation project in which almost all farmers paid ISF. From this experience, he was well acquainted with the farmers’ thoughts on the payment of ISF. He eagerly explained and made substantial training to the Ou Veang FWUC committee members about procedures of ISF collection. Since his explanation was based on actual practices, they easily understood it. From such experience, it was recognized that employment of experienced local experts was so effective in discussing subjects familiar to the local people such as the collection of ISF.



Explain FWUC Committee on ISF Collection Procedure

(2) Strategy-2: Project Operation by United Farmer-Government-NGO Project Team

(a) Formation of United Farmer-Government-NGO Project Team to Collect ISF

The successful ISF collection could not be attained only by training by the experienced local expert. The JICA study team thus considered that the united farmer-government-NGO team was indispensable in enhancing the collection rate of the ISF. Although PDOWRAM had less experience in ISF collection, its authority was required for the smooth collection of the ISF. The FWUC adequately understood the farmers’ situations and views on the payment of ISF and should execute this activity by himself. Therefore, PDOWRAM, experienced NGOs, and FWUC were united under the support of the JICA study team, to cope with the ISF collection. Many meetings were organized in 2007/08, and much discussions were made. FWUC faithfully followed the conclusions made in the meetings which resulted in an increase in the ISF collection rate from the present rate of 30% to about 86%. This experience indicated that activities conducted by a combination



Discussion on ISF Collection Among PDOWRAM, NGO and FWUC

of each entity could have a synergistic effect.

(3) Strategy-3: Government Agencies' Collaboration in Integrated Agriculture Related Activities

(a) Need of Collaboration between PDOWRAM and PDA for Dissemination of Proper Water Management

PDOWRAM sincerely explained to the farmers the need for proper water management in order to realize even and timely water supply. In the discussion, the JICA study team came to know that the farmers did not show much interest in water management since they hardly understood that there was a relation between water management and crop production. In order to cope with this situation, the JICA study team considered that if proper water management was linked with higher crop production, the farmers would become interested in it. Thus a joint explanation by PDOWRAM and PDA was given to them. As a result, farmers showed keen response to the need for proper water management. It was learned from this fact, that the collaboration between PDOWRAM and PDA was duly needed since farmers sharply responded to the incentive that crop production would increase through proper water management.



Explanation of Effect of Water Management to Crop Production by Agricultural Expert

(b) Need for Joint Meeting for Creating Coordination between PDOWRAM and PDA

The joint meetings among PDOWRAM, PDA and NGO (CEDAC) were frequently held as part of the pilot projects activities, aiming to share the data and information with them. Through the meetings, several matters related to agricultural activities, including water management, were timely shared among PDOWRAM, PDA and NGO. In particular, the staff of PDOWRAM and PDA recognized the need for coordination between them for the successful execution of the agricultural activities because they actively exchanged opinions on problems raised in the meetings. In this context, it was learned that the joint meeting was one of the effective means for creating an opportunity for the coordination between PDOWRAM and PDA.



(4) Others

(a) Inadequate Basic Knowledge and Experience of PDOWRAM Staff in Irrigation

Under the direction of the JICA study team, the PDOWRAM staff carried out various pilot project activities such as discharge measurements, calculations of water requirements, and applications of rotational irrigation. These were basic engineering matters for an irrigation engineer. However, the PDOWRAM staff could not implement them well at the beginning, although they came to know them through the “on-the-job training”. From this fact, it was deemed that PDOWRAM staff did not have enough basic engineering knowledge and experience related to irrigation. Therefore, it was necessary to provide training for them on the basic engineering knowledge in advance, so as to enable them to execute the works smoothly.

(b) High Motivation of PDOWRAM Staff on Increasing Knowledge

In order to determine the reservoir capacity and the available volume of water for water harvesting irrigation system, the topographic survey was carried out for the existing reservoirs by the PDOWRAM staff under the direction of the JICA study team. Prior to the commencement of the survey work, the JICA study team considered the required accuracy of survey and the availability of survey equipment in PDOWRAM, and then decided on the simple topographic survey using leveling instruments, handheld GPS, measuring tape and poles. Poles were made from bamboos which were painted white and red. The JICA study team explained to the PDOWRAM staff beforehand the proper use of these tools in the survey. The PDOWRAM staff were confused at the beginning but they were accustomed to the proposed survey work at once and they executed it by themselves.

In the preparation of a preliminary landholding map, the JICA study team conducted a three-day seminar on how to prepare the landholding map using handheld GPS and GIS software. Although the PDOWRAM staff had certain knowledge on the use of GPS, they hardly knew how to use the GIS software. They eagerly tackled the use of GPS and GIS and asked the lecturer lots of questions. After finishing the seminar, the JICA study team collected the questionnaires on the seminar. The questionnaire contained requests for further seminars on the same subject. It was recognized that PDOWRAM staff would have high motivation in learning new techniques.



(c) High Expectation of Downstream Farmers on Proper Water Management

On water management, the JICA study team proposed the application of the rotational irrigation system in order to achieve even and timely water distribution in the pilot project area in Zone-1. To fulfill this rotational irrigation system, it was required to not only maintain the good condition of the tertiary canal (RT-2), but also the construction/rehabilitation of watercourses. FWUC requested the farmers to conduct these

works. In reply to this request, the farmers implemented these works. The farmers who attended were mostly downstream farmers. This showed that downstream farmers suffered from shortage of water and they need more water. It was evident that the downstream farmers had high expectations of proper water management. Presently, gate control for water distribution to RT-2 is carried out by the chief of Sub-FWUG who has his land at the upstream area. If downstream farmers were to be given more attention as to even and timely water distribution, it might be better that this gate control would be made by a representative of downstream farmers. In the future, gate control should be made alternately by representatives of upstream and downstream farmers. The chief of Sub-FWUG should be selected from upstream and downstream farmers every year.



(d) Need for Formation of WUGs on the Canal Basis

The main purpose of the FWUC was to execute the O&M of the irrigation system transferred by the government. Prior to the commencement of the pilot project, there were no farmers' groups on the canal basis, so that the FWUC's purpose was not clear to the farmers concerned. To improve such unsuitable situations for FWUC, the following farmers' groups were formed on a canal and distribution structure basis:

- Seven WUGs for six division boxes and two field outlets
- One Sub-FWUG for RT-2 (Tertiary Canal)

Under the direction of the PDOWRAM, a leader of each WUG was selected from the farmers concerned through election. A leader of the Sub-FWUG was also elected from the seven leaders of the WUG. The responsibilities of the leaders of the WUG and the Sub-FWUG were determined through discussions with the FWUC committee as follows:



Election of WUG leader by voting

Responsibilities of the leaders of WUG

- Distribution of water from RT-2 to watercourse
- Provision of water request form
- Collection of ISF
- Request to farmers on O&M of watercourse
- Settlement of water conflict along watercourse
- Information of any activities of FWUC to farmers

Responsibilities of leader of Sub-FWUG

- Distribution of water from RS-3 to RT-2
- Request to farmers on O&M of RT-2
- Settlement of water conflict along RT-2



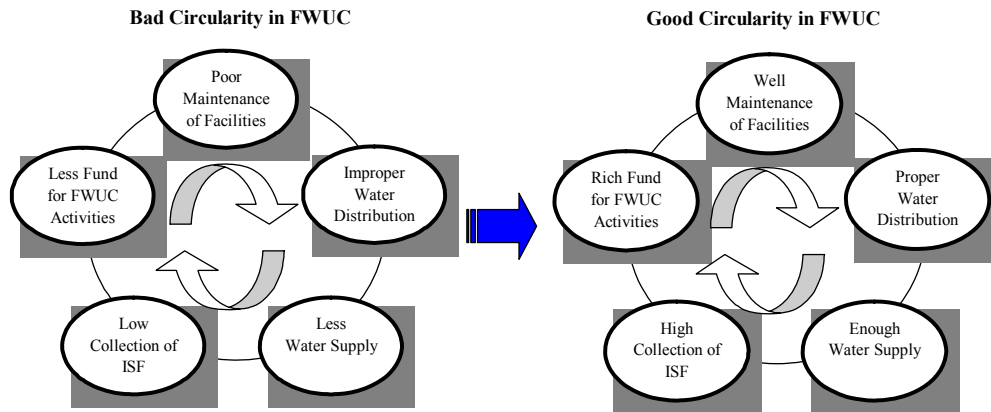
Expression of Hope
by Elected Leader of Sub-FWUG

Due to the formation of WUGs and Sub-FWUG, the FWUG activities became clear to the farmers resulting in the creation of the foundation to execute the O&M of irrigation system including the construction of watercourses. This is a lesson learned that proper

organization needs for fulfilling the FWUC purpose.

(e) Need of Slipping Out of Bad Circularity in FWUC Activity

Through the discussions with the Ou Veang FWUC committee, it was found out that the Ou Veang FWUC falls in the bad situation, and thus should slip out of it urgently.



These factors had been already trained by PDOWRAM, NGO and the JICA study team in the pilot project. In particular, among five factors mentioned in the above figure, the factor of “Well Maintenance of Facilities” was easily tackled by farmers at first as a means to slip out of the bad situation. In fact, there was good evidence that farmers executed cleaning of RT-2 cooperatively in the pilot project activities. From this viewpoint, the factor of “Well Maintenance of Facilities” should be considered as a breakthrough in slipping out of the bad situation.

(f) Application of Collection of ISF at the Village Level

As mentioned previously, ISF collection was incorporated into the duties imposed on each WUG leader since he knew the member farmers. The WUG leader tried to collect the ISF from his members, but he faced the following problems:

- One farmer had his plots at different WUG areas so that he was confused by the request of ISF from different WUG leaders.
- There were WUG areas which covered several villages so that the WUG leader had to visit villages one by one.

Based on these problems, the meeting was held among PDOWRAM, NGO (CEDAC) and FWUC committee including WUG leaders, and eventually concluded that ISF collection for WUGs covering several villages should be made on a per village basis.

(g) Effect of Involvement of Local Authority

The PDOWRAM and FWUC committee planned to organize the meeting with farmers. Sometimes, however, the number of farmers who attended was so small that the meeting had to be cancelled. In order to improve this situation, the PDOWRAM asked the commune council and the village chief to organize the meeting. The involvement of the commune council and village chief was successful and it was evident that farmers respected them. In conclusion, it was required that important meetings should involve the commune council and the village chief.

(h) Need of Simple Measuring Device

Originally, the irrigation canal system was not designed in consideration of the application of a gravity water supply system. In addition, the water level in RS-3, which was the parent canal of RT-2, had largely fluctuated due to the lack of check structure on the main canal. Thus, a measuring device which requires a certain water head could not be provided for RT-2. The control of water distribution from RS-3 to RT-2 was therefore

conducted by opening the intake gate and staff gauge only. This measuring system did not bear a high accuracy in the measurement of the distributed amount and it was also complicated. A main purpose of water management by FWUC in this pilot project was put on acclimation for gate control based on water demand because the FWUC was quite new in water management. The leader of the Sub-FWUG who was in charge of gate operation at RT-2 was trained by the PDOWRAM and JICA study team on gate control in advance. Although he made an effort of fulfilling his duty and prepared a good record of water distribution, this measuring system seemed to be slightly complicated for him. From this lesson learned, canal design should be conducted so as to provide enough water head to construct the simple measuring device like abroad-crested weir, taking into consideration that water management would be carried out by the FWUC.

(i) Need of discussion focusing on what farmers can do by themselves

In the meetings with farmers, it was seen that the farmers often raised requests to PDOWRAM and/or JICA study team which were not related to the pilot project activities. The important matters discussed in the meeting were duly what farmers could do themselves towards the improvement of water management. Therefore, the meeting should be directed towards giving attention to this principle. Otherwise, farmers would always rely on the government and/or donors so that it would be difficult or rather impossible to encourage their self-reliance in the future.

(j) Need for further strengthening the coordination among leaders of WUGs and FWUG

Seven WUGs and one FWUG were established on a per canal basis aiming at proper O&M of irrigation system. The leaders of these groups should play an important role on O&M of irrigation system as subordinated ones of the Ou Veang FWUC. In particular, their major task was the even and timely water distribution. If water conflicts occurred, they should settle it. The PDOWRAM frequently explained to them this matter. Some leaders understood this task and they displayed their ability on the construction of watercourses and installation of pipes. However, further explanation was required to deepen their understanding of this task and the importance of strengthening the coordination among them. In the meetings, the respective leaders were able to express their opinions but the coordination among them was still weak because they hardly exchanged opinions among themselves. Under this situation, it seemed so difficult to settle problems occurring among WUGs. From this fact, it was learned that coordination among leaders would become one of important factors in order to realize successful FWUC activities.

(k) Heightening of awareness of FWUC

In 2007, the FWUC reached the high collection rate of ISF of about 86 %. This meant that the farmers highly expected FWUC to conduct their activities properly. It can be said that the higher the collection rate of ISF becomes, the FWUC's responsibilities become greater. In the meeting with the FWUC committee, however, it could not be seen that the FWUC understood the link between the farmers' expectations and the high collection rate of ISF. In order to make the FWUC committee understand this situation, it was necessary to further heighten the FWUC's awareness in responding to the farmers' expectations such as even and timely water distribution and transparency of accounting.

(l) Recognition of importance of PDOWRAM's role in supporting FWUC

For about two years, PDOWRAM had conducted the participatory irrigation management and development for the Ou Veang FWUC in cooperation with the JICA study team and NGO (CEDAC). Consequently, the Ou Veang FWUC gradually understood their tasks, but further continuous support of the Ou Veang FWUC was still needed in promoting and attaining the next level, that is, self-reliance. This support is the responsibility of

PDOWRAM. From this finding, it was evident that the PDOWRAM had a major role in fulfilling this support successfully. For this, PDOWRAM had accumulated the necessary experiences to support the FWUC, by serving as the counterpart agency of the JICA study team in the participatory irrigation management and development, as mentioned above.



PDOWRAM staff discussed with farmers on the need of FWUC

CIV-2.2.3 Participatory Agriculture Extension

(1) Strategy-1: Learning from good farmers' practices in Cambodia

(a) Participation of government staff in study tour visit to successful project

As a follow-up to the previous year, a study tour was planned and carried out successfully. The impact of the study tour was surprisingly very high. Generally, farmers were conservative especially in the introduction of new farming practices since nobody guaranteed them against risks although they keenly want higher production. In the study tour, the visiting farmers directly saw the good farming practices contributing to high crop production, which was superior to any logical explanation by outside persons like government staff and researchers.



Inspection on Well Farming Practice

The PDA staff, in addition to the PDOWRAM staff, took part in the study tour. The study tour was effective for PDA and PDOWRAM staff as well as the farmers because they learned what kind of discussions was made among farmers and what matters made impressions to farmers. These findings enabled them to efficiently give support to farmers in the future.

(b) Difficulty in dissemination of proposed method against insect and mouse injuries

In the participatory agriculture extension activities, the NGO (CEDAC) proposed the use of banana leaves for protection from mouse injury and botanical pesticides. This was composed of small bamboo pieces, bamboo water, and soap powder for the extermination of brown plant hoppers based on his experience in other projects. However, this proposal was hardly accepted by farmers because they did not know its benefits. In order to make them understand easily, the experienced farmers should make a practical demonstration in front of the farmers.

(2) Strategy-2: Project operation by united Farmer-Government-NGO Project Team

(a) Expectation of follow-up works by government and NGO

After completion of the pilot projects, a follow-up should be mainly carried out by the government. If government, the PDOWRAM in this case, had worked as members of the team, they would become familiar with the follow-up works, and would fulfill the works easily accordingly. This was one of the merits of forming the united team. The same merit would also apply for the NGO. In the study, CEDAC took part in the pilot project as a member of the united team. According to CEDAC, they had a strategy to support farmers in Kampong Spue Province on low inputs SRI, formation of saving groups and dissemination of ecological chicken raising. CEDAC planned to continue the same activities with the pilot project in the same area. This was good news for the successful follow-up of the pilot project. From these, it was learned that involvement of local NGO

as well as the government was a possibility for ensuring the sustainability of the pilot project.

(3) Strategy-4: Minimum material and equipment input from farmers

(a) Effect of minimum inputs of material and equipment from farmers

The dissemination of low inputs SRI was carried out notwithstanding the minimum input of materials and equipment, taking into consideration its easy dissemination and sustainability without assistance from the government and/or donors. This method was appreciated by farmers mainly due to the low cost and less labor force which meant that many farmers applied the low inputs SRI, especially in Zone-1. From this fact, it was learned that low costs and less labor force, as well as the increase of crop production, would become a major incentive for farmers. In fact, several farmers pointed out that one seedling proposed in the low inputs SRI contributed to savings in cost and labor force.

(4) Strategy-5: Introduction of farmer-to-farmer extension

(a) High impact by presentation of experienced farmers

The NGO (CEDAC) held inter-village workshops, farmers' field days, and study tours, to promote the low inputs SRI. In these events, they always planned and conducted the discussion of the farmers' experiences. This gave a high impact to the attendees. This method was one of the effective ones for disseminating the proposed farming practices. In addition, the representative requested the attendees to express their opinions on the event in front of all attendees. This enhanced the spirits of the attendees towards the introduction of the proposed farming practice. He cleverly utilized the effect of mass psychology. Since the PDOWRAM and the PDA staff took part in these events, it was expected that they would apply this method to their extension works.

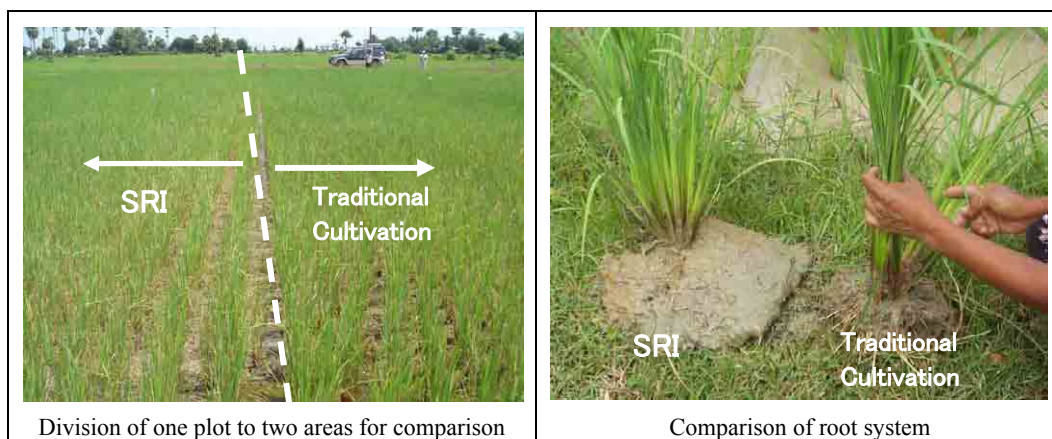


Description of experience
by host farmer

(5) Others

(a) High impression by paddy cultivation in SRI system and traditional system at the same plot

The NGO (CEDAC) proposed to the cooperative farmers to cultivate paddy by means of the SRI and the traditional way by dividing one plot into two areas in order to demonstrate the effect of SRI. Strictly speaking, this approach did not present the same conditions scientifically, but farmers could easily understand the effect of SRI as compared with the traditional farming practice. In fact, when we asked the farmers about the effect of SRI at the site, they triumphantly indicated the difference of the growing conditions of paddy cultivated at the same plot in different ways. This manner of comparison would be effective for the dissemination of SRI.



(b) Effect of Timely Monitoring and Support to Cooperative Farmers

The NGO (CEDAC) had carried out timely monitoring and support to the cooperative farmers by visiting their paddy fields regularly. In these visits, the representative discussed with farmers the problems they encountered and gave them solutions or countermeasures as required. This system relieved farmers of their anxiety on the application of new farming practices like the low inputs SRI. It was deemed that this system was substantial for extension work. The face to face activity would bear an efficient relationship of mutual trust, which would finally lead to the successful extension of the proposed farming practice.



Monitoring of farmers applying low inputs SRI

CIV-2.2.4 Experimental Farming Practice Improvement

(1) Strategy-3: Government agencies' collaboration in integrated agriculture related activities

(a) Need of collaborative field activities of PDA and PDORAM

The periodical meetings of the PDA and PDORAM (joint meetings) were held under the pilot project. However, collaborative field activities of the two agencies were limited. For the introduction of envisaged on-farm water management in farming practices, intensified collaborative field activities between them should be institutionalized and carried out periodically in addition to the continuation of the joint meetings of the agencies.

(2) Strategy-5: Introduction of farmer-to-farmer extension

(a) Difficulty in farmer-to-farmer extension

The introduction of farmer-to-farmer extension was carried out in 2007 in a preliminary trial scale by appointing Village Extension Agents (VEA) from the demonstrators in 2006. The VEA is more or less a copy of Village Livestock Agent (VLA) introduced and extensively deployed by the Animal Health and Production Office of PDA Kampong Speu. However, the activity of VEA was limited because of its improvised nature. For the deployment of VEA for extension purposes, the firm institutionalization of the extension methods involving VEA in the extension system of PDA/MAFF was essential as VLA was a main provider of veterinary services and livestock sub-sector extension under the PDA. In addition, there was a very essential issue in the introduction of farmer-to-farmer

extension. The issue was as to **who will take responsibility when crop failures occur by adopting farming practices disseminated under the farmer-to-farmer extension system**. The approach for the objective will be the training of contact farmers selected from advanced or leading farmers in farming communities as envisioned in the extension system of the Dept. of Extension, MAFF.

(3) Others

(a) Improved practices easily accepted

The improvement of simple farming practices such as seed selection, seedbed preparation & nursery management, seeding rate, and planting methods will result in improved productivity. The results of the farmers' acceptability survey indicated that improved practices easily accepted by farmers were seed selection, reduced seeding rate, reduced number of seedlings/hill and the planting of younger seedlings as discussed in BII-4.8 and BIII-4.8, which will be disseminated quickly with demonstration and timely provision of guidance. In addition to this, most of the farmer group members in Zone 1 and 3 reported changes in transplanting methods from mere random planting to random line planting (line planting without using planting string or line marker), which indicates the possibility of extension of regular planting by way of simple line planting with further field practical guidance and support by PDA staff. Furthermore, the introduction of the rotary weeder will promote the adoption of the simple line planting.

The new regular transplanting method introduced in the verification tests in 2007 were accepted by all the demonstrators acknowledging the improved efficiency of the method compared with the other regular transplanting methods such as line planting using planting string and using line marker.

(b) Dissemination of improved farming practices in Zone-3

The farmers' wishes for improving rice productivity through the adoption of improved farming practices appeared to be very high, especially in Zone-3, where the livelihood of villagers seem to be harder compared with the other zones. In the zone, all the farmer group members interviewed reported the adoption of improved farming practices on seeding rate, number of plants/hill, and planting of younger seedlings as discussed in BIII-4.8.

(c) Farmers' knowledge on organic fertilizer

The farmers were well aware of the economic importance (saving fertilizer costs) and agronomic meaning (improvement of soil conditions) of compost/manure. The manure application level is lower than the recommendation level due to the limited availability of such resources. Compost preparation will be a solution to increase the quantity of organic fertilizers. However, the source of bulk plant materials was generally limited in the zones because most of the rice straws were fed to cattle.

(d) Effect of provision of seed on seed replacement

Some demonstrators reported visiting a group of villagers seeking to purchase seeds which were harvested in verification plots because of excellent performance of the seeds. The provision of seeds will benefit not only the project beneficiaries but also the neighboring farmers through distribution of better seeds to others and the promotion of seed replacement in farming communities.



(e) Farmer operated trial

In the verification tests in 2006, a very simple trial on 1 plant/hill and 2-3 plants/hill were carried out by the farmers in all the verification plots. Such simple trial activities by farmers themselves should be disseminated as soil conditions in individual fields differ substantially. In Zone-3, one demonstrator conducted such a simple trial by himself as shown in the photograph.

(f) Limited practical skills of the PDA staff

The practical skills of extension staff appear to be still limited. This might be attributed to their limited chances for involvement in practical extension activities or in operating extension activities individually. The empowerment of extension staff by way of learning through doing and enhancement of confidence in them should be seriously sought.

(g) Weak field extension activities

The farmers' anticipation and motivation toward the improvement of farming practices appear to be high. The current extension services supported by donors with weak ownership of PDA appear to be responding less to such needs. To meet such farmers' expectations, the deployment of extension staff having sufficient practical skills should be envisaged. The primary target of extension activities should better be placed on the improvement of rice productivity, current exclusive crop, and upland crops production in paddy fields during the early rainy season.

Field activities of the extension staff were restricted due partly to financial constraints of the extension agencies. However, problems and hints for solutions are often found in fields. Field activities of the staff should be intensified to an extent possible.

PART-D

EVALUATION OF PILOT PROJECTS



Participatory evaluation workshops, questionnaire survey and technology transfer to the counterparts

PART-D: EVALUATION OF PILOT PROJECTS

D-1 Purpose of Evaluation

At the terminal point of the pilot projects, these projects need to be comprehensively evaluated whether the intended objectives had been achieved or not. The results of the evaluation are utilized as the information sources for judging whether the pilot projects are sustainable and/or replicable.

D-2 Framework of Evaluation

(1) Methodology of Evaluation

The evaluation of the three pilot projects was conducted as the terminal evaluation in accordance with “JICA Guideline for Project Evaluation ~ Practical Methods for Project Evaluation ~” published in 2004.

(2) PDM for Evaluation (PDMe)

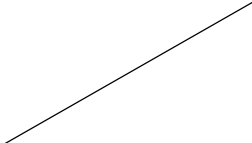
The PDM for Evaluation (PDMe) was prepared based on the PDMs Versions 1 and 2 and close consultations within the JICA study team for clarifying ambiguous points in the expressions and logic used in each PDM. According to the thorough discussion within the study team, some new Objectively Verifiable Indicators (O.V.I) were added to PDMe for measuring the achievements more clearly. Newly added O.V.Is in PDMe were underlined. The PDMe by zone are as follows.

PDMe for Irrigated Agriculture On-farm Technology Improvement Pilot Project in Zone-1

Narrative Summary	Objectively Verifiable Indicators (O.V.I)	Means of Verification	Important Assumptions
Overall Goal Agricultural productivity centering on rice is improved in the target area.	1-1 Agricultural productivity in the target area is improved as proposed in the master plan by year 2015.	1-1 Agricultural statistics	/
Project Purpose Good model of on-farm irrigated agriculture improvement in Zone-1 is established.	1-1 Result of the pilot project is evaluated as being an applicable model for Zone-1 in the target area by stakeholders by February 2008. <u>1-2 80% of the participant farmers were satisfied with the implementation of the pilot project at the end of the project period.</u>	1-1 Questionnaire to the stakeholders 1-2 Outcome of participatory evaluation workshops and farmers' acceptability survey	- All the proposed activities in the master plan in post-project stage are implemented as scheduled. - Climate is not changed significantly. - Irrigation facilities are not damaged severely by natural disaster.
Outputs 1 Irrigation water is distributed based on the actual water demand by a model FWUC. 2 Low input SRI is disseminated by farmer-to-farmer extension. 3 Target yield of the master plan is confirmed to be achieved by applying SRI based improved farming practices.	1-1 Irrigation water is distributed based on the actual water demand by a model FWUC by February 2008. <u>1-2 Collection rate of Irrigation Service Fee (ISF) (headcount/value) comes to 100% as close as possible by February 2008.</u> 2-1 A total of fifty farmers in the model villages apply low input SRI by farmer-to-farmer extension by February 2008. 3-1 Yield of improved farming practices in experimental plots is higher than the target yields of the master plan.	1-1 Outcome of participatory evaluation workshops. 1-2 Record of water distribution, record of ISF collection. 2-1 Monitoring survey 3-1 Crop yield survey	- Responsibility of each stakeholder in water management is not changed within the project period.

<p>Activities (1. Participatory Irrigation Management and Development)</p> <p>1-1 To prepare preliminary landholding maps. 1-2 To prepare water use maps. 1-3 To minimize water loss. 1-4 To establish FWUC sub-groups. 1-5 To educate FWUC about proper water use. 1-6 To prepare irrigation service plan. 1-7 To construct on-farm irrigation facilities. 1-8 To construct watercourses. 1-9 To improve FWUC administration. 1-10 To construct FWUC meeting building. 1-11 To train FWUC for water management.</p> <p>(2. Participatory Agriculture Extension)</p> <p>2-1 To organize study tours. 2-2 To conduct village training. 2-3 To carry out inter-village training. 2-4 To hold farmers' field days.</p> <p>(3. Experimental Farming Practice Improvement)</p> <p>3-1 To conduct verification tests to confirm effectiveness of SRI based improved farming practices. 3-2 To conduct small scale adaptability trials for further improvement of the farming practices. 3-3 To conduct farmers' acceptability survey for confirming the possibility to introduce the improved farming practices by seeing the results of the first year from technical and economical viewpoints.</p>	<p>Input</p> <p>Japan <Personnel> Experts</p> <p><Others> Transportation Equipment of map preparation Equipment for monitoring irrigation water distribution Construction cost of on-farm irrigation facilities Construction materials of FWUC meeting building Construction cost of FWUC meeting building Training materials Cost of study tours Materials, equipment, and cost of verification test and adaptability trials Cost of monitoring survey, crop yield survey, farmers' acceptability survey, participatory evaluation workshops, and questionnaire survey</p>	<p>Cambodia <Personnel> <u>FWUC and FWUGs</u> FWUC and FWUG members</p> <p><u>Provincial government</u> Counterparts from PDOWRAM and PDA</p> <p><u>Central government</u> Counterparts from MOWRAM and MAFF</p> <p><u>NGO</u> Facilitators</p> <p><Others> Office place for the JICA study team in MOWRAM Some office facilities and equipment</p>	<p>- Related government agencies and a model FWUC continue to involve in the project during the project period. - No severe natural disaster within the project period comes.</p> <p>Preconditions - Irrigated agriculture improvement is highly needed in the target area. - Related organizations understand the master plan well. - Basic irrigation facilities are installed in the project area.</p>
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PDMe for Irrigated Agriculture On-farm Technology Improvement Pilot Project in Zone-3

Narrative Summary	Objectively Verifiable Indicators (O.V.I)	Means of Verification	Important Assumptions
<p>Overall Goal Agricultural productivity centering on rice is improved in the target area.</p>	<p>1-1 Agricultural productivity in the target area is improved as proposed in the master plan by year 2015.</p>	<p>1-1 Agricultural statistics</p>	
<p>Project Purpose Good model of on-farm irrigated agriculture improvement in Zone-3 is established.</p>	<p>1-1 Result of the pilot project is evaluated as being an applicable model for Zone-3 in the target area by stakeholders by February 2008. <u>1-2 80% of the participant farmers are satisfied with the implementation of the project at the end of the project period.</u></p>	<p>1-1 Questionnaire to the stakeholders 1-2 Outcome of participatory evaluation workshops and farmers' acceptability survey</p>	<p>- All the proposed activities in the master plan in post-project stage are implemented as scheduled. - Climate is not changed significantly. - Irrigation facilities are not damaged severely by natural disaster.</p>
<p>Outputs 1 Irrigation water is released from reservoirs by the FWUCs considering growing stages of paddy. 2 Low input SRI is disseminated by farmer-to-farmer extension.</p>	<p>1-1 Irrigation water is released from reservoir by the FWUCs considering growing stages of paddy by February 2008 2-1 A total of fifty farmers in the model villages apply low input SRI by farmer-to-farmer extension by February 2008</p>	<p>1-1 Record of water release from reservoir, interview with the FWUCs 2-1 Monitoring survey</p>	<p>- Responsibility of each stakeholder in water management is not changed within the project period. - Reservoir is filled with rainwater.</p>

3 Target yield of the master plan is achieved by applying SRI based improved farming practice.	3-1 Yield of improved farming practice in experimental plots is higher than the target yield of the master plan	3-1 Crop yield survey	
Activities (1. Participatory Irrigation Management and Development) 1-1 To prepare preliminary landholding maps. 1-2 To prepare water use maps. 1-3 To establish the FWUCs based on existing irrigation management groups. 1-4 To clarify the reservoir capacity. 1-5 To prepare the irrigation service plan. 1-6 To train the FWUCs for water management. (2. Participatory Agriculture Extension) 2-1 To organize study tour. 2-2 To conduct village training. 2-3 To carry out inter-village training. 2-4 To hold farmers' field day. (3. Experimental Farming Practice Improvement) 3-1 To conduct verification test to confirm effectiveness of SRI based on improved farming practices. 3-2 To conduct small scale adaptability trials for further improvement of the farming practice. 3-3 To conduct farmers' acceptability survey for confirming the possibility to introduce the improved farming practices by seeing the results of the first year from technical and economical viewpoints.	Inputs Japan <Personnel> Experts <Others> Transportation Equipment of map preparation Equipment for monitoring irrigation water distribution Training materials Cost of study tours Materials, equipment, and cost of verification test and adaptability trials Cost of monitoring survey, crop yield survey, farmers' acceptability survey, participatory evaluation workshops, and questionnaire survey	Cambodia <Personnel> FWUC and FWUGs FWUC and FWUG members Provincial government Counterparts from PDOWRAM and PDA Central government Counterparts from MOWRAM and MAFF NGO Facilitators <Others> Office place for the JICA study team in MOWRAM Some office facilities and equipment	- Related governmental agencies and a model FWUC continue to involve in the project during the project period. - No severe natural disaster within the project period comes. Preconditions - Irrigated agriculture improvement is highly needed in the target area. - Related organizations understand the master plan well. - Basic irrigation facilities are provided in the project area.

PDMe for Rain fed Agriculture Improvement Pilot Project in Zone-4

Narrative Summary	Objectively Verifiable Indicators (O.V.I)	Means of Verification	Important Assumptions
Overall Goal Agricultural productivity centering on rice is improved in the target area.	1-1 Agricultural productivity in the target area is improved as proposed in the master plan by year 2015.	1-1 Agricultural statistics	/
Project Purpose Good model of rainfed agriculture improvement in Zone-4 is established.	1-1 Result of the pilot project is evaluated as applicable model for Zone-4 by stakeholders by February 2008. 1-2 80% of the participant farmers are satisfied with the implementation of the project at the end of the project period.	1-1 Questionnaire to the stakeholders 1-2 Outcome of participatory evaluation workshops and farmers' acceptability survey	- All the proposed activities in the master plan in post-project stage are implemented as scheduled. - Climate is not changed significantly.
Outputs 1 Low input SRI is disseminated by farmer-to-farmer extension. 2 Target yields of the master plan are achieved by applying SRI based improved farming practice.	1-1 A total of fifty farmers in the model village apply low input SRI by farmer-to-farmer extension by February 2008. 2-1 Yields of improved SRI in experimental plots is higher than the target yields of the master plan.	1-1 Monitoring survey 2-1 Crop yield survey	
Activities	Input		

(1. Participatory Agriculture Extension) 1-1 To organize study tours. 1-2 To conduct village training. 1-3 To carry out inter-village training. 1-4 To hold farmers' field days. (2. Experimental Farming Practice Improvement) 2-1 To conduct verification tests to confirm effectiveness of SRI based improved farming practices. 2-2 To conduct small scale adaptability trials for further improvement of the farming practices. 2-3 To conduct farmers' acceptability survey for confirming the possibility to introduce the improved farming practices by seeing the results of the first year from technical and economical viewpoints.	Japan <Personnel> Experts <Others> Transportation Training materials Cost of study tours Materials, equipment, and cost of verification test and adaptability trials Cost of monitoring survey, crop yield survey, farmers' acceptability survey, participatory evaluation workshops, and questionnaire survey	Cambodia <Personnel> <u>Provincial government</u> Counterparts from PDA <u>Central government</u> Counterparts from MAFF <u>NGO</u> Facilitators <Others> Office place for the JICA study team in MOWRAM Some office facilities and equipment	- Related governmental agencies and a model FWUC continue to involve in the project during the project period. - No severe natural disaster within the project period comes.
	Precondition - Rainfed agriculture improvement is highly needed in the target area.		

(3) Method of Data Collection

Evaluation questions, judgmental standards, required data, data sources, and data collection methods were summarized in the Evaluation Grid (see Table D-2.1~Table D-2.3). The data for the evaluation were mainly collected through (i) literature review, (ii) interview with the JICA study team, (iii) participatory evaluation workshops, and (iv) questionnaire surveys. Details of the participatory evaluation workshops and questionnaire survey are as follows.

(a) Participatory Evaluation Workshops

1) Purposes

Participatory evaluation workshops were conducted for the following purposes; i) to grasp the participant farmers' evaluation on the pilot projects, ii) to know how the activities of the projects were carried-out by the participant farmers, iii) to understand the achievements of the projects from the viewpoint of their satisfaction, iv) to observe the impact of the projects from their viewpoint, and v) to estimate the sustainability of the projects' benefits based on the motivation of the participants.



Participatory evaluation workshop

2) Schedule

The venues and participants are summarized in the table below. Duration of workshops is one day for each. The expected number of participants was 20 for each workshop.

Schedule of Participatory Evaluation Workshops

No	Venue/ Village	Participants	Number (M:F)
1	Zone-1; Boss Ta Ney (Participatory irrigation management and development activities)	<ul style="list-style-type: none"> • FWUC members • Participant farmers • Commune Council 	19 (14:5)

		members • PDOWRAM staff	
2	Zone-1; Kandaol Dom (Participatory agricultural extension)	• Experimental farmers • Cooperating farmers • CEDAC staff	16 (6:10)
3	Zone-3; Banla S'et (Participatory irrigation management and development activities)	• Prey Robong FWUC members • Farmers (who attended the meetings with JICA) • Commune Council members • PDWORAM staff	24 (9:15)
4	Zone-3; Mohaleaph (Participatory irrigation management and development activities)	• Prey Kjeay FWUC members • Ditto	23 (9:14)
5	Zone-3; Mohalumpeang Ti I (Participatory irrigation management and development activities)	• Ta Kao FWUC members • Ditto	18 (18:0)
6	Zone-3; Mohaleaph (Participatory agricultural extension)	• Experimental farmers • Cooperating farmers • CEDAC staff	21 (7:14)
7	Zone-4, Prey Nheat (Participatory agricultural extension)	Ditto	22 (9:13)

3) Discussion Issues

The participants discussed the following seven issues: i) their previous activities in the pilot project; ii) outputs produced by i); iii) evaluation of the outputs, the reason of the evaluation; iv) problems faced until the achievement of outputs; v) actions for solving the problems by the participants; vi) learning from the project; v) impact/changes due to the implementation of the project; and vi) future direction. Evaluation was expressed by four grades; ++ (very satisfied), + (satisfied), - (dissatisfied), and – (very dissatisfied). The future direction described the commitment of the participants to the continuation of the practice after the termination of the project.

4) Results of Discussions

The results of discussions are summarized as the outcomes of the participatory evaluation workshops by activity and zone in Table D-2.4~Table D-2.10.

(b) Questionnaire Survey on Non-participants

1) Purposes

The questionnaire survey was conducted on the farmers who lived in the target areas of the pilot projects but had not participated in them, the so-called non-participants, to obtain the information of recognition of the projects in the target areas and the reasons why they had not participated in the projects. The collected information was used as the grounds to make judgments about “impact” and “sustainability.” Respondents were randomly selected. There were a total of 30



Questionnaire survey on a non-participant

respondents, ten from each zone.

2) Schedule

The questionnaire survey covered one zone per day. The villages covered and the number of the respondents in each village per zone are described in the table below.

Schedule of Questionnaire Survey on Non-participants

Zone-1		Zone-3		Zone-4	
Village Name/ No. of Respondents		Village Name/ No. of Respondents		Village Name/ No. of Respondents	
• Ou Veang	2	• Mohalumpeang Ti I	2	• Prey Nheat	3
• Srae Thnal	2	• Mohalumpeang Ti II	3	• Dam Daek	2
• Kandaol Dom	1	• Banla S'et	2	• Trapeang Kanthor	2
• Bos Ta Ney	2	• Mohaleaph	3	• Hoang	1
• Kahaeng	1			• Prey Kuk	2
• Trapeang Preah	1				
• Rumleang	1				
Total	10	Total	10	Total	10

3) Questionnaire

The questionnaire was a multiple choice type of survey where respondents marked all items that were applicable.

4) Results of Questionnaire Survey

a) Zone-1

All respondents were aware of the pilot project's implementation. Most of them knew about the participatory irrigation and management and development activities (80%) and the participatory agricultural extension activities (90%) including the organization of saving groups (80%). The main reasons why they had not been involved in the pilot project were: i) they were busy with side jobs (40%) and ii) they wanted to join but were not selected as participant farmers (50%). The results implied that many non-participants were interested in the pilot project but did not have the chance to participate.

b) Zone-3

All respondents were aware of the projects' implementation. More than half of them knew the participatory irrigation management and development activities (60%) including the measurement of paddy fields (70%). The main reasons why they had not been involved in the project were: i) they were busy with side jobs (60%); ii) they were not called for the first meeting (70%), and iii) the distance from the irrigation system to paddy field (60%). The results implied that many non-participants were interested in the project but they missed the opportunity to attend the first meeting and then hesitated in involving themselves in successive activities. The distance from their paddy fields was also one of the main constraints.

c) Zone-4

All respondents were aware of the projects' implementation. Most of them knew about the participatory agricultural extension activities (90%). The main reasons why they had not been involved in the project were: i) they were busy with side jobs (40%), and ii) they wanted to join but were not selected as participant farmers (50%). The respondents also mentioned that they thought that the trial of SRI was too risky. They were afraid of failure due to the limited water supply available.

More detailed results are summarized in Table D-2.11~Table D-2.13.

D-3 Achievements of Pilot Project

D-3.1 Irrigated Agriculture On-farm Technology Improvement Pilot Project

D-3.1.1 Zone-1

(1) Achievement of Inputs

Since the project was implemented in the framework of the study on the comprehensive agricultural development of the Prek Thnot River Basin, the achievement of inputs for the project cannot be clearly distinguished from that of the study.

(2) Achievement of Outputs

(a) Output 1

The collection rate of ISF had drastically increased in value and headcount from a rate of 30% before the implementation of the project. The results of the participatory evaluation workshop, however, showed that some farmers had not been able to obtain water timely and they had felt that water distribution had been unfair. It was evident that there was miscommunication or misunderstanding on the distribution of irrigation water between the FWUC Ou Veang and the farmers. In the near future, it can be expected that these kinds of problems will be solved as FWUC gets used to irrigation water management. Moreover, some farmers complained in the participatory evaluation workshop that the measurement results of their paddy plots were not acceptable because the measurement had not been done by an authorized agency such as the Ministry of Land Management, Urban Planning and Construction.

Accordingly, there had been some problems which could impede the achievement of Output 1. Therefore, it can be said that Output 1, where irrigation water had been distributed by a model FWUC (FWUC Ou Veang) based on the actual water demand, had been mostly achieved.

Degree of Achievement of Output 1

Output 1	Objectively Verifiable Indicator (Plan)	Actual Achievement
Irrigation water was distributed based on the actual water demand by a model FWUC.	1-1 Irrigation water was distributed based on the actual water demand by a model FWUC by February 2008.	1-1 Some farmers pointed out they were not able to obtain irrigation water timely and fairly.
	1-2 Collection rate of Irrigation Service Fee (headcount/ value) comes as close as possible to 100% by February 2008.	1-2 Collected Irrigation Service Fee was about 86% of estimated value and 97% in headcount as of February 2008.

Source: FWUC Ou Veang, the JICA Study Team

(b) Output 2

The actual number of farmers who had applied low input SRI had largely exceeded the intended one in the PDMe. Therefore, it can be said that the Output 2 “Low input SRI is disseminated by farmer-to-farmer extension” had been achieved. Additionally, according to the result of the participatory evaluation workshop, some of the participant farmers had a plan to organize the farmers’ group in order to sell surplus rice attained from the increased yield through the application of SRI and the establishment of a rice seed bank. They also had become eager to search for new farming techniques.

Degree of Achievement of Output 2

Output 2	Objectively Verifiable Indicator (Plan)	Actual Achievement
Low input SRI was disseminated by farmer-to-farmer extension.	2-1 A total of 50 farmers in the model villages applied low input SRI by farmer-to-farmer extension by February 2008.	2-1 82 farmers in five villages, namely, Rumleang, Kandaol Dom, Trapeang Preah, Srae Thnal, and Kahaeng, applied low input SRI in a 31.46 ha paddy field.

Source: CEDAC, the JICA Study Team

(c) Output 3

The yields of both early and medium rice have considerably exceeded the target yields intended in the master plan. The average yield of early rice was 4.1t/ha and that of medium rice was 3.8t/ha during the rainy season. Therefore, it can be said that the Output 3: “Target yield of the master plan,” was confirmed to be achieved to a large degree by applying SRI based improved farming practices.

Degree of Achievement of Output 3

Output 3	Objectively Verifiable Indicator (Plan)	Actual Achievement
Target yield of the master plan was confirmed to be achieved by applying SRI based improved farming practices.	3-1 Yield of improved farming practices in experimental plots was higher than the target yields of the master plan.	3-1 Early rice: Av. 4.1t/ha (Target: 3.3t/ha) Medium rice: Av. 3.8t/ha (Target 3.0t/ha)

Source: the JICA study team

(3) Possibility of Achieving Project Purpose and Overall Goal

All of three outputs had been already achieved in varying degrees. Moreover, according to the outcome of the participatory evaluation workshops on participatory irrigation management and development activities and participatory agricultural extension activities, which are related to the Output 1 and the Output 2 respectively, and the result of farmers’ acceptability survey associated with the Output 3, more than 80% of the participant farmers were satisfied with the implementation of the project. Therefore, it can be said that the project purpose: “Good model of on-farm irrigated agriculture improvement in Zone-1 is established,” had been achieved. As the project purpose has been achieved and the situation of the important assumptions estimated in the PDME will be not drastically changed until 2015 according to the research of the expert in hydrology/flood control, it is quite likely that the overall goal: “agricultural productivity centering on rice is improved in the target area,” will be achieved by 2015.

D-3.1.2 Zone-3

(1) Achievement of Inputs

Situation is the same with Zone-1.

(2) Achievement of Outputs

(a) Output 1

Although all intended activities in the PDME had been conducted, reservoirs had not been filled with rainfall due to the lack of good amount of rainfall in Prey Robong, Ta Kao, and Prey Kjeay water harvesting irrigation system areas. Accordingly, the Output 1: irrigation water is released from reservoirs by the FWUCs considering growing stages of paddy, had not been achieved.

Degree of Achievement of Output 1

Output 1	Objectively Verifiable Indicator (Plan)	Actual Achievement
Irrigation water was released from reservoirs by the FWUCs considering growing stages of paddy.	1-1 Irrigation water was released from reservoir by the FWUCs considering growing stages of paddy by February 2008.	1-1 The FWUCs had not been able to release irrigation water from the reservoirs considering growing stages of paddy by February 2008.

Source: the JICA study team

(b) Output 2

The actual number of farmers who had applied SRI had reached 80% of the intended number. According to the results of the questionnaire survey on non-participants, one of the respondents mentioned that he/she wanted to apply the low input SRI but unfortunately he/she had finished transplanting before the project came. Some non-participant farmers also remarked that they were interested in the activities of the low input SRI, however, they had not been invited for the first meeting. These remarks show that there had been potentially more farmers who wanted to join but they had missed the opportunity due to poor information dissemination.

Consequently, it can be said that Output 2: “Low input SRI is disseminated by farmer-to-farmer extension,” had been nearly achieved.

Degree of Achievement of Output 2

Output 2	Objectively Verifiable Indicator (Plan)	Actual Achievement
Low input SRI was disseminated by farmer-to-farmer extension.	2-1 A total of 50 farmers in the model village applied low input SRI by farmer-to-farmer extension by February 2008.	2-1 41 farmers in Mohaleph village applied low input SRI in 38.05ha of paddy fields.

Source: CEDAC, the JICA study team

(c) Output 3

The yields of medium rice had exceeded the target yield intended in the master plan. The average yield of medium rice was 3.0t/ha during the rainy season. Therefore, it can be said that the Output 3: “Target yield of the master plan is confirmed to be achieved by applying SRI based improved farming practices,” had been achieved.

Degree of Achievement of Output 3

Output 3	Objectively Verifiable Indicator (Plan)	Actual Achievement
Target yields of the master plan was confirmed to be achieved by applying SRI based improved farming practices.	3-1 Yield of improved farming practices in experimental plots was higher than the target yields of the master plan.	3-1 Medium rice: Av. 3.0t/ha (Target 2.8t/ha).

Source: the JICA study team

(3) Possibility of Achieving Project Purpose and Overall Goal

The Output 2 had been nearly achieved and the Output 3 had been achieved. The Output 1 had not been achieved due to the lack of a good amount of rainfall in the target area. However; since all intended and required activities had been completed for the FWUCs’ releasing irrigation water from the reservoirs, the lessons learned for establishment of a

good model of on-farm irrigated agriculture improvement in Zone-3 could have been drawn. Moreover, according to the outcome of the participatory evaluation workshops on Participatory Irrigation Management and Development Activities and Participatory Agricultural Extension Activities, which were related to the Output 1 and the Output 2 respectively, and farmers' acceptability survey associated with the Output 3, more than 80% of the participant farmers were satisfied with the implementation of the project. Therefore, it can be said that the project purpose: "Good model of on-farm irrigated agriculture improvement in Zone-3 is established," had been nearly achieved. As the project purpose had been nearly achieved and the situation of the important assumptions estimated in the PDMe would be not drastically changed until 2015 according to the research of the expert in hydrology/flood control, it was likely that the overall goal: "Agricultural productivity centering on rice is improved in the target area," would be achieved by 2015, if reservoirs were filled with sufficient amount of rainwater for irrigation use.

D-3.2 Rainfed Agriculture Improvement Pilot Project in Zone-4

(1) Achievement of Inputs

The situation was the same with Irrigated Agriculture On-farm Technology Improvement Pilot Project Zone-1 and Zone-3.

(2) Achievement of Outputs

(a) Output 1

The actual number of farmers who have applied low input SRI has reached around 90% of the intended number, even though the participant farmers pointed out that there had been many farmers who did not want to practice low input SRI in the target area because they do not believe it in the participatory evaluation workshop. Moreover, the results of the questionnaire survey on the non-participants showed that many of them misunderstood the methods, results, and benefits of low input SRI.

Accordingly, it can be said that the Output 1: "Low input SRI is disseminated by farmer-to-farmer extension," had been very nearly achieved.

Degree of Achievement of Output 1

Output 1	Objectively Verifiable Indicator (Plan)	Actual Achievement
Low input SRI was disseminated by farmer-to-farmer extension.	1-1 A total of 50 farmers in the model villages applied low input SRI by farmer-to-farmer extension by February 2008.	1-1 46 farmers in villages Dam Daek, Prey Kuk, Trapeang Kanthor, Trapeang Kralanh, and Hornh applied low input SRI in 16.82ha of paddy fields.

Source: CEDAC, the JICA study team

(b) Output 2

The yield of medium rice had considerably exceeded the target yield intended in the master plan. The average yield of medium rice was 3.5t/ha during the rainy season. Therefore, it can be said that the Output 2: "Target yield of the master plan is confirmed to be achieved by applying SRI based improved farming practices," had been achieved to a large degree.

Degree of Achievement of Output 2

Output 2	Objectively Verifiable Indicator (Plan)	Actual Achievement
The target yield of the master plan was confirmed to be achieved by applying SRI based improved farming practices.	3-1 Yield of improved farming practices in experimental plots was higher than the target yields of the master plan.	3-1 Medium rice: Av. 3.5t/ha (Target 2.0t/ha).

Source: the JICA study team

(3) Possibility of Achieving Project Purpose and Overall Goal

The Outputs 1 and 2 had been mostly achieved. According to the outcome of the participatory evaluation workshop on participatory agricultural extension activities, which was related to the Output 1 and farmers' acceptability survey associated with the Output 2, more than 80% of the participant farmers were satisfied with the implementation of the project. Therefore, it can be said that the project purpose: "Good model of rainfed agriculture improvement in Zone-4 is established," had been achieved. As the project purpose had been achieved and the situation of the important assumptions estimated in the PDMe will be not drastically changed until 2015 according to the research of the expert in hydrology/flood control, it was quite likely that the overall goal: "Agricultural productivity centering on rice is improved in the target area," would be achieved by 2015.

D-4 Management System and Process

(1) Implementation of the Activities

(a) Irrigated Agriculture On-farm Technology Improvement Pilot Project

1) Zone-1

a) Activities 1-1 ~ 1-11

Except for activity 1-8, which was to construct watercourses, all intended activities had been completed as scheduled. The construction of watercourses by the FWUC member farmers had been slightly behind schedule due to their inconvenience.

b) Activity 2-1 ~ 2-4, c) Activity 3-1 ~ 3-3

All intended activities had been conducted as scheduled.

2) Zone-3

a) Activities 1-1 ~ 1-6, b) Activity 2-1 ~ 2-4, c) Activity 3-1 ~ 3-3

All intended activities had been conducted as scheduled.

3) Zone-4

a) Activities 1-1 ~ 1-4, b) Activity 2-1 ~ 2-3

All intended activities had been conducted as scheduled.

(2) Management System and Monitoring System

(a) Management System

The coordination among the JICA study team, the MOWRAM/ PDOWRA, MAFF/ PDA, and CEDAC had been smooth throughout the project period of both Irrigated Agriculture

On-farm Technology Improvement Pilot Project (Zone-1, Zone-3) and Rainfed Agriculture Improvement Pilot Project (Zone-4). These parties concerned had shared the information and experience on the projects through regular joint meetings and close consultations.

(b) Monitoring System

The monitoring systems for both projects had been working properly based on the good coordination among the parties concerned. The results of monitoring had been compiled in the monthly report submitted to JICA. These results included the record of pilot project activity (activity report) and the Interim Report Volume-IV pilot projects.

(3) Assignment of the Counterparts and Technology Transfer

(a) Assignment of the Counterparts

According to the request from the JICA study team, seven MOWRAM officers, three MAFF officers, and one MOE officer had been assigned as counterparts. Additionally, five PDOWRAM officers, eight PDA officers of Kampong Speu and two Prey Pda Experimental Station (MAFF) officers had been assigned to the implementation of the pilot projects. An advisory team composed of two MOWRAM officers, three MAFF officers, two JICA Experts of MOWRAM and MAFF, and one JICA Cambodia staff had been also organized.



Presentation of a PDOWRAM Officer in a Kick-off Seminar

(b) Technology Transfer

The required technology for the smooth implementation of the pilot projects had been transferred to the counterparts, PDOWRAM, and PDA officers throughout the project period.

D-5 Evaluation Results based on Five Evaluation Criteria

D-5.1 Irrigated Agriculture On-farm Technology Improvement Pilot Project

D-5.1.1 Zone-1

(1) Relevance

(a) Result of Evaluation

The relevance of the Irrigated Agriculture On-farm Technology Improvement Pilot Project in Zone-1 was evaluated as “very high” due to the following reasons:

(b) Main Reasons and Causes

1) Consistency with the development policies of Cambodia

The Post-Second Socioeconomic Development Plan 2001 – 2005 prepared by the Ministry of Planning was the National Strategic Development Plan 2006 – 2010 approved by the Council of Minister meeting on January 27, 2006. This national development policy aims to enhance the agricultural sector through the improvement of productivity and the diversification of the agricultural sector. The Strategic Development Plan for Water Sector 2006-2010 prepared by MOWRAM

and Agricultural Development Plan, Long, Medium and Short Term 1999-2010 prepared by MAFF had not been revised.

2) Consistency with the development assistance policies of Japan

MOFA's assistance strategy for Cambodia stated the importance of assistance for agricultural development and improvement of agricultural productivity in contributing to poverty reduction. JICA's assistance strategy for Cambodia emphasized that JICA assist in the agricultural and rural development for economic growth and poverty reduction. It was also clearly mentioned that the assistance for agricultural and rural development should be concentrated on the improvement of agricultural productivity through the improvement of rice cultivation techniques and the construction/rehabilitation of irrigation facilities associated with organized farmers' groups for their proper operation and management.

3) Consistency with the needs of the Target Group

As a result of the participatory evaluation workshops, the questionnaire survey on non-participants, and the farmers' acceptability survey, it can be said that the need for improving agricultural productivity through the improvement of irrigated agriculture on-farm technology was still high among the target group.

Accordingly, the project purpose and the overall goal conformed to the development policies of Cambodia, the development assistance policies of Japan, and the needs of the target group even up to the period of the terminal evaluation.

(2) Effectiveness

(a) Result of Evaluation

The effectiveness of the Irrigated Agriculture On-farm Technology Improvement Pilot Project in Zone-1 was evaluated as "high" due to the following reasons:

(b) Main Reasons and Causes

1) Relationship between the achievement of the project purpose and the degree of the achievement of outputs

A model FWUC, FWUC Ou Veang, had distributed water nearly based on the actual demand of farmers (Output 1). More farmers than the intended number had started to practice low input SRI with farmer-to-farmer extension (Output 2). The participant farmers mentioned that the yield of paddy had increased due to the application of low input SRI. The yield of experimental plots had highly exceeded that considered in the master plan (Output 3). Therefore, it can be said that the achievement of three intended outputs had contributed to the achievement of the project purpose: "Good model of on-farm irrigated agriculture improvement in Zone-1 is established". (For more details, see (3) Possibility of Achieving Project Purpose and Overall Goal of D-3.1.1 Zone 1.)

2) Contributing factors of the achievement of Project Purpose

Contributing factors of the achievement of the project purpose are as follows;

- The basic strategies of the pilot project implementation had been effective.
- The pilot project had used "good practices" in Cambodia such as the application of well functioned ISF collection procedures and conduct of study tours to observe them.
- Coordination among implementing agencies, the JICA study team, MOWRAM/

PDOWRAM, MAFF/ PDA and NGO (CEDAC), had been smooth as a result of their effort.

- The main implementers, the officers of PDOWRAM and PDA, gradually but willingly had committed themselves to the pilot project due to their professional interest and their awareness that they had been needed.
- Irrigated agriculture on-farm technology improvement had been critically needed by farmers in the pilot area.

(3) Efficiency

(a) Result of Evaluation

The efficiency of the Irrigated Agriculture On-farm Technology Improvement Pilot Project in Zone-1 was evaluated as “high” due to the following reasons:

(b) Major Reasons and Causes

1) Achievement of outputs

See (2) Achievement of outputs in D-3.1.1 Zone-1.

2) The achievement of outputs through utilizing inputs

Inputs had been provided appropriately in terms of quality, quantity, and timing. All provided inputs had been utilized for converting into the outputs properly. The JICA study team had monitored and managed the provision of inputs through close cooperation with the Cambodian parties concerned.

(4) Impact

(a) Result of Evaluation

The impact of the Irrigated Agriculture On-farm Technology Improvement Pilot Project in Zone-1 was evaluated as “Positive impacts are observed.”

(b) Major Reasons and Causes

According to the results of the participatory evaluation workshops and the questionnaire survey on non-participants, the following positive impacts were observed;

- Agricultural productivity centering on rice had been improving in the target area.
- Living standards of the participant farmers in terms of income had become better than the period prior to the implementation of the pilot project.
- The participant farmers had started helping each other and they exchanged ideas more.
- The participant farmers had started cooperating more closely with each other.
- Water conflicts had been reduced among farmers including the non-participants.
- The villages in the target area had become lively.

Negative impacts on natural environment, gender, social strata had not been observed.

(5) Sustainability

(a) Result of Evaluation

The sustainability of the Irrigated Agriculture On-farm Technology Improvement Pilot Project in Zone-1 was evaluated as “high” due to the following reasons:

(b) Main Reasons and Causes

The PDOWRAM and PDA, the main successors of the pilot project had been well trained

through the on-the-job-training and technical seminars on the basic engineering knowledge related to irrigated agriculture conducted by the JICA study team. Therefore, it can be expected that they could continue to provide the necessary support for improving the irrigated agriculture on-farm technology to farmers. The required equipment for their supporting activities will be passed-on from the JICA study team to MOWRAM first, and then to PDOWRAM and PDA. The NGO (CEDAC) involved mentioned that they would continue the extension of low input SRI in the target area. Furthermore, the participant farmers had the strong will to continue and disseminate the practices that they have learned from the pilot project. Particularly, it was highly expected that the members of Ou Veang FWUC could continue to distribute irrigation water based on the farmers' actual demand and collect and utilize ISF in a transparent manner because they have trained thoroughly in water management and administration.

As of this time, however, the budget allocation to PDOWRAM and PDA for their supporting activities had not been committed.

(6) Conclusion

The relevance of the pilot project was evaluated as very high. The improvement of irrigated agriculture on-farm technology had been critically needed by farmers in the project area. The participant farmers had the strong will to continue the practice that they learned from the project. Moreover, according to the results of the questionnaire survey on the non-participants, the main reason why they had not joined in the pilot project was "I was not called for the first meeting." It meant that many farmers were interested in the project components but were not able to join because they were not informed.

The basic strategies of the pilot project implementation determined by the JICA study team had been effective in implementing the project smoothly and seeing to it that most of the benefits of the project had been attained.

Accordingly, it can be said that the Irrigated Agriculture On-farm Technology Improvement Pilot Project in Zone-1 and its model are sustainable and replicable.

(7) Recommendations and Lessons Learned

(a) Recommendations

The following recommendation can be proposed:

- To promote the sustainability of the pilot project, the JICA and its study team need to appeal to the royal government of Cambodia to allocate budget to PDOWRAM and PDA.
- To increase the collection rate of ISF by persuading the user farmers, the measurements conducted in the pilot project should be authorized. Consequently, it required asking the Ministry of Land Management, Urban Planning and Construction to cooperate in the preparation of a land holding or cadastral map.

(b) Lessons Learned

- When the JICA study team held meeting and trainings, it was important to call as many farmers as possible and inform them about the meetings and trainings at least a couple of days in advance. Especially, it was crucial to invite the highest possible number of farmers who were interested in the project during the first/kick-off meeting.
- Learning from good farmers' practice in the areas with similar conditions within the country and farmer-to-farmer extension were quite effective in convincing the farmers who were generally very conservative to try a new technique such as SRI.
- Provided inputs from outside should be minimum, as well as supplied one from farmers, for promoting sustainability.

- The key point of smooth project implementation was to maintain good coordination and collaboration among the implementing agencies and local authorities through the frequent exchange of information and ideas.

D-5.1.2 Zone-3

(1) Relevance

(a) Result of Evaluation

The relevance of the Irrigated Agriculture On-farm Technology Improvement Pilot Project in Zone-3 was evaluated as “very high” due to the following reasons:

(b) Main Reasons and Causes

The main reasons and causes were the same with (b) main reasons and causes for the pilot project in Zone-1.

(2) Effectiveness

(a) Result of Evaluation

The effectiveness of the Irrigated Agriculture On-farm Technology Improvement Pilot Project in Zone-3 was evaluated as “relatively high” due to the following reasons:

(b) Main Reasons and Causes

1) Relationship between the achievement of project purpose and the degree of the achievement of outputs

The newly established FWUCs, Prey Robong FWUC, Ta Kao FWUC, Prey Kjeay FWUC, had not been able to release irrigation water from the reservoirs, although all required and intended activities were completed as scheduled (Output 1). A critical reason that the Output 1 had not been achieved was that the reservoirs had not been filled with rainwater due to the lack of a good amount of rainfall in the target area. Around 80% of the targeted number of farmers had started to practice low input SRI with farmer-to-farmer extension (Output 2). Moreover, some participant farmers mentioned that the quality of paddy had been improved with high yield due to the application of low input SRI. The yield of experimental plots had exceeded that considered in the master plan (Output 3). Accordingly, the Outputs 1 and 2 had not been achieved to a large degree. These factors slightly impeded the achievement of the project purpose: “Good model of on-farm irrigated agriculture improvement in Zone-3 is established.” (For more details, see (3) Possibility of Achieving Project Purpose and Overall Goal of D-3.1.2 Zone 3.)

2) Contributing factors of the achievement of Project Purpose

- The basic strategies of the pilot project implementation had been effective.
- The newly established FWUCs, especially Ta Kao FWUC, were highly motivated by the needs of farmers to release irrigation water.
- All non-participants of the pilot project who responded to the questionnaire had been interested in the practice of SRI.
- Coordination among implementing agencies, the JICA study team, MOWRAM/ PDOWRAM, MAFF/ PDA and NGO (CEDAC), had been smooth as a result of their effort.

(3) Efficiency

(a) Result of Evaluation

The efficiency of the Irrigated Agriculture On-farm Technology Improvement Pilot Project in Zone-3 was evaluated as “high” due to the following reasons:

(b) Major Reasons and Causes

1) Achievement of outputs

See (2) Achievement of Outputs in D-3.1.2 Zone-3.

2) The achievement of outputs through utilizing inputs

The situation was the same as the Irrigated Agriculture On-farm Technology Pilot Project in Zone-1.

(4) Impact

(a) Result of Evaluation

The impact of the Irrigated Agriculture On-farm Technology Improvement Pilot Project in Zone-3 was evaluated as “Positive and slight negative impacts are observed.”

(b) Major Reasons and Causes

According to the results of the participatory evaluation workshops and the questionnaire survey on non-participants, the following positive impacts were observed;

- Agricultural productivity centering on rice had been improving in the target area.
- Living standards of the participant farmers in terms of income had become better than that period prior to the implementation of the pilot project.
- Water conflicts had been reduced among farmers which included the non-participant farmers.
- Some non-participant farmers reported that they had started to practice some SRI techniques by imitating what the participant farmers did and the methods they learned in the field guidance conducted by the JICA study team.
- Some of the participant farmers had been encouraged enough to express their opinions in front of the people.

Negative impacts on natural environment, gender, and social strata had not been observed. However, due to the absence of an authorized agency for land measurement, a small number of households had been protesting the accuracy of their plot sizes.

(5) Sustainability

(a) Result of Evaluation

The sustainability of the Irrigated Agriculture On-farm Technology Improvement Pilot Project in Zone-3 was evaluated as “relatively high” due to the following reasons:

(b) Main Reasons and Causes

The PDOWRAM and PDA, the main successors of the pilot project, had been well trained through the on-the-job-training and technical seminars on the basic engineering knowledge related to irrigated agriculture conducted by the JICA study team. Therefore, it can be expected that they could continue to provide the necessary support for improving the irrigated agriculture on-farm technology to farmers. The required equipment for their supporting activities will be passed-on from the JICA study team to MOWRAM first, and

then to PDOWRAM and PDA. The NGO (CEDAC) involved mentioned that they would continue the extension of low input SRI in the target area. Furthermore, the participant farmers had the strong will to continue and disseminate the practices that they have learned from the pilot project. Particularly, it was highly expected that the members of Ou Veang FWUC could continue to distribute irrigation water based on the farmers' actual demand and collect and utilize ISF in a transparent manner because they have trained thoroughly in water management and administration. Although sufficient rainwater to irrigate paddy plots had not been stored in the reservoirs, the members of the newly established FWUCs had showed the willingness to continue their activities. Especially, it was noteworthy that the members of Ta Kao FWUC had been highly motivated to continue the operation and maintenance of the Ta Kao reservoir and its water harvesting irrigation system through monitoring and construction of minimum irrigation facilities under the cooperation of all villagers.

As of this time, however, the budget allocation to PDOWRAM and PDA for their supporting activities had not been committed. Particularly, the newly established FWUCs need much support from PDOWRAM to release water from the reservoirs in the near future when sufficient rainwater filled the reservoirs because they had never practiced it.

(6) Conclusion

The relevance of the pilot project was evaluated as very high. The improvement of the irrigated agriculture on-farm technology had been critically needed by the farmers in the pilot project area. Particularly, the members of Ta Kao FWUC showed the strong enthusiasm for continuing the operation and management of the Ta Kao reservoir and its water harvesting irrigation system in cooperation with all villagers. Moreover, according to the result of the questionnaire survey on the non-participants, the main reason why they had not participated in the pilot project was "I was not called for the first meeting." It meant that many farmers were interested in the project components but were not able to participate due to the lack of dissemination of information.

The effectiveness of the pilot project was evaluated as relatively high. None of the newly established FWUCs had been able to release irrigation water from the reservoirs owing to the lack of sufficient amount of rainfall around the reservoirs, although all intended activities have been done as scheduled. The JICA study team predicted that sufficient rainwater for irrigation use would be stored in the reservoirs based on the interviews and thorough discussions with MOWRAM, PDOWRAM and the wise elderly in the target area. However, it had not occurred. This experience indicated the necessity of more accurate data, such as regional meteorological data, which had never been collected yet in the target area, for the management and development of the water harvesting irrigation system.

Accordingly, it can be said that the Irrigated Agriculture On-farm Technology Improvement Pilot Project in Zone-3 and its model were nearly sustainable and replicable.

(7) Recommendations and Lessons Learned

a) Recommendations

The following recommendation can be proposed:

- To promote sustainability of the pilot project, JICA and its study team need to appeal to the royal government of Cambodia to allocate budgets for PDOWRAM and PDA.
- To avoid conflicts in the accuracy of farming plot sizes, the measurements conducted in the pilot project should be authorized. Consequently, it required asking the cooperation of the Ministry of Land Management, Urban Planning and Construction in the preparation of a land holding or cadastral map.

b) Lessons Learned

- When the JICA study team held meeting and trainings, it was important to call as many farmers as possible and inform them about the meetings and trainings at least a couple of days in advance. Especially, it was crucial to invite the highest possible number of farmers who were interested in the project during the first/kick-off meeting. . Preparing an easy-to-understand visual presentation showing the profits from the project was also important in attracting more farmers to participate in the project.

The other lessons learned were the same with the Irrigated Agriculture On-farm Technology Improvement Pilot Project in Zone-1.

D-5.2 Rainfed Agriculture Improvement Pilot Project

(1) Relevance

(a) Result of Evaluation

The relevance of the Rainfed Agriculture Improvement Pilot Project in Zone-4 was evaluated as “relatively high” due to the following reasons:

(b) Main Reasons and Causes

1) Consistency with the development policies of Cambodia

The Post-Second Socioeconomic Development Plan 2001 – 2005 prepared by the Ministry of Planning was the National Strategic Development Plan 2006 – 2010 approved by the Council of Minister meeting on 27 January 2006. This national development policy aims at the enhancement of the agricultural sector through the improvement of productivity and diversification of the agricultural sector. The Agricultural Development Plan, Long, Medium and Short Term 1999-2010 prepared by MAFF had not been revised.

2) Consistency with the development assistance policies of Japan

MOFA’s assistance strategy for Cambodia stated the importance of assistance for agricultural development and improvement of agricultural productivity in contributing to poverty reduction. JICA’s assistance strategy for Cambodia emphasized that JICA assist in the agricultural and rural development for economic growth and poverty reduction. It was also clearly mentioned that the assistance for agricultural and rural development should be concentrated on the improvement of agricultural productivity through the improvement of rice cultivation techniques.

3) Consistency with the needs of the Target Group

As the result of the participatory evaluation workshops, the questionnaire survey on non-participants, and the farmers’ acceptability survey, it can be said that the need for improving agricultural productivity through the improvement of irrigated agriculture on-farm technology was still high among the target group. However, some farmers hope for irrigated agriculture, although its introduction is impossible due to topographical and hydrological conditions.

Accordingly, the project purpose and the overall goal conformed to the development policies of Cambodia, the development assistance policies of Japan, and the needs of the target group even up to the period of the terminal evaluation.

(2) Effectiveness

(a) Result of Evaluation

The effectiveness of the Rainfed Agriculture Improvement Pilot Project in Zone-4 was evaluated as “high” due to the following reasons.

(b) Main Reasons and Causes

1) The relationship between the achievement of the project purpose and the degree of achievement of outputs

Around 90% of the target number of farmers had started to practice low input SRI with farmer-to-farmer extension (Output 1). Moreover, the yield with low input SRI had been higher than that with the traditional method. The yield of experimental plots had considerably exceeded that of the master plan (Output 2). Therefore, it can be said that the achievement of two intended outputs had contributed to the achievement of the project purpose: “Good model of rainfed agriculture improvement in Zone-4 is established.” (For more details, see (3) Possibility of Achieving Project Purpose and Overall Goal of D-3.2 Rainfed Agriculture Improvement Pilot Project in Zone-4.)

2) Contributing factors to the achievement of Project Purpose

Contributing factors to the achievement of the project purpose are as follows;

- The basic strategies of the pilot project implementation had been effective.
- The pilot project had used “good practices” in Cambodia through serially conducted study tours.
- Coordination among implementing agencies, the JICA study team, MAFF/ PDA, and NGO (CEDAC), had been smooth as a result of their effort.

(3) Efficiency

The efficiency of the Rainfed Agriculture Improvement Pilot Project in Zone-4 was evaluated as “high” due to the following reasons:

(b) Major Reasons and Causes

1) Achievement of outputs

See (2) Achievement of Outputs in D-3.2 Rainfed Agriculture Improvement Pilot Project in Zone-4.

2) The achievement of outputs through utilizing inputs

The situation was the same with the Irrigated Agriculture On-farm Technology Improvement Pilot Project in Zone-1 and Zone-3.

(4) Impact

(a) Result of Evaluation

The impact of the Rainfed Agriculture Improvement Pilot Project in Zone-4 was evaluated as “Positive impacts are observed.”

(b) Major Reasons and Causes

Based on the results of the participatory evaluation workshops and the questionnaire

survey on non-participants, the following positive impacts were observed;

- Agricultural productivity centering on rice had been improving in the target area.
- Living standards of the participant farmers in terms of income had become better than the period prior to the implementation of the pilot project.
- The participant farmers had started to cooperate with each other more through group activities in the pilot project.

Negative impacts on natural environment, gender, social strata had not been observed.

(5) Sustainability

(a) Result of Evaluation

The sustainability of the Rainfed Agriculture Improvement Pilot Project in Zone-4 was evaluated as “high” due to the following reasons:

(b) Main Reasons and Causes

The participant farmers had the strong will to continue the practice that they have learned from the pilot project. Since the low input SRI required the minimum inputs and simple techniques, it would be technically and financially acceptable for the other farmers. Moreover, this method did not have any gender-related constraints. Therefore, low input SRI could be easily acceptable for the other farmers after they had recognized its method and benefits visually and correctly. The package of low input SRI, ecological chicken raising, and saving groups could be also effective in Zone-4 where there was water resource constraint. Therefore, it was expected to maintain benefits gained by the pilot project after its completion.

(6) Conclusion

Relevance of the Rainfed Agriculture Improvement Pilot Project was evaluated as relatively high. The development policies of Cambodia and development assistance policies of Japan exactly accord with the components of the pilot project. However, the farmers in Zone-4 hoped for irrigated agriculture even with the existence of the topographical and hydrological constraints.

The basic strategies of the pilot project implementation determined by the JICA study team had been effective in implementing the pilot project smoothly.

Accordingly, it can be said that the Rainfed Agriculture Improvement Pilot Project and its model are sustainable and replicable.

(7) Recommendations and Lessons Learned

(a) Recommendations

The following recommendations can be proposed;

- To promote the sustainability of the pilot project requires explaining the topographical and hydrological constraints to farmers for promoting their involvement in the pilot project. It can be assumed that some non-participant farmers had expected irrigated agricultural development but then they had not participated in the pilot project. It was also important to make them understand the method and the expected results and benefits of low input SRI correctly in order to solve the anxiety and questions of its application and to allay their misunderstanding.

(b) Lessons Learned

- Learning from good farmers’ practice in the area with similar conditions within the country through the conduct of study tours and farmer-to-farmer extensions are

effective in convincing the farmers who were generally very conservative to try a new technique such as SRI.

- Provided inputs from outside should be minimum as well as supplied one from farmers for promoting sustainability.
- Package of low input SRI, ecological poultry, and organization of a saving group is effective in rainfed agriculture areas.

D-6 Recommendation

(a) Need of Strengthening of Budget Arrangement for Provincial Offices

The farmers' subsequent activity aiming at higher agricultural productivity still needs the support of provincial offices (PDOWRAM and PDA). The high crop yields obtained at the pilot projects could be continuously ensured by appropriate guidance of similar water management and farming practices provided by provincial offices. However, the provincial offices do not have enough budgets to provide such appropriate guidance for farmers. It is thus recommended that in view of the decentralization policy, the government should keenly consider this matter so as to realize and maintain the higher agricultural production effectively using the valuable experiences of water management and farming practices by farmers under the support of provincial offices.

(b) Need for Monitoring and Further Strengthening of FWUC Capability by Kampong Spue PDOWRAM

Through the participatory irrigation management and development activities at the pilot project, the Ou Veang FWUC could collect ISF with a high collection rate of 86%. In other words, this means that farmers who paid ISF highly expected the proper activities of Ou Veang FWUC. If the Ou Veang FWUC could not supply the irrigation water evenly and timely through proper maintenance of irrigation facilities, the farmers would never pay ISF again. In this sense, the next season is very important for the Ou Veang FWUC as well as the Kampong Spue PDOWRAM. Also, transparency in accounting is crucial for the collection of ISF. With these viewpoints, it is recommended that the Kampong Spue PDOWRAM should properly monitor the Ou Veang FWUC activities and strengthen its capability as required.

Tables

Table BI-4.1 Results of Yield Surveys: Zone I Verification Test (2006/2007)

Plot	Variety/ Treatment/ Planting Density	Planting Method (plants/hill)	Crop Cut Survey										Field Yield		Remarks
			Tiller No. per Hill	Panicle No. per Hill	Effective Tiller %	Panicle No. per m ²	% of Ripened Grains	Grain Weight per Panicle (g)	1000 Grain Weight (g)	Yield Range (ton/ha)	Average Yield/Ha (ton) 1/	Yield/Ha (ton) 2/			
Plot 1	Riang Chey (25 x 25cm)	2 - 3 plants 1 plant	9 8	9 8	97 97	138 124	80 79	3.5 4.5	22.5 26.8	4.1 ~ 5.0 5.0 ~ 5.1	4.5 5.0	3.9	- Inundation at tillering stage - Infested with stem borer		
	Riang Chey (25 x 25cm)	2 - 3 plants 1 plant	10 10	10 9	95 92	158 146	87 87	3.4 3.2	23.2 22.7	4.3 ~ 5.8 4.1 ~ 4.9	5.2 4.5	4.8			
Plot 3	Riang Chey (30 x 30cm)	2 - 3 plants 1 plant	11 11	11 11	98 95	124 118	86 87	3.5 4.2	22.4 22.7	3.6 ~ 4.6 4.5 ~ 4.9	4.1 4.7	3.9			
	Neang Meng (30 x 30cm)	2 - 3 plants 1 plant	10 10	9 9	92 93	104 108	74 80	3.4 3.0	18.9 18.6	3.1 ~ 3.5 2.8 ~ 3.1	3.3 3.0	3.2	- Inundation after transplanting - Infested with stem borer		
Plot 5	Sen Pidao (20 x 20cm)	2 - 3 plants 1 plant	10 11	9 9	91 76	236 215	81 86	2.0 2.3	26.0 25.9	3.7 ~ 5.2 3.9 ~ 5.3	4.4 4.6	4 3/	- Crop loss caused by rat serious		
	Sen Pidao (20 x 20cm)	2 - 3 plants 1 plant	10 9	10 8	96 92	240 189	83 79	2.1 2.2	26.9 26.0	4.1 ~ 5.0 3.9 ~ 4.2	4.6 4.0	4 3/	- Crop loss caused by rat		
Medium Variety Simple Trial 4/ Variety Trial	Phka Rumchang	2 - 3 plants	11	11	99	179	58	2.2	26.7	-	3.6	-	- Inundation just after transplanting		
	Phka Rumduol CAR 4	2 - 3 plants 2 - 3 plants	11 9	11 9	98 95	170 143	71 75	2.5 4.2	27.2 21.8	- -	3.9 5.6	3.8 3.2	- Excellent initial growth up to at around panicle initiation stage		
On-farm Water Management Seeding Rate	Riang Chey	2 - 3 plants	12	11	95	178	81	3.4	21.5	-	4.7	3.9	- After panicle initiation, damages caused by stem borer became		
	C. Intermittent V. Intermittent	2 - 3 plants 2 - 3 plants	12 13	10 12	84 86	165 185	86 78	3.0 3.3	23.5 20.8	- -	4.7 5.9	3.7 4.4			
Management Seeding Rate	C. Flooding	2 - 3 plants	11	10	89	160	75	3.2	22.0	-	5.1	3.2			
	25 g/m ² 40 g/m ²	1 plant 2 - 3 plants	11 12	10 11	88 92	152 179	80 78	3.3 3.4	23.4 21.6	- -	4.9 5.5	3.2 5.4			
Early Variety Simple Trial (implemented at Prey Pdao Experimental Station, MAFF) 4/ Variety Trial	60 g/m ²	2 - 3 plants	12	11	90	172	75	3.3	22.3	-	5.8	5.7			
	IR 66	2 - 3 plants	11	11	97	276	83	2.2	22.0	-	5.4	5.9	- Excellent growth throughout growth period		
On-farm Water Management Seeding Rate & Planting Density	Sen Pidao	2 - 3 plants	14	13	89	320	73	2.1	24.0	-	5.9	4.5			
	IR Kesar Chul Sar	2 - 3 plants 2 - 3 plants	10 13	9 12	93 88	222 296	71 72	2.7 2.0	25.0 23.0	- -	5.2 5.3	4.5 4.6			
Farmers Field	C. Intermittent V. Intermittent	2 - 3 plants 2 - 3 plants	15 15	13 14	92 94	336 346	82 78	1.7 1.9	24.0 22.0	- -	5.2 6.1	4.1 4.4			
	C. Flooding	2 - 3 plants	12	12	94	292	84	2.1	25.0	-	5.6	4.9			
Farmers Field	25 g/m ² 40 g/m ²	1 plant 2 - 3 plants	10 12	10 11	95 93	243 282	77 83	2.4 2.4	24.0 23.0	- -	5.5 6.1	4.9 5.1			
	40 g/m ²	2 - 3 plants	14	13	94	317	77	2	24.0	-	5.7	4.6			
Farmers Field	Riang Chey Per Hill	Per Hill	7.4	6.8	97	97		2.9			2.6		Poor field		
	Riang Chey Per Hill	Per Hill	7.2	6.9	96	157		3.2			4.7		Field of Plot 5 demonstrator		
	Riang Chey Per Hill	Per Hill	6.8	6.6	98	126		3.0			3.6		Field of Plot 2 & 3 demonstrator		

1/: Yield of a whole plot of 2-3 plants/hill 2/: Whole plot yield (having border effects in case of simple trial plot)

3/: Both plots suffered from rat attacks; estimated yield assuming that rat damages are kept at ordinal level

4/: Crop cut survey. Sampled at spot showing normal growth & indicating potential or reference yield

Table BII-4.1 Results of Yield Surveys: Zone 3 Verification Test (2006/2007)

Plot	Variety/ Treatment/ Planting Density (plants/hill)	Planting Method (plants/hill)	Crop Cut Survey							Field Yield		Remarks	
			Tiller No. per Hill	Panicle No. per Hill	Effective Tiller %	Panicle No. per m ²	% of Ripened Grains	Grain Weight per Panicle (g)	1000 Grain Weight (g)	Yield Range (ton/ha) 1/	Average Yield/Ha (ton) 1/		Yield/Ha (ton) 2/
Plot 1	Riang Chey (25 x 25cm)	2-3 plants 1 plant	9	9	96	144	85	3.1	24.0	3.0~4.7	4.1	3.2	- Growing well, but suffered from water shortage during growth
Plot 2	Chung Kong Mon	2-3 plants 1 plant	12	11	90	180	83	2.4	24.7	3.8~4.1	3.9	2.5	- Suffered from drought - Poor land leveling
Plot 3	Stov Krohorm (25 x 25cm)	2-3 plants 1 plant	11	10	96	165	75	1.9	19.1	2.9~3.2	3.0	3.2	- Growing well up to flowering, - Suffered from drought at maturing
Plot 4	Riang Chey (25 x 25cm)	2-3 plants 1 plant	11	11	94	168	63	2	18.8	-	3.1	0.7	- Nutritional disorder - Suffered from drought
Plot 5	Riang Chey (25 x 25cm)	2-3 plants 1 plant	9	9	97	139	69	2.0	19.7	2.3~3.3	2.7	1.6	- Suffered from drought
Medium Variety Simple Trial 3/ Variety Trial													
	Phka Rumchang	2-3 plants	12	12	99	187	74	2.3	25.3	-	3.9	2.9	- Good initial growth,
	Phka Rumduol	2-3 plants	11	10	90	164	57	1.5	24.4	-	2.4	2.3	- Suffered from water shortage during vegetative to flowering,
	Sen Pidao	2-3 plants	16	15	93	239	70	1.9	23.4	-	4.0	-	- Growth recovered at maturing stage
	C. Kong Mon	2-3 plants	10	9	94	147	84	3.1	30.7	-	4.3	3.4	
	Chna Prom	2-3 plants	14	12	91	196	82	2.2	17.7	-	4.1	3.4	
	Riang Chey	2-3 plants	10	10	99	165	82	2.5	22.3	-	3.7	-	
Planting Density (Riang Chey)	20 x 20 cm	2-3 plants	7	6	89	149	80	2.1	22.8	-	2.9	-	- Good initial growth,
Seeding Rate (Riang Chey)	25 x 25 cm	2-3 plants	10	10	99	165	82	2.5	22.3	-	3.7	-	- Suffered from water shortage during vegetative to flowering,
	30 x 30 cm	2-3 plants	15	15	94	162	87	2.7	22.2	-	4.0	-	- Growth recovered at maturing stage
	40 g/m ²	2-3 plants	9	8	97	134	78	3.0	19.1	-	3.7	-	
	60 g/m ²	2-3 plants	13	12	96	194	86	2.8	23.3	-	4.9	-	
Farmers Field	CAR 9	Per Hill	7.8	7.7	97	144					3.7		Field with normal growth

1/: Yield of a whole plot of 2-3 plants/hill

2/: Whole plot yield (having border effects in case of simple trial plot)

3/: Crop cut survey. Sampled at spot showing normal growth & indicating potential or reference yield

Table BIII-3.1 Results of Yield Surveys: Zone 4 Verification Test (2006/2007)

Plot	Variety/ Treatment/ Planting Density	Planting Method (plants/hill)	Crop Cut Survey								Field Yield		Remarks	
			Tiller No. per Hill	Panicle No. per Hill	Effective Tiller %	Panicle No. per m ²	% of Ripened Grains	Grain Weight per Panicle (g)	1000 Grain Weight (g)	Yield Range (ton/ha) 1/	Average Yield/Ha (ton) 1/	Yield/Ha (ton) 2/		
Plot 1	Chma Prom (25 x 25cm)	2 - 3 plants 1 plant	13	12	93	187	90	2.7	19.2	4.4 ~ 5.7	5.1	4.4		
Plot 2	Riang Chey (25 x 25cm)	2 - 3 plants 1 plant	12	11	93	183	89	2.8	18.4	4.8 ~ 5.1	4.9	3.7	Suffered from water shortage during growth	
Plot 3	Chma Prom (25 x 25cm)	2 - 3 plants 1 plant	10	10	95	154	83	2.7	24.3	4.0 ~ 4.3	4.1	3.9		
Plot 4	Chma Prom (25 x 25cm)	2 - 3 plants 1 plant	12	11	94	176	85	2.5	18.8	4.1 ~ 4.5	4.4	3.3	Suffered from water shortage during growth	
Plot 5	Riang Chey (25 x 25cm)	2 - 3 plants 1 plant	11	10	94	168	89	2.5	18.3	4.0 ~ 4.4	4.2	3.2	Suffered from water shortage during growth	
Medium Variety Simple Trial	Sen Pidao (Transplanting)	2 - 3 plants	15	13	89	209	80	1.7	20.8	2.8 ~ 3.3	3.0	2.4		
Variety Trial (Direct Sowing)	Phka Rumchang	2 - 3 plants	11	10	95	163	87	2.8	29.3	-	4.1	-	Suffered from water shortage during growth	
	Phka Rumduol	2 - 3 plants	11	10	96	162	94	3.3	28.2	-	4.9	-		
	C. Kong Mon	2 - 3 plants	9	8	93	129	89	2.9	28.1	-	3.3	-		
	Chma Prom	2 - 3 plants	13	12	91	195	86	1.6	17.4	-	3.0	2.9		
	Riang Chey	2 - 3 plants	11	9	90	151	85	1.7	23.3	-	2.5	2.2		
	Sen Pidao	per/m	289	-	84	243	-	-	-	-	-	2.8	-	- Excellent growth at vegetative phase;
	Phka Rumchang		155	-	97	151	-	-	-	-	-	3.4	-	- Growth rather poor from panicle formation to flowering;
	Phka Rumduol		161	-	100	161	-	-	-	-	-	3.4	-	- At maturing stage, growth recovered
	C. Kong Mon		172	-	92	158	-	-	-	-	-	2.5	-	
	Chma Prom		191	-	84	161	-	-	-	-	-	1.9	1.7	
Farmers Field	Chma Prom	Per Hill	8.5	7.6	97	151	-	2.1	2.1	-	2.9	2.1	Field of demonstrator Plot 1	
	Chma Prom	Per Hill	12.4	11.4	92	200	-	2.0	2.0	-	3.7	-	Field of demonstrator Plot 2	
	Riang Chey	Per Hill	6.2	5.8	94	129	-	2.5	2.5	-	2.9	-		

1/: Yield of a whole plot of 2-3 plants/hill

2/: Whole plot yield (having border effects in case of simple trial plot)

3/: Crop cut survey: Sampled at spot showing normal growth & indicating potential or reference yield

Table CI-4.1 Results of Yield Surveys: Zone 1 Verification Test (2007/2008)

Cropping Season/ Plot	Variety/ Planting Density	Planting Method (plants/hill)	Crop Cut Survey								Whole Plot Yield (ton/ha) 3/	Remarks	
			Tiller No. per Hill	Panicle No. per Hill	Effective Tiller %	Panicle No. per m2	% of Ripened Grains	Grain Weight per Panicle (g)	1000 Grain Weight (g)	Yield Range (ton/ha) 1/			Average Yield/Ha (ton/ha) 2/
Early Rainy Season													
Plot 1	IR 66 (20 x 25 cm)	2 plants	14.5	14.3	99	286	-	2.0	-	5.0 ~ 5.4	5.2	4.8	- Infested with Tungro - Uniform growth
Plot 2	IR 66 (20 x 25 cm)	2 plants	12.0	11.5	96	230	-	2.5	-	4.9 ~ 5.4	5.2	3.8	- Crab cut damage/ Tungro - Uneven growth
Plot 3	IR 66 (20 x 20 cm)	2 - 3 plants	11.9	11.8	99	295	-	1.7	-	4.4 ~ 4.5	4.5	4.7	- Infested with Tungro - Uniform growth
Plot 4	IR 66 (20 x 25 cm)	2 plants	12.8	12.7	99	254	-	2.2	-	4.5 ~ 5.8	5.0	4.2	- Infested with Tungro - Fairly uniform growth
Rainy Season													
Plot 1	Riang Chey (25 x 25 cm)	2 - 3 plants	11.4	11.1	98	178	-	3.1	-	4.5 ~ 5.3	4.8	3.7	- Uniform growth throughout a growing period
Plot 2	Sen Pidao (20 x 25 cm)	2 - 3 plants	12.6	12.1	96	241	-	2.2	-	4.7 ~ 4.8	4.7	3.4	- Crab cut damage substantial Uneven growth
Plot 3	Sen Pidao (20 x 25 cm)	2 - 3 plants	13.8	13.5	98	270	-	1.9	-	4.2 ~ 5.4	4.7	4.0	- Uniform growth throughout a growing period
Plot 4	Riang Chey (25 x 25 cm)	2 - 3 plants	9.5	9.2	97	147	-	3.4	-	4.2 ~ 4.5	4.4	3.1	- Crab cut damage substantial - Uneven growth
Plot 5	Riang Chey (25 x 25 cm)	2 - 3 plants	8.9	8.8	99	141	-	3.8	-	4.2 ~ 4.8	4.5	3.6	- Uniform growth throughout a growing period
Farmers Field 4/													
	Riang Chey	Random Planting								2.9			- Average field
	Riang Chey									2.6			- Average field
	Riang Chey									3.2			- Good field
	Average									2.9			Average of 3 fields

1/: Crop cut survey: 3 samples per plot; sampling site size 1 m2

2/: Average of 3 samples

3/: Whole plot yield

4/: 1 sample per plot; sampling site size 4 m2

Table CI-4.2 Results of Yield Surveys: Zone 1 Adaptability Test (2007/2008)

Plot	Treatment/ Planting Method	Planting Distance/ Variety	Crop Cut Survey 1/							Whole Plot Yield		Remarks		
			Tiller No. per Hill	Panicle No. per Hill	Effective Tiller %	Panicle No. per m ²	% of Ripened Grains	Grain Weight per Panicle (g)	Yield Range (ton/ha) 2/	Average Yield/Ha (ton/ha) 3/	Yield Range (ton/ha) 4/		Average Yield (ton/ha) 5/	
Medium Variety Trial 6/ Planting Method - Rieng Chey	1 plant/hill	25 x 25 cm	8.1	7.9	98	127	79	3.5	-	4.4	-	3.7	-	Uniform growth throughout a growing period
	2 plants/hill	25 x 25 cm	9.3	9.1	98	146	81	3.7	-	5.4	-	3.8	-	Slightly infested with stem borer
	3 plants/hill	25 x 25 cm	7.9	7.7	98	123	76	3.2	-	3.9	-	4.0	-	
	4 plants/hill	25 x 25 cm	9.7	9.1	94	145	82	3.0	-	4.3	-	3.8	-	
	5 plants/hill	25 x 25 cm	10.5	9.9	95	159	77	3.0	-	4.8	-	3.9	-	
- Sen Pdao	1 plant/hill	25 x 25 cm	11.1	10.8	97	172	87	1.8	-	3.1	-	-	-	Uniform growth throughout a growing period
	2 plants/hill	25 x 25 cm	11.7	11.4	97	182	87	1.5	-	2.7	-	-	-	Seriously attacked by rats
	3 plants/hill	25 x 25 cm	10.4	9.9	95	158	91	1.6	-	2.5	-	-	-	
	4 plants/hill	25 x 25 cm	11.7	11.4	97	182	80	1.3	-	2.4	-	-	-	
	5 plants/hill	25 x 25 cm	11.9	11.8	99	189	81	1.3	-	2.4	-	-	-	
On-farm Water Management Fertilization 6/	C. Intermittent	25 x 25 cm	10.8	10.6	98	113	78	3.3	4.8 ~ 5.4	5.1	4.1 ~ 4.5	4.3	-	Uniform growth throughout a growing period
	V. Intermittent	25 x 25 cm	9.6	8.8	92	142	80	3.3	3.9 ~ 4.8	4.3	3.9 ~ 4.0	4.0	-	Slightly infested with stem borer
	C. Flooding	25 x 25 cm	10.6	10.2	96	163	78	3.3	4.6 ~ 5.0	4.9	3.8 ~ 4.1	3.9	-	Uniform growth throughout
	Manure 10 ton/ha	25 x 25 cm	9.8	9.4	96	151	79	3.4	4.5 ~ 4.8	4.6	4.0 ~ 4.3	4.2	-	Uniform growth throughout a growing period
	Manure 5.0 ton/ha	25 x 25 cm	8.9	8.4	94	135	81	3.4	4.0 ~ 4.3	4.2	3.6 ~ 4.1	3.8	-	Slightly infested with stem borer
Early Variety Trial (implemented at Prey Pdao Experimental Station, MAFF)	Manure 2.5 ton/ha	25 x 25 cm	9.5	9.0	95	145	82	3.4	4.1 ~ 4.8	4.5	4.0 ~ 4.5	4.3	-	Uniform growth throughout a growing period
	Manure 0 ton/ha	25 x 25 cm	9.6	9.0	93	144	80	3.4	4.3 ~ 5.0	4.6	4.2 ~ 4.4	4.3	-	Slightly infested with stem borer
	Regular Planting	IR 66		9.7							4.7 ~ 4.8	4.7	-	Uniform growth throughout a growing period
	Random Planting	IR 66		9.9							4.1 ~ 4.8	4.5	-	Uniform growth throughout a growing period
	Seeding Broadcasting	IR 66		8.1							4.1 ~ 4.4	4.3	-	Uniform growth throughout a growing period
Direct Sowing	IR 66		3.8							4.1 ~ 4.9	4.5	-	Uniform growth throughout a growing period	

1/: Crop cut survey yield; sampling 1m x 1 m
 2/: Yield range of plural samples
 3/: Average of 3 samples or yield of 1 sample
 4/: Whole plot yield (having border effects); yield range of plural sub-plots
 5/: Whole plot yield; average of plural plots or single plot yield (having border effects)
 6/: Treatments: Manure 10 ton/ha + 0 fertilizer; manure 5 ton/ha + 0 fertilizer; manure 2.5 ton/ha + 1/2 fertilizer; manure 0 ton/ha + fertilizer

Table CII-4.1 Results of Yield Surveys: Zone 3 Verification Test (2007/2008)

Plot	Variety/ Treatment/ Planting Density	Planting Method (plants/hill)	Crop Cut Survey 1/						Whole Plot Yield (ton/ha) 4/	Remarks		
			Tiller No. per Hill	Panicle No. per Hill	Effective Tiller %	Panicle No. per m ²	% of Ripened Grains	Grain Weight per Panicle (g)			Yield Range (ton/ha) 2/	Average Yield/Ha (ton/ha) 3/
Plot 1	Riang Chey (25 x 25cm)	3 plants	10.2	9.8	96	157	-	2.6	2.9 ~ 4.5	3.5	2.8	- Suffered from drought - Poor land leveling
Plot 2	Riang Chey (25 x 25cm)	3 plants	10.0	9.8	98	157	-	3.5	4.7 ~ 5.0	4.8	3.0	- Growing well, but infested with neck blast & planthopper after heading
Plot 3	Riang Chey (25 x 25cm)	3 plants	9.5	9.4	98	150	-	3.3	3.8 ~ 4.7	4.2	3.1	- Suffered from drought - Poor land leveling
Plot 4	Chung Kong Mon	3 plants	8.6	8.3	97	133	-	3.6	3.9 ~ 4.8	4.2	3.1	- Growing well, but suffered from water shortage during growth period
Adaptability Test 5/												
Variety Trial	Phka Rumchak	3 plants	8.1	8.0	98	128	85	2.7	-	3.4	-	- Growing well, but infested with neck blast & planthopper after heading
	Phka Rumduol	3 plants	9.4	8.9	95	143	77	2.9	-	4.1	-	-
	Sen Pidao	3 plants	14.5	14.4	100	231	77	1.9	-	4.5	-	-
	Riang Chey	3 plants	10.1	9.8	97	156	84	3.0	-	4.6	-	-
	C. Kong Mon	3 plants	9.4	9.1	97	146	74	2.8	-	4.0	-	-
Planting Density	Nieng Om	3 plants	9.9	9.9	100	158	86	3.0	-	4.7	-	-
	20 x 20 cm	3 plants	6.4	6.3	99	157	77	2.2	-	3.5	-	- Growing well, but infested with neck blast & planthopper after heading
	25 x 25 cm	3 plants	10.3	9.7	95	155	78	2.3	-	3.6	-	-
	30 x 30 cm	3 plants	11.1	10.8	97	119	77	2.7	-	3.2	-	-
	1 plant/hill	25 x 25 cm	9.3	9.2	99	147	75	2.7	-	3.9	-	- Growing well, but infested with neck blast & planthopper after heading
Method (Riang Chey)	2 plants/hill	25 x 25 cm	7.9	7.6	96	122	86	2.6	-	3.2	-	-
	3 plants/hill	25 x 25 cm	9.8	9.3	94	148	83	2.5	-	3.7	-	-
	4 plants/hill	25 x 25 cm	9.3	8.9	95	142	81	2.6	-	3.7	-	-
	5 plants/hill	25 x 25 cm	9.9	9.1	91	145	75	2.5	-	3.6	-	-
	Direct Sowing (Phka Rumduol)	Line planting 25 cm	182	160	88	-	-	1.8	-	3.9	-	- Suffered from inundation & drought - Sampling at good growth
Farmers Field 6/	C. Kong Mon	Random Planting	5.6	5.4	97	126	-	1.6	-	2.0	-	- Average field
	C. Kong Mon		5.1	4.7	93	126	-	2.2	-	2.7	-	- Good field
	C. Kong Mon		4.8	4.6	95	119	-	1.8	-	2.1	-	- Average field
	Average		5.1	4.9	95	123	-	1.9	-	2.3	-	- Average of 3 fields

1/: Crop cut survey yield; verification & adaptability test field; sampling 1m x 1 m; farmers field: 2m x 2m 3/: Average of 3 samples or yield of 1 sample

4: Whole verification plot yield 5/: Samples taken at spot showing normal growth & indicating potential yield 6/: 1 sample per plot; sampling site size 4 m²

Table D-2.1 Evaluation Grid of Terminal Evaluation for “Irrigated Agriculture On-farm Technology Improvement Pilot Project in Zone - 1”

Achievement of the Project	Evaluation Question		Judgmental Standard	Required Data	Data Source	Data Collection Method
	Normative Question	Descriptive Question				
(1) Achievement of Inputs	How (when and by what means) were the Inputs used?	How (timing, place, quantity, quality) has JICA invested the Inputs? <ul style="list-style-type: none"> Personnel Materials/ equipment, facilities Running cost How (timing, place, quantity, quality) has Cambodia (MOWRAM/ PDWORAM, MAFF/ PDA) invested the Inputs? <ul style="list-style-type: none"> Personnel Materials/ equipment, facilities Running cost 	How much have the plan (PDMe) and implementation accorded with? (Comparison with the plan and the current achievement) If they have not accorded each other, why haven't? What are the constraints?	Performance of the Japanese Experts in the JICA Study Team <ul style="list-style-type: none"> Installed materials, equipment and facilities Record of expenditure on the Pilot Project in Zone-1. Opinions of the parties concerned 	Accounting book of running cost Activity report Monthly report submitted to JICA Interim Report Volume - IV Pilot Projects MOWRAM/ PDWORAM, MAFF/ PDA, the JICA Study Team Experts	Literature survey/ review Interview (Hearing)
(2) Degree to the achievement of Project Purpose	How much degree to the achievement of the Project Purpose's indicator intended in the PDMe been achieved?	1) Is the model of on-farm irrigated improvement in Zone-1 applicable for MOWRAM/ PDWORAM and MAFF/ PDA? 2) Are 80% of the participated farmers satisfied with the implementation of the pilot project?	How much have the plan (PDMe) and achievement accorded with? (Comparison with the plan and the current achievement) If they have not accorded each other, why haven't? What are the constraints?	1) Comments of the counterparts at central and provincial level Comments of the JICA Study Team Experts 2) Comments/Sentiments of the participated farmers Comments and observation of the JICA Study Team Experts	1) Counterparts of MOWRAM/ PDWORAM and MAFF/ PDA Activity report Monthly report submitted to JICA Interim Report Volume - IV Pilot Projects 2) Participated farmers Activity report Monthly report submitted to JICA Interim Report Volume - IV Pilot Projects	1) Interview (Hearing) on the counterparts Literature survey/ review 2) Participatory Workshops Literature survey/ review
(3) Achievement of Outputs	Have the Indicators of Outputs intended in the PDMe been achieved? How likely will the Indicators of Outputs intended in the PDMe be achieved?	<Output 1> Indicator 1-1: Have irrigation water been distributed based on the actual water demand by a model FWUC (Ou Veang FWUC) by February 2008? <Output 2> Indicator 2-1: Have totally 50 farmers in the model villages applied ecological SRI through farmer-to farmer extension by February 2008? <Output 3> Indicator 3-1: Have yield of improved farming practices in experimental plots is higher than the target yields of the Master Plan?	How much have the plan (PDMe) and achievement accorded with? (Comparison with the plan and the current achievement) If they have not accorded each other, why haven't? What are the constraints?	<Output 1> Comments of the participated farmers concerning on the model FWUC (Ou Veang FWUC) Comments and observation of the JICA Study Team Experts <Output 2> No. of farmers who applied ecological SRI through farmer-to-farmer extension <Output 3> Yield of improved farming practice in experimental plots (and the target yields of the Master Plan)	<Output 1> Participated farmers concerning on the model FWUC (Ou Veang FWUC) The JICA Study Team Experts Activity report Monthly report submitted to JICA Interim Report Volume - IV Pilot Projects <Output 2> Activity report Monthly report submitted to JICA Interim Report Volume - IV Pilot Projects <Output 3> Activity report Monthly report submitted to JICA	<Output 1> Record of water distribution Literature survey/ review Interview (Hearing) on the model FWUC (Ou Veang FWUC) Participatory Workshop Evaluation <Output 2> Literature survey/ review <Output 3> Literature survey/ review

2. Management System & Process: Smooth implementation of the Activities/ Analysis of the status during implementation process, constraints & contributing factors related to the implementation process

Management System & Process	Evaluation Question		Judgmental Standard	Required data	Data Source	Data Collection Method
	Normative Question	Descriptive Question				
(1) Implementation of the Activities	Have “Activities” in PDMe been implemented according to the schedule under the person in charge and implementers in PO?	<1-1> Have MOWRAM/ PDOWRA, the JICA Study Team and the model FWUC (Ou Veang FWUC) prepared the preliminary landholding map? <1-2>	How much have the plan (PDMe) and achievement accorded with? (Comparison with the PO) If they have not accorded each other, why haven't? What are the constraints?	<Activities 1-1 ~ 1-11> Plan of Operation Achievement of the Activities Comments and observation of MOWRAM/ PDOWRAM, the JICA Study Team Experts	<Activities 1-1 ~ 1-11> Plan of Operation Activity report Monthly report submitted to JICA Interim Report Volume - IV	<Activities 1-1 ~ 1-11> Literature survey/ review Interview (Hearing) Participatory Workshop Evaluation

	<p>Have MOWRAM/ PDOWRA and the JICA Study Team prepared water use maps? <1-3> Have MOWRAM/ PDOWRA and the JICA Study Team taken some measures to minimize water loss? <1-4> Have MOWRAM/ PDOWRA and the JICA Study Team established FWUC sub-groups? <1-5> Have MOWRAM/ PDOWRA and the JICA Study Team educated the FWUC on proper water use? <1-6> Have MOWRAM/ PDOWRA, the JICA Study Team, and the FWUC prepared irrigation service plan? <1-7> Have on-farm irrigation facilities been constructed as schedule? <1-8> Have watercourses been constructed as schedule? <1-9></p> <ul style="list-style-type: none"> • Have any training courses been conducted for improving the FWUC's administration? • Through the training courses, has the FWUC's administration been improved? <p><1-10> Has the FWUC meeting building been constructed as schedule? <1-11> Has the FWUC been trained on water management?</p> <p><2-1> Have the JICA Study Team and CEDAC organized the Study Tours? <2-2> Have the JICA Study Team and CEDAC conducted village trainings? <2-3> Have the JICA Study Team and CEDAC carried out inter-village trainings? <2-4> Have the JICA Study Team and CEDAC held "Farmers' Field Days"?</p> <p><3-1> Have the JICA Study Team and MAFF/ PDA conducted verification test to confirm effectiveness of SRI based improved farming practice? <3-2> Have the JICA Study Team and MAFF/ PDA conducted small scale adaptability trials for further improvement of the farming practice? <3-3> Have the JICA Study Team and</p>		<ul style="list-style-type: none"> • Comments and observation of the participated farmers including the members of the FWUC and FWUGs 	<ul style="list-style-type: none"> • Pilot Projects MOWRAM/ PDOWRA, the JICA Study Team Experts Participated farmers including the members of the FWUC and FWUGs 	<ul style="list-style-type: none"> • <Activities 2-1 ~ 2-3> Plan of Operation • Activity report • Monthly report submitted to JICA • Interim Report Volume -IV Pilot Projects the JICA Study Team Experts and CEDAC Participated farmers • <Activities 3-1 ~ 3-2> Plan of Operation 	<ul style="list-style-type: none"> • <Activities 2-1 ~ 2-3> Literature survey/ review • Interview (Hearing) • Participatory Workshop • Evaluation
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		<p>MAFF/ PDA conducted farmers' acceptability To conduct for confirming the possibility to introduce the improved farming practices by seeing the results of the first year from technical and economical viewpoints?</p>	<p>1) Has the coordination among the JICA Study Team, MOWRAM/ PDOWRAM, and MAFF/ PDA and CEDAC been going well? Could they have shared the information on the pilot project in Zone-1?</p> <p>2) Is the monitoring report summarized according to the methods of "data collection" and "data aggregation" in the prepared monitoring system? Is this monitoring report shared among the stakeholders?</p>	<p>How much have the plan (the monitoring system) and achievement accorded with? (Comparison with the prepared monitoring system) If they have not accorded each other, why haven't? What are the constraints?</p>	<p>1) Times, frequency, and contents of the meeting and communication between the JICA Study Team and MOWRAM/ PDOWRAM, or MAFF/ PDA or CEDAC</p> <p>Opinions of the parties concerned</p> <p>2) Results of monitoring Opinions of the parties concerned</p>	<p>1) Times, frequency, and contents of the meeting and communication between the JICA Study Team and MOWRAM/ PDOWRAM, or MAFF/ PDA or CEDAC</p> <p>Opinions of the parties concerned</p> <p>2) Results of monitoring Opinions of the parties concerned</p>	<p>Activity report submitted to JICA</p> <p>Monthly report submitted to JICA</p> <p>Interim Report Volume - IV Pilot Projects</p> <p>the JICA Study Team Experts and MAFF/PDA</p>	<p><Activities 3-1 ~ 3-2></p> <ul style="list-style-type: none"> Literature survey/ review Interview (Hearing)
(2) Management System/ Monitoring System		<p>1) Has the management system of the JICA Study Team, MOWRAM/ PDOWRAM, and MAFF/ PDA and CEDAC been functioning properly?</p> <p>2) Has the monitoring been conducted according with the monitoring system agreed among the JICA Study Team, MOWRAM/ PDOWRAM, and MAFF/ PDA?</p>						<ul style="list-style-type: none"> Literature survey/ review Interview (Hearing)
(3) Assignment of the counterpart personnel		<p>Have the counterpart personnel assigned as the JICA Study Team requested?</p>		<p>Comparison with the request of the JICA Study Team and the actual assignment of the counterparts</p>	<p>Contents of the request of the JICA Study Team to MOWRAM and MAFF</p> <p>Information of the counterparts such as their names, departments, and expertise</p> <p>Opinions of the parties concerned</p>	<p>Request form the JICA Team to MOWRAM and MAFF</p> <p>Member list of the counterparts</p> <p>The counterparts, the JICA Study Team Experts</p>		<ul style="list-style-type: none"> Literature survey/ review Interview (Hearing)
(4) Understanding of the superordinate agencies concerned on the project		<p>Have MOWRAM, MAFF and JICA Cambodia Office intended to grasp the status and problems of the pilot project in Zone-1 and to deal with them?</p>	<p>1) Have MOWRAM, MAFF and JICA Cambodia Office grasped the status and problems of the pilot project in Zone-1 well?</p> <p>2) Have MOWRAM, MAFF and JICA Cambodia Office intended to establish and execute the handling policies against the problems?</p>	<p>1) Degree of MOWRAM, MAFF and JICA Cambodia Office's understanding the status and the problems of the pilot project in Zone-1</p> <p>2) Appropriateness of the handling policies</p>	<p>Opinions of the parties concerned</p> <p>Ideas of the handling policies</p>	<p>Persons in charge in MOWRAM, MAFF, and JICA Cambodia Office</p> <p>The handling policies (summary of the present status and challenges/ problems of the pilot project in Zone-1 and the handling policies/ the contents of the survey)</p>		<ul style="list-style-type: none"> Literature survey/ review Interview (Hearing)

3. Five Evaluation Criteria

Five Evaluation Criteria	Evaluation Question		Judgmental Standard	Required data	Data Source	Data Collection Method
	Normative Question	Descriptive Question				
(1) Relevance	Do Project Purpose (Good model of on-farm irrigated agriculture improvement in Zone-1 established.) and Overall Goal (Agricultural productivity centering on rice is improved in the target area.) accord with the national development policies of Cambodia?	Are Project Purpose and Overall Goal consistent with Second Socioeconomic Development Plan 2001 – 2005; “Economic Growth and Poverty Reduction” and policies of MOWRAM; Strategic Development Plan for Water Sector 2006-2010; “Better Water Management of Irrigated and Rainfed Croplands by development of Hardware and Software in a Complementary Way” and MAFF; Agricultural development Plan, Long, Medium and Short Term 1999-2010; “Ensuring of food security, poverty alleviation and job creation by increasing rice cultivated area”?		<ul style="list-style-type: none"> PDMs of the pilot project in Zone-1 Relation with the components of the pilot project in Zone-1 and each Cambodian national development policy Contents of Second Socioeconomic Development Plan 2001 – 2005 Contents of Strategic Development Plan for Water Sector 2006-2010 and Agricultural development Plan, Long, Medium and Short Term 1999-2010 	<ul style="list-style-type: none"> PDMs of the pilot project in Zone-1 Counterparts, the JICA Study Team Experts 	<ul style="list-style-type: none"> Literature survey/ review Interview (Hearing)
	Does the direction aimed by the pilot project consistent with MOFA's Assistance Strategy for Cambodia and JICA's Project Implementation Strategy for Cambodia?			<ul style="list-style-type: none"> Contents of MOFA's Assistance Strategy for Cambodia Contents of JICA's Project Implementation Strategy for Cambodia 	<ul style="list-style-type: none"> MOFA's Assistance Strategy for Cambodia JICA's Project Implementation Strategy for Cambodia 	Literature survey/ review
(2) Effectiveness	Was the selection of the Target group relevant?	Did the contents of the pilot project in Zone-1 accord with the needs of the target area?		<ul style="list-style-type: none"> Results of the baseline surveys; Socio-economic questionnaire survey, RRA workshops Comments of the both participated and non-participated farmers in Zone-1 pilot project area 	<ul style="list-style-type: none"> Activity report Monthly report submitted to JICA Interim Report Volume – IV Pilot Projects The other relevant reports prepared by the Study Team and participated non-participated farmers 	<ul style="list-style-type: none"> Literature survey/ review (Hearing, questionnaire survey on non-participated farmers) Participatory Evaluation Workshop
		Did farmers in Zone-1 pilot project area have the needs of water distribution based on actual water distribution?				
		Did farmers in Zone-1 pilot project area have the needs of ecological SRI extension?				
(2) Effectiveness	Is the Project Purpose going to be achieved by the end of the project period?	Is the good model of on-farm irrigated agriculture improvement in Zone-1 going to be established by February 2008?		<ul style="list-style-type: none"> Opinions of the JICA Study Team Experts and counterparts 	<ul style="list-style-type: none"> the JICA Study Team and counterparts 	<ul style="list-style-type: none"> Interview (Hearing)

<p>Have Output 1, Output2, and Output3 been the contributors to achieve the Project Purpose? Are the Outputs sufficient to achieve Project Purpose?</p>	<p>Have irrigation water distribution based on the actual demand, farmer-to-farmer extension of ecological SRI, and confirmation of the target yield in the Master Plan contributed to the establishment of the applicable model for Zone-1?</p>	<p>Has the logic (Means – Ends) intended in the PDMe been effective? If it has not been effective, why not? Were there any problems with the project formulation? Have the Outputs intended in the PDMe been effectively achieved? If they have been not achieved, what have been the constraints?</p>	<p>Observation and comments of the JICA Study Team and counterparts</p>	<p>Activity report submitted to JICA Interim Report Volume – IV Pilot Projects</p>	<p>Literature survey/ review Interview (Hearing) Participatory Workshop Evaluation</p>
<p>Have external condition such as Important Assumptions been contributing/ constraining to achieve the Project Purpose?</p>	<p>Has the responsibility of each stakeholder in water management is changed within the project period? Has severe natural disaster hit the pilot project area in Zone-1? Has drought/ less precipitation occurred in the pilot project area in Zone-1? Has selected agricultural technique, ecological SRI been applicable for farmers from the viewpoint of economy, society, and culture? Are there any social/ cultural constraints against communal works such as irrigation management? (Concerning on the history of forced communal works) Are there any other unexpected contributing/ constraining conditions that may have affected the achievement of Outputs and Project Purpose?</p>	<p>Data on demarcation on water management before and during the project period Record of natural disaster Record of precipitation Comments of participated and non-participated farmers Comments of participated and non-participated farmers Comments of participated and non-participated farmers Comments and observation of the JICA Study Team</p>	<p>Royal Decree NS/ RKT/ 0701/234 Activity report submitted to JICA Interim Report Volume – IV Pilot Projects Participated non-participated farmers and Participated non-participated farmers and Participated non-participated farmers and Interim Report Volume – IV Pilot Projects</p>	<p>Literature survey/ review Participatory Workshop Interview (questionnaire survey on non-participated farmers) Participatory Workshop Interview (questionnaire survey on non-participated farmers) Literature survey/ review Participatory Workshop Evaluation</p>	<p>Literature survey/ review Interview (Hearing) Participatory Workshop Evaluation</p>
<p>Five Evaluation Criteria (3) Efficiency (See the parts of the Inputs and Outputs in “Achievement of the Project”)</p>	<p>Normative Question Were quality, quantity, and timing, and method of Inputs appropriate to achieve the Outputs and conduct Activities as intended in the PDMe and Plan of Operation?</p>	<p>Judgmental Standard How much have the plan (PDMe) and implementation accorded with? (Comparison with the plan and the current achievement) If they have not accorded each other, why haven't? What are the constraints/ reasons/ causes?</p>	<p>Required data Dispatch record of the experts Record of the provided materials and equipment Book of running cost Opinions of the parties concerned</p>	<p>Data Source Plan of Operation Activity report submitted to JICA Interim Report Volume – IV Pilot Projects the JICA Study Team, PDOWRAM, MAFF/ PDA</p>	<p>Data Collection Method Literature survey/ review Interview (Hearing)</p>
<p>Were there any non-utilized/ unfruitful Inputs? Was there lack of any Inputs?</p>	<p>Descriptive Question Were the provided materials/ equipment utilized to achieve the Outputs according to the intended purpose in the PDMe? Were they utilized not to achieve the Outputs? Were there any non-utilized/ unfruitful Inputs? Was there lack of any Inputs?</p>	<p>Were there any other unexpected contributing/ constraining conditions that may have affected the achievement of Outputs and Project Purpose?</p>	<p>Comments of participated and non-participated farmers Comments and observation of the JICA Study Team</p>	<p>Participated non-participated farmers and Activity report submitted to JICA Interim Report Volume – IV Pilot Projects</p>	<p>Literature survey/ review Participatory Workshop Interview (questionnaire survey on non-participated farmers) Literature survey/ review Participatory Workshop Evaluation</p>

	<p>Have the intended Outputs been achieved? (To what degree have the intended Outputs been achieved?)</p> <p>Were sufficient Activities timely implemented to achieve Outputs?</p>	<p>Were there any other means available for achieving the same Outputs at lower cost and smaller Inputs?</p> <p><Output 1> Indicator 1-1: Has the model FWUC (Ou Veang FWUC) distributed irrigation water based on the actual water demand of farmers?</p> <p><Output 2> Has ecological SRI been disseminated by farmer-to-farmer extension?</p> <p>Indicator 2-1: Have 50 farmers in the model villages applied ecological SRI through farmer-to-farmer extension by February 2008?</p> <p><Output 3> Has the target yield of the Master Plan been confirmed to be achieved by applying SRI based on improving farming practices?</p> <p>Indicator 3-1: Is the yield of improved farming practices in experimental plots higher than the target yields of the Master Plan?</p>	<p>Analysis of/ Comparison with the alternatives</p> <p>(For Output 1)</p> <p>(For Output 2)</p> <p>(For Output 3)</p>	<ul style="list-style-type: none"> Opinions of the parties concerned Actual results of water distribution Comments of participated farmers and the model FWUC (Ou Veang FWUC) Cultivated land size of ecological SRI Record of farmer-to-farmer extension Comments of participated and non-participated farmers Cultivated land size of ecological SRI Record of farmer-to-farmer extension Crop yield 	<ul style="list-style-type: none"> the JICA Study Team, MOWRAM/ PDOWRAM, MAFF/ PDA Record of water distribution Participated farmers and the model FWUC (Ou Veang FWUC) Activity report Monthly report submitted to JICA Interim Report Volume - IV Pilot Projects Participated and non-participated farmers Activity report Monthly report submitted to JICA Interim Report Volume - IV Pilot Projects The Master Plan Reports of the similar projects Opinions of the JICA Study Team Experts and counterparts of MOWRAM/ PDOWRAM and MAFF/ PDA Activity report Monthly report submitted to JICA Interim Report Volume - IV Pilot Projects Opinions of the JICA Study Team 	<ul style="list-style-type: none"> Interview (Hearing) Literature survey/ review Interview (Hearing) Participatory Evaluation Workshop Literature survey/ review Interview (Hearing) questionnaire survey on no-participated farmers) Participatory Evaluation Workshop Literature survey/ review Interview (Hearing) Monthly report submitted to JICA Interim Report Volume - IV Pilot Projects Participated and non-participated farmers Activity report Monthly report submitted to JICA Interim Report Volume - IV Pilot Projects The Master Plan Reports of the similar projects Opinions of the JICA Study Team Experts and counterparts of MOWRAM/ PDOWRAM and MAFF/ PDA Activity report Monthly report submitted to JICA Interim Report Volume - IV Pilot Projects Opinions of the JICA Study Team Interview (Hearing)
<p>Five Evaluation Criteria</p> <p>(4) Impact</p>	<p>Normative Question</p> <p>To what extent is the Overall Goal, <u>Agricultural productivity centering on rice</u> improved in the target area, likely to be attained as the positive impact of the Pilot Project?</p> <p>Will the achievement of the Overall Goal be able to be examined in the Ex-post Evaluation?</p>	<p>Evaluation Question</p> <p>Descriptive Question</p>	<p>Judgmental Standard</p> <p>Comparing the situation before and after the implementation of the Pilot Project in Zone-1</p>	<p>Required data</p> <ul style="list-style-type: none"> Average productivity of rice before and after the project implementation Opinions of the JICA Study Team Experts and counterparts 	<p>Data Source</p> <ul style="list-style-type: none"> Baseline survey report Activity report Monthly report submitted to JICA Interim Report Volume - IV Pilot Projects the JICA Study Team and counterparts 	<p>Data Collection Method</p> <ul style="list-style-type: none"> Literature survey/ review Interview (Hearing)

	<p>Are there any constraints to achieve the Overall Goal?</p>		<ul style="list-style-type: none"> Positive changes observed after the project implementation Observation of participated and non-participated farmers and the JICA Study Team Experts Fact relevance, causes, and solutions of the conflicts Observation of participated and non-participated farmers and the JICA Study Team Experts Natural environment before and after the projects' implementation (ex. water pollution, land deterioration) Opinions of the parties concerned Observation/ opinions of participated and non-participated farmers and the JICA Study Team Experts 	<ul style="list-style-type: none"> Activity report submitted to JICA Interim Report Volume - IV Pilot Projects Participated and non-participated farmers, and the JICA Study Team Experts Participated and non-participated farmers, the JICA Study Team Experts, counterparts Participated and non-participated farmers, the JICA Study Team Experts Participated and non-participated farmers, the JICA Study Team Experts, counterparts Participated and non-participated farmers, the JICA Study Team Experts Participated and non-participated farmers, the JICA Study Team Experts 	<ul style="list-style-type: none"> Literature survey/ review Interview questionnaire survey on non-participated farmers Participatory Evaluation Workshop Interview questionnaire survey Participatory Evaluation Workshop Interview questionnaire survey Participatory Evaluation Workshop Interview questionnaire survey Participatory Evaluation Workshop Interview questionnaire survey Participatory Evaluation Workshop
<p>What positive changes other than the Overall Goal has the Pilot Project in Zone-1 brought about?</p>					
<p>What negative changes have the Pilot Project in Zone-1 brought about?</p>	<p>Has the water conflict among the farmers aggravated after the project implementation?</p> <p>Has the income gap drastically increased between rich and poor farmers/ between the participated and non-participated farmers due to the project implementation?</p> <p>Has the environmental degradation stated to be observed in the Zone-1 pilot project area due to the project implementation?</p> <p>Have different impacts by gender or social strata (between rich and poor farmers) been appeared?</p>				

Five Evaluation Criteria	Evaluation Question		Judgmental Standard	Required data	Data Source	Data Collection Method
<p>(5) Sustainability Are the benefits gained through the pilot project in Zone-1 maintained after its completion?</p>	<p>Normative Question <Policies and institutions> Will the supportive policies of the pilot project in Zone-1 be sustained?</p>	<p>Descriptive Question Will the policies of MOWRAM for PIMD be continued?</p> <p>Will the national policies of economic growth and poverty reduction be unchanged?</p> <p>Will the model FWUC (Ou Veang FWUC) be able to continue distributing irrigation water based on the actual demand after the completion of the project?</p> <p>Will collected Irrigation Service Fee be utilized for O&M in a transparent manner?</p> <p>Will farmers be able to extend ecological SRI after the completion of the project?</p>		<ul style="list-style-type: none"> Current policies on irrigation management and development Current national policies on economic growth and poverty reduction Capacity and motivation of the model FWUC (Ou Veang FWUC) Capacity and motivation of the participated farmers 	<ul style="list-style-type: none"> MOWRAM National Development Plan 2006-2010 Model FWUC (Ou Veang FWUC), the JICA Study Team, MOWRAM/ PDOWRAM Participated farmers the JICA Study Team, CEDAC 	<ul style="list-style-type: none"> Interview (Hearing) Literature survey/ review Participatory Workshop Participatory Evaluation Workshop Interview (Hearing) Participatory Workshop

	<p>Will the farmers be able to get the target yield achieved by applying SRI based improved farming practices after the completion of the project?</p>		<ul style="list-style-type: none"> • Farmers' comments on the acceptability of the SRI based improved farming technique 	<ul style="list-style-type: none"> • Capacity and motivation of MOWRAM/ PDOWRAM, MAFF/PDA and CEDAC • Financial source for applying the established model of on-farm irrigated agricultural improvement in Zone-1 	<ul style="list-style-type: none"> • Demonstrating and group farmers 	<ul style="list-style-type: none"> • Farmers' Acceptability Survey
<p>Will MOWRAM/ PDOWRAM, MAFF/PDA and/ or CEDAC be able to assist the model FWUC (Ou Veang FWUC) and/ or the participated farmers?</p>	<ul style="list-style-type: none"> • Opinions, capacity and motivation of the participated and non-participated farmers • Observation of the JICA Study Team, CEDAC, MOWRAM/ PDOWRAM, MAFF/PDA 	<ul style="list-style-type: none"> • Participated and non-participated farmers • the JICA Study Team, CEDAC, MOWRAM/ PDOWRAM, MAFF/PDA 	<ul style="list-style-type: none"> • Financial status report of MOWRAM/ PDOWRAM, MAFF/PDA • Information of financial source for applying the established model of on-farm irrigated agricultural improvement in Zone-1 • Personnel assignment report of MOWRAM/ PDOWRAM, MAFF/PDA • JICA Cambodia Office, the JICA Study Team, CEDAC, MOWRAM/ PDOWRAM, MAFF/PDA 	<ul style="list-style-type: none"> • Literature survey/ review • Interview (Hearing) 		<ul style="list-style-type: none"> • Interview (Hearing) • Participatory Workshop • Evaluation
<p>Will the techniques; participatory irrigation management and farmer-to-farmer extension of ecological SRI, applied in the pilot project be fully accepted by the farmers in the Zone-1 pilot project area?</p>	<p><Technology and technique></p>	<p><Social, cultural, and environmental aspects> →Refer to "Impact."</p>		<p>Will the filed facilities constructed in the pilot project area be well maintained?</p> <p>How likely will the established model of on-farm irrigated agriculture improvement in Zone-1 be replicable?</p>		

**Table D-2.2 Evaluation Grid of Terminal Evaluation for “Irrigated Agriculture On-farm Technology Improvement Pilot Project in Zone - 3”
1. Achievement of the Project : Measuring the achievement of Inputs, Outputs, and Project Purpose/ Comparison with Plan and the current achievement.**

Achievement of the Project	Evaluation Question		Judgmental Standard	Required Data	Data Source	Data Collection Method
	Normative Question	Descriptive Question				
(1) Achievement of Inputs	How (when and by what means) were the Inputs used?	How (timing, place, quantity, quality) has JICA invested the Inputs? <ul style="list-style-type: none"> Personnel Materials/ equipment, facilities Running cost 	How much have the plan (PDMe) and implementation accorded with? (Comparison with the plan and the current achievement) If they have not accorded each other, why haven't? What are the constraints?	Performance of the Japanese Experts in the JICA Study Team Experts <ul style="list-style-type: none"> Installed materials, equipment and facilities Record of expenditure on the Pilot Project in Zone-3. Opinions of the parties concerned 	Accounting book of running cost <ul style="list-style-type: none"> Activity report Monthly report submitted to JICA Interim Report Volume –IV Pilot Projects MOWRAM/ PDOWRAM, MAFF/ PDA, the JICA Study Team Experts 	<ul style="list-style-type: none"> Literature survey/ review Interview (Hearing)
(2) Degree to the achievement of Project Purpose	How much degree to the achievement of the Project Purpose's indicator intended in the PDMe been achieved?	How (timing, place, quantity, quality) has Cambodia (MOWRAM/ PDOWRAM, MAFF/ PDA) invested the Inputs? <ul style="list-style-type: none"> Personnel Materials/ equipment, facilities Running cost 	How much have the plan (PDMe) and achievement accorded with? (Comparison with the plan and the current achievement) If they have not accorded each other, why haven't? What are the constraints?	1) Comments of the counterparts at central and provincial level Comments of the JICA Study Team Experts 2) Comments/Sentiments of the participated farmers Comments and observation of the JICA Study Team Experts	1) Counterparts of MOWRAM/ PDOWRAM and MAFF/ PDA Activity report Monthly report submitted to JICA Interim Report Volume –IV Pilot Projects 2) Participated farmers Activity report Monthly report submitted to JICA Interim Report Volume –IV Pilot Projects	1) Interview (Hearing) on the counterparts Literature survey/ review 2) Participatory Workshops Literature survey/ review Evaluation
(3) Achievement of Outputs	Have the Indicators of Outputs intended in the PDMe been achieved? How likely will the Indicators of Outputs intended in the PDMe be achieved?	<<Output 1>> Indicator 1-1: Have model FWUCs released from the reservoirs by February 2008? <<Output 2>> Indicator 2-1: Have 50 farmers in the model village applied ecological SRI through farmer-to farmer extension by February 2008? <<Output 3>> Indicator 3-1: Have yield of improved farming practices in experimental plots is higher than the target yields of the Master Plan?	<<Output 1>> Comments of the participated farmers concerning on the newly established FWUCs Comments and observation of the JICA Study Team Experts <<Output 2>> No. of farmers who applied ecological SRI through farmer-to-farmer extension <<Output 3>> Yield of improved farming practice in experimental plots (and the target yields of the Master Plan)	<<Output 1>> Participated farmers concerning on the newly established FWUCs the JICA Study Team Experts Activity report Monthly report submitted to JICA Interim Report Volume –IV Pilot Projects <<Output 2>> Activity report Monthly report submitted to JICA Interim Report Volume –IV Pilot Projects <<Output 3>> Activity report Monthly report submitted to JICA	<<Output 1>> Record of water distribution Literature survey/ review Interview (Hearing) on the newly established FWUCs Participatory Evaluation Workshop <<Output 2>> Literature survey/ review <<Output 3>> Literature survey/ review	

2. Management System & Process: Smooth implementation of the Activities/ Analysis of the status during implementation process, constraints & contributing factors related to the implementation process

Management System & Process	Evaluation Question		Judgmental Standard	Required data	Data Source	Data Collection Method
	Normative Question	Descriptive Question				
(1) Implementation of the Activities	Have “Activities” in PDMe been implemented according to the schedule under the person in charge	<1-1> Have MOWRAM/ PDOWRA, the JICA Study Team Experts and the	How much have the plan (PDMe) and achievement accorded with? (Comparison with the PO) If they	<Activities 1-1 ~ 1-6> Plan of Operation Achievement of the Activities	<Activities 1-1 ~ 1-6> Plan of Operation Activity report	<Activities 1-1 ~ 1-11> Literature survey/ review Interview (Hearing)

	<p>and implementers in PO?</p>	<p>irrigation management groups prepared the preliminary landholding maps? <1-2> Have MOWRAM/ PDOWRA, the JICA Study Team Experts and the irrigation management groups prepared the water use maps? <1-3> Have MOWRAM/ PDOWRA and the JICA Study Team Experts established the FWUC with each water harvesting irrigation system in Zone-3? <1-4> Have MOWRAM/ PDOWRA and the JICA Study Team Experts clarified the capacity of reservoirs? <1-5> Have MOWRAM/ PDOWRA, the JICA Study Team Experts, and the newly established FWUCs prepared the Irrigation Service Plan? <1-6></p> <ul style="list-style-type: none"> • Have any training courses been conducted for improving the FWUC's water management? • Through the training courses, has the FWUCs' water management been improved? 	<p>have not accorded each other, why haven't? What are the constraints?</p>	<ul style="list-style-type: none"> • Comments and observation of MOWRAM/ PDOWRAM, the JICA Study Team Experts • Comments and observation of the participated farmers including the members of the organizations and FWUGs 	<ul style="list-style-type: none"> • Monthly report submitted to JICA Interim Report Volume –IV Pilot Projects • MOWRAM/ PDOWRA, the JICA Study Team Experts • Participated farmers including the members of the organizations and FWUGs 	<p>Participatory Workshop</p> <p>Evaluation</p>
	<p><2-1> Have the JICA Study Team Experts and CEDAC organized the Study Tours? <2-2> Have the JICA Study Team Experts and CEDAC conducted village trainings? <2-3> Have the JICA Study Team Experts and CEDAC carried out inter-village trainings? <2-4> Have the JICA Study Team Experts and CEDAC held "Farmers' Field Days"?</p>	<p><2-1> Have the JICA Study Team Experts and CEDAC organized the Study Tours? <2-2> Have the JICA Study Team Experts and CEDAC conducted village trainings? <2-3> Have the JICA Study Team Experts and CEDAC carried out inter-village trainings? <2-4> Have the JICA Study Team Experts and CEDAC held "Farmers' Field Days"?</p>	<p><Activities 2-1 ~ 2-4></p> <ul style="list-style-type: none"> • Plan of Operation • Achievement of the Activities • Comments and observation of the JICA Study Team Experts and CEDAC • Comments and observation of the participated farmers 	<p><Activities 2-1 ~ 2-4></p> <ul style="list-style-type: none"> • Plan of Operation • Activity report • Monthly report submitted to JICA • Interim Report Volume –IV Pilot Projects • the JICA Study Team Experts and CEDAC • Participated farmers 	<p><Activities 2-1 ~ 2-4></p> <ul style="list-style-type: none"> • Literature survey/ review • Interview (Hearing) • Participatory Workshop 	<p>Evaluation</p>
	<p><3-1> Have the JICA Study Team Experts and MAFF/ PDA conducted verification test to confirm effectiveness of SRI based improved farming practice? <3-2> Have the JICA Study Team Experts and MAFF/ PDA conducted small scale adaptability trials for further improvement of the farming practice? <3-3> Have the JICA Study Team and MAFF/ PDA conducted farmers' acceptability To conduct for confirming the possibility to introduce the improved farming practices by seeing the results of the</p>	<p><3-1> Have the JICA Study Team Experts and MAFF/ PDA conducted verification test to confirm effectiveness of SRI based improved farming practice? <3-2> Have the JICA Study Team Experts and MAFF/ PDA conducted small scale adaptability trials for further improvement of the farming practice? <3-3> Have the JICA Study Team and MAFF/ PDA conducted farmers' acceptability To conduct for confirming the possibility to introduce the improved farming practices by seeing the results of the</p>	<p><Activities 3-1 ~ 3-3></p> <ul style="list-style-type: none"> • Plan of Operation • Achievement of the Activities • Comments and observation of the JICA Study Team Experts and MAFF/PDA 	<p><Activities 3-1 ~ 3-3></p> <ul style="list-style-type: none"> • Plan of Operation • Activity report • Monthly report submitted to JICA • Interim Report Volume –IV Pilot Projects • the JICA Study Team Experts and MAFF/PDA 	<p><Activities 3-1 ~ 3-3></p> <ul style="list-style-type: none"> • Literature survey/ review • Interview (Hearing) 	<p>Evaluation</p>

(2) Management System/ Monitoring System	<p>1) Has the management system of the JICA Study Team Experts, MOWRAM/ PDOWRAM, and MAFF/ PDA and CEDAC been functioning properly ?</p> <p>2) Has the monitoring been conducted according with the monitoring system agreed among the JICA Study Team Experts, MOWRAM/ PDOWRAM, and MAFF/ PDA?</p>	<p>How much have the plan (the monitoring system) and achievement accorded with? (Comparison with the prepared monitoring system) If they have not accorded each other, why haven't? What are the constraints?</p>	<p>1) Times, frequency, and contents of the meeting and communication between the JICA Study Team Experts and MOWRAM/ PDOWRAM, or MAFF/ PDA or CEDAC</p> <p>Opinions of the parties concerned</p> <p>2) Results of monitoring of the parties concerned</p>	<p>1) Record of meeting, and communication between the JICA Study Team Experts and MOWRAM/ PDOWRAM, or MAFF/ PDA or CEDAC</p> <p>Monthly report submitted to JICA</p> <p>the JICA Study Team Experts, MOWRAM/ PDOWRAM, MAFF/ PDA or CEDAC</p> <p>Activity report</p> <p>Monthly report submitted to JICA</p> <p>Interim Report Volume –IV Pilot Projects</p> <p>the JICA Study Team Experts, MOWRAM/ PDOWRAM, MAFF/ PDA and CEDAC</p>	<p>1) Literature survey/ review</p> <p>Interview (Hearing)</p>
(3) Assignment of the counterpart personnel	<p>Have the counterpart personnel assigned as the JICA Study Team Experts requested?</p>	<p>Comparison with the request of the JICA Study Team Experts and the actual assignment of the counterparts</p>	<p>Contents of the request of the JICA Study Team Experts to MOWRAM and MAFF</p> <p>Information of the counterparts such as their names, departments, and expertise</p> <p>Opinions of the parties concerned</p>	<p>Request form the JICA Team to MOWRAM and MAFF</p> <p>Member list of the counterparts</p> <p>The counterparts, the JICA Study Team Experts</p>	<p>1) Literature survey/ review</p> <p>Interview (Hearing)</p>
(4) Understanding of the superordinate agencies concerned on the project	<p>Have MOWRAM, MAFF and JICA Cambodia Office intended to grasp the status and problems of the pilot project in Zone-3 and to deal with them?</p>	<p>1) Have MOWRAM, MAFF and JICA Cambodia Office grasped the status and problems of the pilot project in Zone-3 well?</p> <p>2) Have MOWRAM, MAFF and JICA Cambodia Office intended to establish and execute the handling policies against the problems?</p>	<p>1) Degree of MOWRAM, MAFF and JICA Cambodia Office's understanding the status and the problems of the pilot project in Zone-3</p> <p>2) Appropriateness of the handling policies</p>	<p>Persons in charge in MOWRAM, MAFF, and JICA Cambodia Office</p> <p>The handling policies (summary of the present status and challenges/ problems of the pilot project in Zone-3 and the handling policies/ the contents of the survey)</p>	<p>1) Literature survey/ review</p> <p>Interview (Hearing)</p>

3. Five Evaluation Criteria

Five Evaluation Criteria	Evaluation Question		Judgmental Standard	Required data	Data Source	Data Collection Method
	Normative Question	Descriptive Question				
(1) Relevance	Do Project Purpose (Good model of on-farm irrigated agriculture improvement in Zone-3 is established.) and Overall Goal (Agricultural productivity centering on rice is improved in the target areas.) accord with the national development policies of Cambodia? Do they consist with the national development policies of Cambodia?	Are Project Purpose and Overall Goal consistent with Second Socioeconomic Development Plan 2001 – 2005; “Economic Growth and Poverty Reduction” and policies of MOWRAM; Strategic Development Plan for Water Sector 2006-2010; “Better Water Management of Irrigated and Rainfed Croplands by development of Hardware and Software in a Complementary Way” and MAFF; Agricultural development Plan, Long, Medium and Short Term 1999-2010; “Ensuring of food security, poverty alleviation and job creation by increasing rice cultivated area”?		<ul style="list-style-type: none"> PDMs of the pilot project in Zone-3 Relation with the components of the pilot project in Zone-3 and each Cambodian national development policy Contents of Second Socioeconomic Development Plan 2001 – 2005 Contents of Strategic Development Plan for Water Sector 2006-2010 and Agricultural development Plan, Long, Medium and Short Term 1999-2010 	<ul style="list-style-type: none"> PDMs of the pilot project in Zone-3 Counterparts, the JICA Study Team Experts 	<ul style="list-style-type: none"> Literature survey/ review Interview (Hearing)
	Does the direction aimed by the pilot project consistent with MOFA's Assistance Strategy for Cambodia and JICA's Project Implementation Strategy for Cambodia?			<ul style="list-style-type: none"> Contents of MOFA's Assistance Strategy for Cambodia Contents of JICA's Project Implementation Strategy for Cambodia 	<ul style="list-style-type: none"> MOFA's Assistance Strategy for Cambodia JICA's Project Implementation Strategy for Cambodia 	Literature survey/ review
(2) Effectiveness	Was the selection of the Target group relevant?	Did the contents of the pilot project in Zone-3 accord with the needs of the target area? Did farmers in Zone-3 pilot project area have the needs of water distribution with minimum loss of water by irrigation management groups? Did farmers in Zone-3 pilot project area have the needs of ecological SRI extension? Did farmers in Zone-3 pilot project area need high yield applying SRI (based on improved farming practices)?		<ul style="list-style-type: none"> Results of the baseline surveys; Socio-economic questionnaire survey, RRA workshops Comments of the both participated and non-participated farmers in Zone-3 pilot project area 	<ul style="list-style-type: none"> Activity report Monthly report submitted to JICA Interim Report Volume –IV Pilot Projects The other relevant reports prepared by the Study Team and Participated and non-participated farmers 	<ul style="list-style-type: none"> Literature survey/ review Interview (Hearing, questionnaire survey on non-participated farmers) Participatory Evaluation Workshop
	Is the Project Purpose going to be achieved by the end of the project period?	Is the good model of on-farm irrigated agriculture improvement in Zone-3 going to be established by February 2008?		<ul style="list-style-type: none"> Opinions of the JICA Study Team Experts and counterparts 	<ul style="list-style-type: none"> the JICA Study Team Experts and counterparts 	<ul style="list-style-type: none"> Interview (Hearing)

<p>Have Output 1, Output 2, and Output3 been the contributors to achieve the Project Purpose? Are the Outputs sufficient to achieve Project Purpose?</p>	<p>Have release of irrigation water from the reservoirs, farmer-to-farmer extension of ecological SRI, and confirmation of the target yield in the Master Plan contributed to the establishment of the applicable model for Zone-3?</p>	<p>Has the logic (Means – Ends) intended in the PDMe been effective? If it has not been effective, why not? Were there any problems with the project formulation? Have the Outputs intended in the PDMe been effectively achieved? If they have been not achieved, what have been the constraints?</p>	<p>Observation and comments of the JICA Study Team Experts and counterparts</p>	<p>Activity report submitted to JICA Interim Report Volume –IV Pilot Projects</p>	<p>Literature survey/ review Interview (Hearing) Participatory Workshop Evaluation</p>
<p>Have external condition such as Important Assumptions been contributing/ constraining to achieve the Project Purpose?</p>	<p>Has the responsibility of each stakeholder in water management is changed within the project period? Has severe natural disaster hit the pilot project area in Zone-3? Has drought/ less precipitation occurred in the pilot project area in Zone-3? Has selected agricultural technique, ecological SRI been applicable for farmers from the viewpoint of economy, society, and culture? Are there any social/ cultural constraints against communal works such as irrigation management? (Concerning on the history of forced communal works) Are there any other unexpected contributing/ constraining conditions that may have affected the achievement of Outputs and Project Purpose?</p>	<p>Data on demarcation on water management before and during the project period Record of natural disaster Record of precipitation Comments of participated and non-participated farmers Comments of participated and non-participated farmers Comments of participated and non-participated farmers Comments of participated and non-participated farmers</p>	<p>Royal Decree NS/ RK/T/ 0701/234 Activity report submitted to JICA Interim Report Volume –IV Pilot Projects Participated non-participated farmers and Participated non-participated farmers and Participated non-participated farmers and Interim Report Volume –IV Pilot Projects</p>	<p>Literature survey/ review Literature survey/ review Literature survey/ review Participatory Workshop Interview (questionnaire survey on non-participated farmers) Participatory Workshop Interview (questionnaire survey on non-participated farmers) Literature survey/ review Participatory Workshop Evaluation</p>	

Five Evaluation Criteria	Evaluation Question		Judgmental Standard	Required data	Data Collection Method
	Normative Question	Descriptive Question			
(3) Efficiency (See the parts of the Inputs and Outputs in “Achievement of the Project”)	Were quality, quantity, and timing, and method of Inputs appropriate to achieve the Outputs and conduct Activities as intended in the PDMe and PO?	Were the provided materials/ equipment utilized to achieve the Outputs according to the intended purpose and the PDMe? Were they utilized not to achieve the Outputs? Were there any non-utilized/ unfruitful Inputs? Was there lack of any Inputs? Were there any other means available for achieving the same Outputs at lower cost and smaller Inputs?	How much have the plan (PDMe) and implementation accorded with? (Comparison with the plan and the current achievement) If they have not accorded each other, why haven't? What are the constraints/ reasons/ causes? Analysis of/ Comparison with the alternatives	Dispatch record of the experts Record of the provided materials and equipment Book of running cost Opinions of the parties concerned Opinions of the parties concerned	Plan of Operation Activity report submitted to JICA Interim Report Volume –IV Pilot Projects the JICA Study Team Experts, MOWRAM/ PDOWRAM, MAFF/ PDA the JICA Study Team Experts, MOWRAM/ PDOWRAM, MAFF/ PDA Interview (Hearing)

	<p>Have the intended Outputs been achieved? (To what degree have the intended Outputs been achieved?)</p> <p>Were sufficient Activities timely implemented to achieve Outputs?</p>	<p><Output 1> <u>Indicator 1-1:</u> Has the newly established FWUCs released irrigation water from reservoirs considering growing stages of paddy?</p> <p><Output 2> Has ecological SRI been disseminated by farmer-to-farmer extension?</p> <p><u>Indicator 2-1:</u> Have 50 farmers in the model villages applied ecological SRI through farmer-to-farmer extension by February 2008?</p> <p><Output 3> Has the target yield of the Master Plan been confirmed to be achieved by applying SRI based on improving farming practices?</p> <p><u>Indicator 3-1:</u> Is the yield of improved farming practices in experimental plots higher than the target yields of the Master Plan?</p>	<p>(For Output 1)</p> <p>(For Output 2)</p> <p>(For Output 3)</p>	<ul style="list-style-type: none"> Actual results of water distribution Comments of participated farmers and the newly established FWUCs Cultivated land size of ecological SRI Record of farmer-to-farmer extension Comments of participated and non-participated farmers Cultivated land size of ecological SRI Record of farmer-to-farmer extension Crop yield 	<ul style="list-style-type: none"> Record of water distribution Participated farmers and the newly established FWUCs Activity report Monthly report submitted to JICA Interim Report Volume –IV Pilot Projects Participated and non-participated farmers Activity report Monthly report submitted to JICA Interim Report Volume –IV Pilot Projects The Master Plan 	<ul style="list-style-type: none"> Literature survey/ review Interview (Hearing) Participatory Evaluation Workshop Literature survey/ review (Hearing, questionnaire survey on no-participated farmers) Participatory Evaluation Workshop Literature survey/ review Reports of the similar projects Opinions of the JICA Study Team Experts and counterparts of MOWRAM/ PDOWRAM and MAFF/ PDA Activity report Monthly report submitted to JICA Interim Report Volume –IV Pilot Projects Opinions of the JICA Study Team Experts
<p>Five Evaluation Criteria</p> <p>(4) Impact</p>	<p>Normative Question</p> <p>To what extent is the Overall Goal: <u>Agricultural productivity centering on rice is improved in the target area, likely to be attained as the positive impact of the Pilot Project?</u></p> <p>Will the achievement of the Overall Goal be able to be examined in the Ex-post Evaluation?</p> <p>Are there any constraints to achieve the Overall Goal?</p>	<p>Evaluation Question</p> <p>Descriptive Question</p>	<p>Judgmental Standard</p> <p>Comparing the situation before and after the implementation of the Pilot Project in Zone-3</p>	<p>Required data</p> <ul style="list-style-type: none"> Average productivity of rice before and after the project implementation Opinions of the JICA Study Team Experts and counterparts 	<p>Data Source</p> <ul style="list-style-type: none"> Baseline survey report Activity report Monthly report submitted to JICA Interim Report Volume –IV Pilot Projects the JICA Study Team Experts and counterparts 	<p>Data Collection Method</p> <ul style="list-style-type: none"> Literature survey/ review Interview (Hearing)

	<p>What positive changes other than the Overall Goal has the Pilot Project in Zone-3 brought about?</p> <p>What negative changes has the Pilot Project in Zone-3 brought about?</p> <p>Has the water conflict among the farmers aggravated after the project implementation?</p> <p>Has the income gap drastically increased between rich and poor farmers/ between the participated and non-participated farmers due to the project implementation?</p> <p>Has the environmental degradation stated to be observed in the Zone-3 pilot project area due to the project implementation?</p> <p>Have different impacts by gender or social strata (between rich and poor farmers) been appeared?</p>	<ul style="list-style-type: none"> Positive changes observed after the project implementation Observation of participated and non-participated farmers and the JICA Study Team Experts Fact relevance, causes, and solutions of the conflicts Observation of participated and non-participated farmers and the JICA Study Team Experts Natural environment before and after the projects' implementation (ex. water pollution, land deterioration) Opinions of the parties concerned Observation/ opinions of participated farmers and non-participated farmers and the JICA Study Team Experts 	<ul style="list-style-type: none"> Activity report Monthly report submitted to JICA Interim Report Volume –IV Pilot Projects Participated non-participated farmers, and the JICA Study Team Experts Participated and non-participated farmers, the JICA Study Team Experts, counterparts Participated and non-participated farmers, the JICA Study Team Experts Participated non-participated farmers, the JICA Study Team Experts, counterparts Participated non-participated farmers, the JICA Study Team Experts, counterparts 	<ul style="list-style-type: none"> Literature survey/ review Interview questionnaire survey on non-participated farmers Participatory Evaluation Workshop Interview questionnaire survey Participatory Evaluation Workshop Interview questionnaire survey Participatory Evaluation Workshop Interview questionnaire survey Participatory Evaluation Workshop Interview questionnaire survey Participatory Evaluation Workshop
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Five Evaluation Criteria	Evaluation Question		Judgmental Standard	Required data	Data Source	Data Collection Method
	Normative Question	Descriptive Question				
<p>(5) Sustainability Are the benefits gained through the pilot project in Zone-3 maintained after its completion?</p>	<p><Policies and institutions> Will the supportive policies of the pilot project in Zone-3 be sustained?</p>	<p>Will the policies for PIMD be continued?</p>		<ul style="list-style-type: none"> Current policies on irrigation management and development 	<ul style="list-style-type: none"> MOWRAM 	<ul style="list-style-type: none"> Interview (Hearing)
	<p><Organizations and finance> Will the related organization be able to continue the activities to maintain the benefits of the pilot project after its completion?</p>	<p>Will the national policies of economic growth and poverty reduction be unchanged?</p> <p>Will the newly established FWUCs be able to continue releasing irrigation water from the reservoirs after the completion of the project?</p> <p>Will farmers be able to extend ecological SRI after the completion of the project?</p> <p>Will the farmers be able to get the target yield achieved by applying SRI based improved farming practices after the completion of the project?</p>	<p>Will the national policies of economic growth and poverty reduction be unchanged?</p> <p>Will the newly established FWUCs be able to continue releasing irrigation water from the reservoirs after the completion of the project?</p> <p>Will farmers be able to extend ecological SRI after the completion of the project?</p> <p>Will the farmers be able to get the target yield achieved by applying SRI based improved farming practices after the completion of the project?</p>	<ul style="list-style-type: none"> Current national policies on economic growth and poverty reduction Capacity and motivation of the newly established FWUCs Capacity and motivation of the participated farmers Farmers' comments on the acceptability of the SRI based improved farming technique 	<ul style="list-style-type: none"> National Development Plan 2006-2010 Model organizations, the JICA Study Team Experts, MOWRAM/PDOWRAM Participated farmers the JICA Study Team Experts, CEDAC Demonstrating and group farmers 	<ul style="list-style-type: none"> Literature survey/ review Participatory Workshop Participatory Evaluation Workshop Interview (Hearing) Participatory Evaluation Workshop Farmers' Acceptability Survey

	<p>Will MOWRAM/ PDOWRAM, MAFF/ PDA and/ or CEDAC be able to assist the newly established FWUCs and/ or the participated farmers?</p>	<ul style="list-style-type: none"> Capacity and motivation of MOWRAM/ PDOWRAM, MAFF/ PDA and CEDAC Financial source for applying the established model of on-farm irrigated agricultural improvement in Zone-3 	<ul style="list-style-type: none"> Financial status report of MOWRAM/ PDOWRAM, MAFF/ PDA Information of financial source for applying the established model of on-farm irrigated agricultural improvement in Zone-3 Personnel assignment report of MOWRAM/ PDOWRAM, MAFF/ PDA JICA Cambodia Office, the JICA Study Team Experts, CEDAC, MOWRAM/ PDOWRAM, MAFF/ PDA 	<ul style="list-style-type: none"> Literature survey/ review Interview (Hearing)
	<p>Will the techniques; participatory irrigation management and farmer-to-farmer extension of ecological SRI, applied in the pilot project be fully accepted by the farmers in the Zone-3 pilot project area?</p>	<ul style="list-style-type: none"> Opinions, capacity and motivation of the participated and non-participated farmers Observation of the JICA Study Team Experts, CEDAC, MOWRAM/ PDOWRAM, MAFF/ PDA 	<ul style="list-style-type: none"> Participated and non-participated farmers the JICA Study Team Experts, CEDAC, MOWRAM/ PDOWRAM, MAFF/ PDA 	<ul style="list-style-type: none"> Interview (Hearing) Participatory Workshop Evaluation
<p><Technology and technique></p>	<p>Will the on-farm irrigation facilities constructed in the pilot project area be well maintained? How likely will the established model of on-farm irrigated agriculture improvement in Zone-3 be replicable?</p>			
<p><Social, cultural, and environmental aspects> →Refer to “Impact.”</p>				

Table D-2.3 Evaluation Grid of Terminal Evaluation for “Rainfed Agriculture Improvement Pilot Project in Zone - 4”

1. Achievement of the Project : Measuring the achievement of Inputs, Outputs, and Project Purpose/ Comparison with Plan and the current achievement.

Achievement of the Project	Evaluation Question		Judgmental Standard	Required Data	Data Source	Data Collection Method
	Normative Question	Descriptive Question				
(1) Achievement of Inputs	How (when and by what means) were the Inputs used?	How (timing, place, quantity, quality) has JICA invested the Inputs? <ul style="list-style-type: none"> Personnel Materials/ equipment, facilities Running cost How (timing, place, quantity, quality) has Cambodia (MAFF/ PDA) invested the Inputs? <ul style="list-style-type: none"> Personnel Materials/ equipment, facilities Running cost 	How much have the plan (PDMe) and implementation accorded with? (Comparison with the plan and the current achievement) If they have not accorded each other, why haven't? What are the constraints?	Performance of the Japanese Experts in the JICA Study Team Experts Installed materials, equipment and facilities Record of expenditure on the Pilot Project in Zone-4. Opinions of the parties concerned	Accounting book of running cost Activity report Monthly report submitted to JICA Interim Report Volume –IV Pilot Projects MAFF/ PDA, the JICA Study Team Experts	<ul style="list-style-type: none"> Literature survey/ review Interview (Hearing)
(2) Degree to the achievement of Project Purpose	How much degree to the achievement of the Project Purpose's indicator intended in the PDMe been achieved?	1) Is the model of rainfed agriculture improvement in Zone-4 applicable for MAFF/ PDA? 2) Are 80% of the participated farmers satisfied with the implementation of the pilot project?	1) Comments of the counterparts at central and provincial level Comments of the JICA Study Team Experts 2) Comments/Sentiments of the participated farmers Comments and observation of the JICA Study Team Experts	1) Counterparts of MAFF/ PDA Activity report Monthly report submitted to JICA Interim Report Volume –IV Pilot Projects 2) Participated farmers Activity report Monthly report submitted to JICA Interim Report Volume –IV Pilot Projects	1) Interview (Hearing) on the counterparts Literature survey/ review 2) Participatory Workshops Literature survey/ review	
(3) Achievement of Outputs	Have the Indicators of Outputs intended in the PDMe been achieved? How likely will the Indicators of Outputs intended in the PDMe be achieved?	<Output 1> Indicator 1-1: Have totally 50 farmers in the model villages applied ecological SRI through farmer-to farmer extension by 2007? <Output 2> Indicator 2-1: Have yield of improved farming practices in experimental plots is higher than the target yields of the Master Plan?	<Output 1> No. of farmers who applied ecological SRI through farmer-to-farmer extension <Output 2> Yield of improved farming practice in experimental plots (and the target yields of the Master Plan)	<Output 1> Activity report submitted to JICA Interim Report Volume –IV Pilot Projects <Output 2> Activity report submitted to JICA	<Output 1> Literature survey/ review <Output 2> Literature survey/ review	

2. Management System & Process: Smooth implementation of the Activities/ Analysis of the status during implementation process, constraints & contributing factors related to the implementation process

Management System & Process	Evaluation Question		Judgmental Standard	Required data	Data Source	Data Collection Method
	Normative Question	Descriptive Question				
(1) Implementation of the Activities	Have “Activities” in PDMe been implemented according to the schedule under the person in charge and implementers in PO?	<1-1> Have the JICA Study Team Experts and CEDAC organized the Study Tours? <1-2> Have the JICA Study Team Experts and CEDAC conducted village trainings? <1-3> Have the JICA Study Team Experts and CEDAC carried out inter-village trainings? <1-4> Have the JICA Study Team Experts and CEDAC held “Farmers’ Field Days”?	How much have the plan (PDMe) and achievement accorded with? (Comparison with the PO) If they have not accorded each other, why haven't? What are the constraints?	<Activities 1-1 ~ 1-4> Plan of Operation Achievement of the Activities the JICA Study Team Experts and CEDAC Comments and observation of the participated farmers	<Activities 1-1 ~ 1-4> Plan of Operation Activity report Monthly report submitted to JICA Interim Report Volume –IV Pilot Projects the JICA Study Team Experts and CEDAC Participated farmers	<Activities 1-1 ~ 1-3> Literature survey/ review Interview (Hearing) Participatory Evaluation Workshop

		<p><2-1> Have the JICA Study Team Experts and MAFF/ PDA conducted verification test to confirm effectiveness of SRI based improved farming practice? <2-2> Have the JICA Study Team Experts and MAFF/ PDA conducted small scale adaptability trials for further improvement of the farming practice? <2-3> Have the JICA Study Team and MAFF/ PDA conducted farmers' acceptability To conduct for confirming the possibility to introduce the improved farming practices by seeing the results of the first year from technical and economical viewpoints?</p>		<p><Activities 2-1 ~ 2-3> • Plan of Operation • Achievement of the Activities • Comments and observation of the JICA Study Team Experts and MAFF/PDA</p>	<p><Activities 2-1 ~ 2-3> • Plan of Operation • Activity report • Monthly report submitted to JICA • Interim Report Volume –IV Pilot Projects • the JICA Study Team Experts and MAFF/PDA</p>	<p><Activities 2-1 ~ 2-3> • Literature survey/ review • Interview (Hearing)</p>
(2) Management System/ Monitoring System	<p>1) Has the management system of the JICA Study Team Experts, and MAFF/ PDA and CEDAC been functioning properly ? 2) Has the monitoring been conducted according with the monitoring system agreed among the JICA Study Team Experts, and MAFF/ PDA?</p>	<p>1) Has the coordination among the JICA Study Team Experts, MAFF/ PDA and CEDAC been going well? Could they have shared the information on the pilot project in Zone-4? 2) Is the monitoring report summarized according to the methods of “data collection” and “data aggregation” in the prepared monitoring system? Is this monitoring report shared among the stakeholders?</p>	<p>How much have the plan (the monitoring system) and achievement accorded with? (Comparison with the prepared monitoring system) If they have not accorded each other, why haven't? What are the constraints?</p>	<p>1) Times, frequency, and contents of the meeting and communication between the JICA Study Team Experts and MAFF/ PDA or CEDAC Opinions of the parties concerned 2) Results of monitoring Opinions of the parties concerned</p>	<p>1) Record of meeting, and communication between the JICA Study Team Experts and MAFF/ PDA or CEDAC Monthly report submitted to JICA the JICA Study Team Experts, MAFF/ PDA or CEDAC 2) Activity report Monthly report submitted to JICA Interim Report Volume –IV Pilot Projects the JICA Study Team Experts, MAFF/ PDA and CEDAC</p>	<p>• Literature survey/ review • Interview (Hearing)</p>
(3) Assignment of the counterpart personnel	<p>Have the counterpart personnel assigned as the JICA Study Team Experts requested?</p>	<p>Comparison with the request of the JICA Study Team Experts and the actual assignment of the counterparts</p>		<p>• Contents of the request of the JICA Study Team Experts to MAFF • Information of the counterparts such as their names, departments, and expertise • Opinions of the parties concerned</p>	<p>• Request form the JICA Team to MAFF • Member list of the counterparts • The counterparts, the JICA Study Team Experts</p>	<p>• Literature survey/ review • Interview (Hearing)</p>
(4) Understanding of the superordinate agencies concerned on the project	<p>Have MAFF and JICA Cambodia Office intended to grasp the status and problems of the pilot project in Zone-4 and to deal with them?</p>	<p>1) Have MAFF and JICA Cambodia Office grasped the status and problems of the pilot project in Zone-4 well? 2) Have MAFF and JICA Cambodia Office intended to establish and execute the handling policies against the problems?</p>	<p>1) Degree of MAFF and JICA Cambodia Office's understanding the status and the problems of the pilot project in Zone-4 2) Appropriateness of the handling policies</p>	<p>• Opinions of the parties concerned • Ideas of the handling policies</p>	<p>• Persons in charge in MAFF, and JICA Cambodia Office • The handling policies (summary of the present status and challenges/ problems of the pilot project in Zone-4 and the handling policies/ the contents of the survey)</p>	<p>• Literature survey/ review • Interview (Hearing)</p>

3. Five Evaluation Criteria

Five Evaluation Criteria	Evaluation Question		Judgmental Standard	Required data	Data Source	Data Collection Method
	Normative Question	Descriptive Question				
(1) Relevance	Do Project Purpose (Good model of on-farm irrigated agriculture improvement in Zone-4 is established.) and Overall Goal (Agricultural productivity centering on rice is improved in the target areas.) accord with the national development policies of Cambodia? Do they consist with the national development policies of Cambodia?	Are Project Purpose and Overall Goal consistent with Second Socioeconomic Development Plan 2001 – 2005; “Economic Growth and Poverty Reduction” and policies of MOWRAM; Strategic Development Plan for Water Sector 2006-2010; “Better Water Management of Irrigated and Rainfed Croplands by development of Hardware and Software in a Complementary Way” and MAFF; Agricultural development Plan, Long, Medium and Short Term 1999-2010; “Ensuring of food security, poverty alleviation and job creation by increasing rice cultivated area”?		<ul style="list-style-type: none"> • PDMe of the pilot project in Zone-4 • Relation with the components of the pilot project in Zone-4 and each Cambodian national development policy • Contents of Second Socioeconomic Development Plan 2001 – 2005 • Contents of Strategic Development Plan for Water Sector 2006-2010 and Agricultural development Plan, Long, Medium and Short Term 1999-2010 	<ul style="list-style-type: none"> • PDMe of the pilot project in Zone-4 • Counterparts, the JICA Study Team Experts 	<ul style="list-style-type: none"> • Literature survey/ review • Interview (Hearing)
	Does the direction aimed by the pilot project consistent with MOFA's Assistance Strategy for Cambodia and JICA's Project Implementation Strategy for Cambodia? Was the selection of the Target group relevant?	<p>Did the contents of the pilot project in Zone-4 accord with the needs of the target area?</p> <p>Did farmers in Zone-4 pilot project area have the needs of ecological SRI extension?</p> <p>Did farmers in Zone-4 pilot project area need high yield applying SRI (based on improved farming practices)?</p>		<ul style="list-style-type: none"> • Contents of MOFA's Assistance Strategy for Cambodia • Contents of JICA's Project Implementation Strategy for Cambodia • Results of the baseline surveys; Socio-economic questionnaire survey, RRA workshops • Comments of the both participated and non-participated farmers in Zone-4 pilot project area 	<ul style="list-style-type: none"> • MOFA's Assistance Strategy for Cambodia • JICA's Project Implementation Strategy for Cambodia • Activity report • Monthly report submitted to JICA • Interim Report Volume –IV Pilot Projects • The other relevant reports prepared by the Study Team • Participated and non-participated farmers 	<ul style="list-style-type: none"> • Literature survey/ review • Interview (Hearing, questionnaire survey on non-participated farmers) • Participatory Evaluation Workshop
(2) Effectiveness	Is the Project Purpose going to be achieved by the end of the project period?	Is the good model of rainfed agriculture improvement in Zone-4 going to be established by February 2008?		<ul style="list-style-type: none"> • Opinions of the JICA Study Team Experts and counterparts 	<ul style="list-style-type: none"> • the JICA Study Team Experts and counterparts 	<ul style="list-style-type: none"> • Interview (Hearing)

	<p>Have Output 1, Output2, and Output3 been the contributors to achieve the Project Purpose? Are the Outputs sufficient to achieve Project Purpose?</p> <p>Have external condition such as Important Assumptions been contributing/ constraining to achieve the Project Purpose?</p>	<p>Have farmer-to-farmer extension of ecological SRI, and confirmation of the target yield in the Master Plan contributed to the establishment of the applicable model for Zone-4?</p> <p>Has severe natural disaster hit the pilot project area in Zone-4? Has drought/ less precipitation occurred in the pilot project area in Zone-4?</p> <p>Has selected agricultural technique, ecological SRI been applicable for farmers from the viewpoint of economy, society, and culture?</p> <p>Are there any social/ cultural constraints against communal works such as irrigation management? (Concerning on the history of forced communal works)</p> <p>Are there any other unexpected contributing/ constraining conditions that may have affected the achievement of Outputs and Project Purpose?</p>	<p>Has the logic (Means – Ends) intended in the PDMe been effective? If it has not been effective, why not? Were there any problems with the project formulation? Have the Outputs intended in the PDMe been effectively achieved? If they have been not achieved, what have been the constraints?</p>	<ul style="list-style-type: none"> Observation and comments of the JICA Study Team Experts and counterparts 	<ul style="list-style-type: none"> Activity report submitted to JICA Interim Report Volume –IV Pilot Projects 	<ul style="list-style-type: none"> Literature survey/ review Interview (Hearing) Participatory Workshop Evaluation 								
<p>(3) Efficiency (See the parts of the Inputs and Outputs in “Achievement of the Project”)</p>	<table border="1"> <thead> <tr> <th colspan="2">Evaluation Question</th> </tr> <tr> <th>Normative Question</th> <th>Descriptive Question</th> </tr> </thead> <tbody> <tr> <td>Were quality, quantity, and timing, and method of Inputs appropriate to achieve the Outputs and conduct Activities as intended in the PDMe and PO?</td> <td>Were the provided materials/ equipment utilized to achieve the Outputs according to the intended purpose and the PDMe? Were they utilized not to achieve the Outputs? Were there any non-utilized/ unfruitful Inputs? Was there lack of any Inputs?</td> </tr> <tr> <td>Were there any other means available for achieving the same Outputs at lower cost and smaller Inputs?</td> <td></td> </tr> </tbody> </table>		Evaluation Question		Normative Question	Descriptive Question	Were quality, quantity, and timing, and method of Inputs appropriate to achieve the Outputs and conduct Activities as intended in the PDMe and PO?	Were the provided materials/ equipment utilized to achieve the Outputs according to the intended purpose and the PDMe? Were they utilized not to achieve the Outputs? Were there any non-utilized/ unfruitful Inputs? Was there lack of any Inputs?	Were there any other means available for achieving the same Outputs at lower cost and smaller Inputs?		<p>Judgmental Standard</p> <p>How much have the plan (PDMe) and implementation accorded with? (Comparison with the plan and the current achievement) If they have not accorded each other, why haven't? What are the constraints/ reasons/ causes?</p> <p>Analysis of/ Comparison with the alternatives</p>	<p>Required data</p> <ul style="list-style-type: none"> Dispatch record of the experts Record of the provided materials and equipment Book of running cost Opinions of the parties concerned 	<p>Data Source</p> <ul style="list-style-type: none"> Plan of Operation Activity report Monthly report submitted to JICA Interim Report Volume –IV Pilot Projects the JICA Study Team Experts, MOWRAM/ PDOWRAM, MAFF/ PDA the JICA Study Team Experts, MOWRAM/ PDOWRAM, MAFF/ PDA 	<p>Data Collection Method</p> <ul style="list-style-type: none"> Literature survey/ review Interview (Hearing)
Evaluation Question														
Normative Question	Descriptive Question													
Were quality, quantity, and timing, and method of Inputs appropriate to achieve the Outputs and conduct Activities as intended in the PDMe and PO?	Were the provided materials/ equipment utilized to achieve the Outputs according to the intended purpose and the PDMe? Were they utilized not to achieve the Outputs? Were there any non-utilized/ unfruitful Inputs? Was there lack of any Inputs?													
Were there any other means available for achieving the same Outputs at lower cost and smaller Inputs?														

<p>Have the intended Outputs been achieved? (To what degree have the intended Outputs been achieved?)</p> <p>Were sufficient Activities timely implemented to achieve Outputs?</p>	<p><Output 2> Has ecological SRI been disseminated by farmer-to-farmer extension?</p> <p><u>Indicator 1-1:</u> Have 50 farmers in the model villages applied ecological SRI through farmer-to-farmer extension by 2007?</p>	<p>(For Output 1)</p>	<ul style="list-style-type: none"> Cultivated land size of ecological SRI Record of farmer-to-farmer extension Comments of participated and non-participated farmers 	<ul style="list-style-type: none"> Activity report Monthly report submitted to JICA Interim Report Volume –IV Pilot Projects Participated and non-participated farmers 	<ul style="list-style-type: none"> Literature survey/ review Interview questionnaire survey on no-participated farmers) Participatory Evaluation Workshop
<p>Compared with the similar projects and the Pilot Project in Zone-4, was the cost for achieving the Outputs appropriate (not too small/ not too much)?</p>	<p><Output 2> Has the target yield of the Master Plan been confirmed to be achieved by applying SRI based on improving farming practices?</p> <p><u>Indicator 2-1:</u> Is the yield of improved farming practices in experimental plots higher than the target yields of the Master Plan?</p>	<p>(For Output 2)</p>	<ul style="list-style-type: none"> Cultivated land size of ecological SRI Record of farmer-to-farmer extension Crop yield 	<ul style="list-style-type: none"> Activity report Monthly report submitted to JICA Interim Report Volume –IV Pilot Projects The Master Plan 	<ul style="list-style-type: none"> Literature survey/ review
<p>Have any external factors such as Important Assumptions affected to the achievement of the Outputs? Are Important Assumptions appropriately set at the evaluation period?</p>	<p>Is total cost of the Inputs appropriate?</p> <p>1) Have continuous involvement of related government agencies and model organizations during the project period been there? Have severe natural disaster hit the Zone-4 pilot project area?</p> <p>2)</p>	<p>Comparison with total cost of the Pilot Project in Zone-4 and that of the similar projects in charge of MAFF</p> <p>Comparison with total cost of the Pilot Project in Zone-4 and that of the similar projects (previous projects conducted by the other donors)</p>	<ul style="list-style-type: none"> Total cost of the similar projects Opinions of the parties concerned 	<ul style="list-style-type: none"> Reports of the similar projects Opinions of the JICA Study Team Experts and counterparts of MAFF/PDA 	<ul style="list-style-type: none"> Literature survey/ review

Five Evaluation Criteria	Evaluation Question		Judgmental Standard	Required data	Data Source	Data Collection Method	
(4) Impact	Normative Question	Descriptive Question	Comparing the situation before and after the implementation of the Pilot Project in Zone-4	<ul style="list-style-type: none"> Average productivity of rice before and after the project implementation Opinions of the JICA Study Team Experts and counterparts Positive changes observed after the project implementation 	<ul style="list-style-type: none"> Baseline survey report Activity report Monthly report submitted to JICA Interim Report Volume –IV Pilot Projects The JICA Study Team Experts and counterparts 	<ul style="list-style-type: none"> Literature survey/ review Interview (Hearing) 	
To what extent is the Overall Goal; Agricultural productivity centering on rice is improved in the target area, likely to be attained as the positive impact of the Pilot Project?	Will the achievement of the Overall Goal be able to be examined in the Ex-post Evaluation?	Are there any constraints to achieve the Overall Goal?	What positive changes other than the Overall Goal has the Pilot Project in Zone-4 brought about?			<ul style="list-style-type: none"> Activity report Monthly report submitted to JICA Interim Report Volume –IV 	<ul style="list-style-type: none"> Literature survey/ review

					<ul style="list-style-type: none"> Observation of participated and non-participated farmers and the JICA Study Team Experts 	<ul style="list-style-type: none"> Pilot Projects Participated non-participated farmers, and the JICA Study Team Experts 	<ul style="list-style-type: none"> Interview questionnaire survey on non-participated farmers) Participatory Evaluation Workshop Interview questionnaire survey) Participatory Evaluation Workshop
				<ul style="list-style-type: none"> Has the income gap drastically increased between rich and poor farmers/ between the participated and non-participated farmers due to the project implementation? Has the environmental degradation stated to be observed in the Zone-4 pilot project area due to the project implementation? Have different impacts by gender or social strata (between rich and poor farmers) been appeared? 	<ul style="list-style-type: none"> Observation of participated and non-participated farmers and the JICA Study Team Experts Natural environment before and after the projects' implementation (ex. water pollution, land deterioration) Opinions of the parties concerned Observation/ opinions of participated and non-participated farmers and the JICA Study Team Experts 	<ul style="list-style-type: none"> Participated and non-participated farmers, the JICA Study Team Experts, counterparts Participated and non-participated farmers, the JICA Study Team Experts, counterparts Participated and non-participated farmers, the JICA Study Team Experts, counterparts 	<ul style="list-style-type: none"> Interview questionnaire survey) Participatory Evaluation Workshop Interview questionnaire survey) Participatory Evaluation Workshop Interview questionnaire survey) Participatory Evaluation Workshop

Five Evaluation Criteria	Evaluation Question		Judgmental Standard	Required data	Data Source	Data Collection Method
	Normative Question	Descriptive Question				
(5) Sustainability Are the benefits gained through the pilot project in Zone-4 maintained after its completion?	<Policies and institutions> Will the supportive policies of the pilot project in Zone-4 be sustained?	Will the national policies of economic growth and poverty reduction be unchanged?		<ul style="list-style-type: none"> Current national policies on economic growth and poverty reduction 	<ul style="list-style-type: none"> National Development Plan 2006-2010 	<ul style="list-style-type: none"> Literature survey/ review
		Will farmers be able to extend ecological SRI after the completion of the project?		<ul style="list-style-type: none"> Capacity and motivation of the participated farmers 	<ul style="list-style-type: none"> Participated farmers the JICA Study Team Experts, CEDAC 	<ul style="list-style-type: none"> Interview (Hearing) Participatory Evaluation Workshop
	<Organizations and finance> Will the related organization be able to continue the activities to maintain the benefits of the pilot project after its completion?	Will the farmers be able to get the target yield achieved by applying SRI based improved farming practices after the completion of the project?		<ul style="list-style-type: none"> Farmers' comments on the acceptability of the SRI based improved farming technique 	<ul style="list-style-type: none"> Demonstrating and group farmers 	<ul style="list-style-type: none"> Farmers' Acceptability Survey
		Will MAFF/ PDA and/ or CEDAC be able to assist the participated farmers?		<ul style="list-style-type: none"> Capacity and motivation of MAFF/ PDA and CEDAC Financial source for applying the established model of rainfed agricultural improvement in Zone-4 	<ul style="list-style-type: none"> Financial status report of MAFF/ PDA Information of financial source for applying the established model of rainfed agricultural improvement in Zone-4 Personnel assignment report of MAFF/ PDA JICA Cambodia Office, the JICA Study Team Experts, CEDAC, MAFF/ PDA 	<ul style="list-style-type: none"> Literature survey/ review Interview (Hearing)
	<Technology and technique>	Will the technique; farmer-to-farmer extension of ecological SRI, applied in the pilot project be fully accepted by the farmers in the Zone-4 pilot project area?		<ul style="list-style-type: none"> Opinions, capacity and motivation of the participated and non-participated farmers Observation of the JICA Study Team Experts, CEDAC, and MAFF/ PDA 	<ul style="list-style-type: none"> Participated and non-participated farmers the JICA Study Team Experts, CEDAC, MAFF/ PDA 	<ul style="list-style-type: none"> Interview (Hearing) Participatory Evaluation Workshop

				<p>How likely will the established model of rainfed agriculture improvement in Zone-4 be replicable?</p>	<p><Social, cultural, and environmental aspects> →Refer to "Impact."</p>	
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Table BV-2.4 Outcome of Participatory Evaluation Workshop in Zone-1; Participatory Irrigation Management and Development (PIMD) Activities

Activities	Outputs/Results	Evaluation	Reason	Problem	Solutions taken by the Participants	Learning	Impacts/ Changes	Future Direction	
1 To join the meeting.	1.1 Getting knowledge on how to use water.	1.1 ++	1.1 Knowledge from the meeting help understand the development.	1.1.1 Lacking of the budget spending for transportation	1.1.1-1.1.5 Some amount of allowance is paid to them	Knowing how to manage FWUC.	Living standard in terms of income is better than the past one.	Maintaining the irrigation system.	
	1.2 Helping farmers' understanding of the benefits.	1.2 +	1.2 A new project with a clear plan that we had not had before.	1.1.2 Lacking farmers of joining meeting. 1.1.3 Farmers devoted most of their time working for individual household. 1.1.4 It is difficult to gather the farmers for meeting. 1.1.5 Farmers did not join meetings frequently.		Knowing the size of paddy field. Knowing how to save water.	Planning to have more trainings.	Appealing to gov't, NGOs to come to provide more training courses.	
2 To join the meeting on WUG-leaders election.	2.1 Helping project become stable.	2.1 +	2.1 Having a committee who can manage water properly.	2.1.1 Some of the FWUC committee members did work much for FWUC. 2.1.2 The committee members and elected WUG-leaders did not work for FWUC. 2.1.3 We did not know the committee and WUG-leaders. 2.1.4 After electing committee and WUG-leaders, we have a problem with opening and closing gate, because all 2.1.5 Some committee members have a problem with their living. 2.2.1 Drawing water to the paddy plots is not timely because the person in charge of water distribution was busy. 2.2.2 When we ask the owners of upstream plots to take water, they do not allow because their plots just finished being 2.2.3 Lacking of check structures. 2.2.4 Canals are damaged. 2.3.1 Downstream farmers need water urgently but upstream farmers take water first. 2.3.2 Some farmers opened the gate illegally. 2.4.1 Asking for water, but no one opens the gate.	2.1.1-2.4.2 Some amount of allowance is used to support them		Knowing how to use water properly.		Rehabilitating and constructing more canals.
	2.2 Easier controlling water.	2.2 +	2.2 Having a committee to distribute water properly.						
3 Distributing water properly.	2.3	2.3 +	2.3 Reducing the conflict on water distribution.						
	2.4 Having the committee for water management.	2.4 +	2.4 Water can be sustainably used without loss.						

Activities	Outputs/Results	Evaluation	Reason	Problem	Solutions taken by the Participants	Learning	Impacts/ Changes	Future Direction
3 To prepare preliminary land holding maps.	3.1 After finishing preparing maps, we can come to know the exact size of each plot.	3.1 +	3.1 Easy collecting irrigation service fee from water users.	2.4.2 FWUC committee members criticized the farmers who did not understand the water distribution rule. 3.1.1 Measuring plot was done improperly. 3.1.2 There was no qualified expert in measuring the paddy field plots. 3.1.3 Some farmers were not informed when their paddy plots would be measured. 4.1.1 Lacking of labor.	3.1.1-3.1.3 Requesting cadastral officers to measure paddy fields.			
4 To join the activity of constructing watercourses.	4.1 Getting enough water for cultivation.	4.1 +	4.1 Easy taking water into the paddy field plots.	4.1.2 Watercourse construction affected the paddy land for cultivation. 4.1.3 Watercourse cannot distribute water to the farmers' plots on time 4.2 There is no problem. 5.1.1 There is no problem.	4.1.1-4.1.3 (1) Hiring the labor. 4.1.1-4.1.3 (2) Requesting farmers to join in constructing watercourse.			
5 To prevent water in canal from not flowing into paddy fields .	4.2 Getting enough water can increase the yield. 5.1 After preventing water from flowing into paddy field, paddies grow well.	4.2 + 5.1 +	4.2 We no longer worry about water shortage and paddy become fruitless anymore. 5.1 Rice yield has increased largely.	6.1.1 Some farmers did not contribute their land to watercourse construction. 6.1.2 Some farmers were not allowed to take water through others' paddy plots. 7.1.1 Culverts for water distribution are short.	6.1.1-6.1.2 Having the meeting on watercourse construction.			
6 To join the activity of constructing watercourses.	6.1 Water is no longer obstructed in paddy plots.	6.1 +	6.1 Water will no longer flood, and destroy the rice crop in the paddy fields.	8.1.1 Reducing the consumption amount of seed.	8.1.1-8.1.2 Do not use the string for transplanting.			
7 To construct watercourses.	7.1 Easy draining out and taking water.	7.1 +	7.1 Rice grows well.	8.1.2 Needing many farmers to transplant by using string. 8.2.1 Rice plants are damaged because of insects.	7.1.1 No solution			
8 To join the activity of applying SRI.	8.1 Increasing the rice yield.	8.1 +	8.1 Reducing the consumption amount of seed.	8.2 Rice yield increases. 8.3 Knowing the techniques of cultivation. 8.4 Reducing the cost of farming expenditure, and saving the time.	8.2.1 Buying pesticide.			

Activities	Outputs/Results	Evaluation	Reason	Problem	Solutions taken by the Participants	Learning	Impacts/ Changes	Future Direction
9 To measure the discharge of RT-2 canal.	9.1 Knowing water level in RT2 canal. 9.2 When we know the accurate water level, we can prevent canals from damage. 9.3 Knowing water loss in canals.	9.1 + 9.2 + 9.3 +	9.1 Knowing the discharge in canals. 9.2 Being able to cultivate in low and high geographical levels of paddy plots. 9.3 Easily making plan for cultivation.	10.1.1 Lacking farmers of joining to construct watercourse in order to install pipes. 10.1.2 & 10.2.1 Installing the pipes faces problem because some watercourses have not yet constructed.	10.1.1-10.2.1 No solution.			
10 To install pipes along the canals.	9.4 Knowing the possibility to take water to reach both low and high paddy plots. 9.5 Knowing the capacity of water that can be used for how many hectares. 10.1 Easy taking water to paddy fields. 10.2 Much easier rice cultivation.	9.4 + 9.5 + 10.1 + 10.2 +	9.4 Preventing canals from damage that can cost a lot for repairing. 9.5 Knowing how much water volume can be stored in canals. 10.1 Preventing some farmers from cutting parts of the dike for water illegally. 10.2 Our cultivation is no longer depending on nature (rainwater).					

Table D-2.5 Outcome of Participatory Evaluation Workshop in Zone-1; Participatory Agricultural Extension Activities

Activities	Outputs/Results	Evaluation	Reason	Problem	Solutions taken by the Participants	Learning	Impacts/ Changes	Future Direction
1 To attend the training about SRI technique.	1.1 Knowing the technique of SRI. 1.2 Getting the knowledge and telling it the other farmers. 1.3 Knowing how to make composts and compost sheds. 1.4 Knowing new organizations.	1.1 ++ 1.2 + 1.3 ++ 1.4 ++	1.1 Higher yield than before. 1.2 SRI has not yet spread out to all farmers. 1.3 Not needing to spend money for fertilizer, but helping to improve land quality. 1.4 Knowing the organizations which come to help us.	1.1-1.4 (1) All farmers do not want to attend the training. 1.1-1.4 (2) Some farmers do not follow SRI technique.	1.1-1.4 (1) Explain other farmers to let them know the benefits of SRI. 1.1-1.4 (1) Try hard to show good results of SRI.	Knowing how to do farming following SRI technique. Starting to share and exchange ideas. Knowing how to produce compost very well. Knowing the method of seed purification.	The living standard of people in the village become better. Farmers help each other and also exchange ideas. Farmers cooperate well each others. Farmers start wanting to know SRI technique.	Continue practicing SRI. Create farmer group for selling rice. Set up rice seed bank. Research new technique of farming.
2 To implement SRI experiment.	2.1 Knowing the difference of yield between traditional practice and SRI. 2.2 Knowing the SRI technique more clearly. 2.3 Practicing SRI uses small amount of seed. 2.4 Knowing how to prepare land for transplanting. 2.5 Knowing how to manage the water in the rice field. 3.1 Knowing how to select pure seed.	2.1 ++ 2.2 ++ 2.3 ++ 2.4 ++ 2.5 ++ 3.1 ++	2.1 The new technique provides the double yield. 2.2 Becoming to implement SRI by ourselves. 2.3 Being able to save many seeds due to transplanting only one seedling. 2.4 More humid soil that can help the young seedling grow well and healthy. 2.5 Rice plants with many tillers. Rice field with much weed. 3.1 Easy to broadcast seeds on the nursery bed.	2.1-2.5 (1) Not knowing perfectly about the transplanting method of SRI. 2.1-2.5(2) Difficult to transplant by using lines. 2.1-2.5(3) Criticized by other farmers. 2.1-2.5(4) Farmers are hopeless in the first half month. 3.1 (1) Taking times to select rice seeds.	2.1-2.5(1) Try to learn more when CEDAC comes to train us. 2.1-2.5(2) Find an easy way to transplant with line. 2.1-2.5(3) Ask them to wait for the result which we will obtain. 2.1-2.5(4) Cheer up hopeless farmers. 3.1 (1) Pay more attention to seed purification.	Starting to exchange ideas in order to progress. Find an easy way to transplant with line. Ask them to wait for the result which we will obtain. Cheer up hopeless farmers. Pay more attention to seed purification.	Most of farmers start practicing SRI technique.	
3 To learn how to select seed.	4.1 Rice is tasty, so we grow strong in health. 4.2 It helps soil become soft and fertile. 4.3 Starting to save the kitchen waste and leaves for making composts. 4.4 We don't need to buy chemical fertilizer. 5.1 Using less labor force. 5.2 Using less amount of seeds. 5.3 All young seedling grow well and healthy.	4.1 ++ 4.2 ++ 4.3 ++ 4.4 ++ 5.1 ++ 5.2 ++ 5.3 ++	4.1 SRI rice provides good health unlike the one used chemical fertilizer. 4.2 It is easy to plow, transplant, weed, all of the useful insects can live. 4.3 The houses are clean, the rice fields are good and people are healthy. 4.4 Saving some money to spend for other things. 5.1 Unnecessary to spend money for hiring people to transplant as before. 5.2 Transplanting faster than before because of only one seedling/ hill. 5.3 Easy to pull out young seedlings. Seedlings grow well after transplanting.	4.1-4.4 No problem. 5.1-5.7 No problem.	4.1-4.4 No problem.	Knowing how to do farming following SRI technique. Starting to share and exchange ideas. Knowing how to produce compost very well. Knowing the method of seed purification.	The living standard of people in the village become better. Farmers help each other and also exchange ideas. Farmers cooperate well each others. Farmers start wanting to know SRI technique.	Continue practicing SRI. Create farmer group for selling rice. Set up rice seed bank. Research new technique of farming.

Activities	Outputs/Results	Evaluation	Reason	Problem	Solutions taken by the Participants	Learning	Impacts/ Changes	Future Direction	
6 To learn how to look after the rice plant.	5.4 SRI provides long panicles at the same time.	5.4 ++	5.4 Rice plants with long panicles provide high yields.						
	5.5 The rice plants have more tillers than the traditional ones.	5.5 ++	5.5 When other farmers see our rice plants grow well, they want to follow us.						
	5.6 Easy to harvest.	5.6 ++	5.6 Easy harvesting due to simultaneous ripening.						
	5.7 Getting high yield.	5.7 ++	5.7 Getting more money through selling more rice.						
	6.1 Knowing how to drain and irrigate water.	6.1 ++	6.1 Saving water and keeping fertility in the rice fields.	6.1 - 6.7 No problem.					
	6.2 The rice plant provides more tillers which have many gains in its panicle.	6.2 ++	6.2 High yields and more straws for cattle.						
	6.3 Easy to find the insects and diseases on the rice plants.	6.3 ++	6.3 Easily finding out the problems on rice plants.						
	6.4 Knowing the exact time that composts should be applied.	6.4 ++	6.4 Saving compost and apply it timely.						
	6.5 Less insects in the rice field.	6.5 ++	6.5 Rice plants are healthy.						
	6.6 Knowing about the growing stages of rice plants.	6.6 ++	6.6 Encouraging farmers to work more hard.						
	6.7 Knowing the problems happened on rice plants and being able to take action on time.	6.7 ++	6.7 Avoiding damage and reduction of yield.						
	7 To learn how to produce natural insecticide.	7.1 Knowing how to produce natural insecticide.	7.1 +	7.1 The technique is not widely practiced. Taking effect at about 50%.	7.1-7.5 (1) Some farmers don't trust natural insecticide.	7.1-7.5 (1) Spread out the technique to those farmers.			
		7.2 Well growing rice plants. Reducing damages of insects.	7.2 +	7.2 Reducing the damage of insects at 50%.	7.1-7.5 (2) Difficult to find the materials to produce insecticide.	7.1-7.5 (2) No solution.			
		7.3 Spending less to buy the materials for producing natural fertilizer.	7.3 +	7.3 Saving about 50% of money compared with buying insecticide.	7.1-7.5 (3) Some farmers don't recognize what kind of leaves can be used for producing insecticide.	7.1-7.5 (3) Find the available material for making compost.			
7.4 The natural insecticide doesn't affect badly human health.		7.4 ++	7.4 Killing insects and making rice plants grow well.						
7.5 Spreading out the technique to other farmers.		7.5 +	7.5 Some other farmers start following SRI.						
8.1 Knowing how to select seed and store the seed.		8.1 ++	8.1 Easy to store because of small amount of rice seed.		8.1-8.4 No problem.				

Activities	Outputs/Results	Evaluation	Reason	Problem	Solutions taken by the Participants	Learning	Impacts/ Changes	Future Direction
	8.2 Getting the pure seed.	8.2 ++	8.2 Getting the necessary rice seeds.					
	8.3 Knowing how to label bags with the different varieties of seeds.	8.3 ++	8.3 Easy to recognize each, not confused with other seeds.					
	8.4 Satisfied with the method.	8.4 ++	8.4 When practicing the method, we have good results.					

Table D-2.6 Outcome of Participatory Evaluation Workshop in Zone-3 Prey Robong; Participatory Irrigation Management and Development (PIMD) Activities

Activities	Outputs/Results	Evaluation	Reason	Problem	Solutions taken by the Participants	Learning	Impacts/ Changes	Future Direction	
1 To join the activity of SRI technique.	1.1 Saving seeds.	1.1 +	1.1 Transplanting one seedling produces many tillers.	1.1-1.5 (1) There is not enough water.	1.1-1.5 (1) Hiring pumping machine.	Practicing what we have learned.	Knowing how to transplant one seedling.	Following the experiences that we have learned.	
	1.2 Getting higher yield.	1.2 +	1.2 SRI paddies produce more tillers than traditional ones do.	1.1-1.5 (2) Suffering from insects.	1.1-1.5 (2) Using insecticide mixed from natural plants.	Farmers understand each other on using water.	Farmers respect the rules of using water.	Trying to make compost by following the JICA technique.	
	1.3 Saving time.	1.3 +	1.3 Spending less time for transplanting.	1.1-1.5 (3) Farmers have not yet believed in SRI technique.	1.1-1.5 (3) Pushing farmers to join.		New model of nursery bed requires less seeds.	Pushing farmers to repair dam.	
	1.4 Reducing labor.	1.4 +	1.4 Using less seedlings.	1.1-1.5 (4) Having difficulty with using strings for transplanting.	1.1-1.5 (4) Farmers have to understand the formulas.		The interval for transplanting varies from one variety to other varieties.	Maintaining irrigation system.	
	1.5 Knowing how to use compost.	1.5 +	1.5 Making soil soft and paddies grow well.	1.1-1.5 (5) Low education.	1.1-1.5 (5) FWUC members and local authorities try to disseminate the SRI technique to farmers.		Knowing the total areas of FWUC coverage.		
	2 To join the meeting on committee election.	2.1 Having proper water usage rules.	2.1 +	2.1 Reducing the conflicts among water users.	1.1-1.5 (6) More difficult to prepare nursery bed.	1.1-1.5 (6) Paying more attention to preparing nursery beds.		Getting high yield because of compost.	
		2.2 Using water limitedly.	2.2 +	2.2 Having properly determined water usages.	1.1-1.5 (7) Plots cannot be irrigated by gravity.	1.1-1.5 (7) Using plastic pipes to connect from reservoir to plots.		Having enough fertilizer for each plot.	
		2.3 Using water understandably and helpfully.	2.3 +	2.3 Water users understand each other.	1.1-1.5 (8) Plots are far from reservoir.	1.1-1.5 (8) Pumping water from reservoir to canals and taking water from canals to plots.			
		2.4 After having committee, no one catches fish illegally.	2.4 +	2.4 Making water clean and protecting fish.	1.1-1.5 (9) Lacking irrigation system.	1.1-1.5 (9) Joining the activity of rehabilitating canals.			
		2.5 Water usage has been improved.	2.5 +	2.5 Up to now there is much water that can be used.	2.1-2.5 (1) Receiving little experience.	2.1-2.5 (1) Joining the meeting with JICA more frequently.			
		3.1 Knowing the water requirement for each plot.	3.1 +	3.1 Using water properly.	2.1-2.5 (2) Lacking material for administration work.	2.1-2.5 (2) Using personal money.			
		3.2 Knowing the water level.	3.2 +	3.2 Easy distributing water and determining the quantity of water.	3.1-3.2 (1) Lacking equipment of measuring water.	3.1-3.2 (1) Requesting equipment from PDOWRAM.			
		4.1 Knowing how to use water.	4.1 +	4.1 Understanding each other and following rules.	3.1-3.2 (2) Not yet knowing how to check staff-gauge.	3.1-3.2 (2) Requesting PDOWRAM to explain more.			
					4.1-4.2 (1) Lacking farmers' participations of joining the meetings.	4.1-4.2 (1) Pushing farmers to join.			

Activities	Outputs/Results	Evaluation	Reason	Problem	Solutions taken by the Participants	Learning	Impacts/ Changes	Future Direction
5 To learn how to check soil condition and measure areas.	4.2 Having used water properly can save for domestic uses.	4.2 +	4.2 Remaining water can be used for animals and domestic uses.	4.1-4.2 (2) Farmers have not yet understood. 4.1-4.2 (3) Low education.	4.1-4.2 (2) FWUC committee has tried to explain farmers. 4.1-4.2 (3) Paying more attention to learn.			
	5.1 Knowing the area of each plot.	5.1 +	5.1 Knowing the water requirement for the area.	5.1-5.2 (1) Difficult to measure plots because not so many farmers joint.	5.1-5.2 (1) Pushing farmers to join.			
6 To make compost.	5.2 Selecting seeds easily.	5.2 +	5.2 Knowing the types of varieties that are suitable for the plots.	5.1-5.2 (2) Lacking of farmers' participations. 5.1-5.2 (3) Plots are far from the reservoir.	5.1-5.2 (2) Pushing farmers to join. 5.1-5.2 (3) Measuring the far-located plots first.			
	6.1 Making soil soft.	6.1 +	6.1 Natural fertilizer does not make soil hard.	5.1-5.2 (4) Some farmers were late to show their plots to be measured.	5.1-5.2 (4) Measuring the plots that farmers showed first.			
6 To make compost.	6.2 Compost does not harm the health.	6.2 +	6.2 It is made of natural material.	5.1-5.2 (5) The period of time for measuring areas was too short.	5.1-5.2 (5) Requesting farmers to show plots on time. 6.1-6.6 (1) Making a very simple compost shed.			
	6.3 Using compost for paddy and other crops provides good results.	6.3 ++	6.3 It can be used with all kinds of crops by providing high effectiveness.	6.1-6.6 (1) Difficult to prepare compost shed.	6.1-6.6 (1) Hiring someone to transport.			
	6.4 Spending less money.	6.4 +	6.4 Lowering the quantity of chemical fertilizer use that need to be bought around 50%.	6.1-6.6 (2) Lacking transportation of taking fertilizer to paddy field.	6.1-6.6 (2) Hiring someone to transport. 6.1-6.6 (3) Hiring someone to dig pit or preparing fence instead of digging pit. 6.1-6.6 (4) Having tried to collect.			
	6.5 Reducing the chemical fertilizer use.	6.5 +	6.5 Not making soil hard.	6.1-6.6 (3) Difficult to dig compost pit.	6.1-6.6 (3) Hiring someone to dig pit or preparing fence instead of digging pit. 6.1-6.6 (4) Having tried to collect.			
	6.6 Understanding the bad effect of chemical fertilizer.	6.6 +	6.6 Using chemical fertilizer badly affects the health.	6.1-6.6 (4) Difficult to collect animal dung.	6.1-6.6 (4) Having tried to collect.			
				6.1-6.6 (5) Using much water to make compost and having to understand the each layer of compost.	6.1-6.6 (5) Explaining farmers to use any kinds of water expect water contains soap.			

Table D-2.7 Outcome of Participatory Evaluation Workshop in Zone-3 Ta Kao; Participatory Irrigation Management and Development (PIMD) Activities

Activities	Outputs/Results	Evaluation	Reason	Problem	Solutions taken by the Participants	Learning	Impacts/ Changes	Future Direction
1 To join in a meeting conducted by JICA on water management of Ta Kao reservoir.	1.1 Knowing about information related to water capacity for future cultivation. 1.2 Understanding about good purpose of JICA project. 1.3 Knowing the objective of JICA project that wants farmers cooperate with each other to conserve the structure. 1.4 We are happy when we have known JICA come to work in our village. They pay attention on villagers. 2.1 After voting, we have selected 4 representatives of farmers to work for FWUC.	1.1 ++ 1.2 ++ 1.3 1.4 ++ 2.1 + 2.2 ++ 2.3 ++ 3.1 ++	1.1 This project has come on time with the need of farmers. 1.2 FWUC establishment will bring the development for all villagers. 1.3 JICA project will help farmers have enough water that could increase output of farming for farmers. 1.4 JICA project will help to establish irrigation system in the future and they pay full attention to the farmers' need. 2.1 4 FWUC committee members have been selected as representatives of farmers, but they have not performed their tasks in full scale yet. 2.2 The villagers will see Ta Kao as good reservoir with a plenty of water. 2.3 Before we don't know exactly about how much rice field areas have, now we know. 3.1 There are people who are responsible for managing water issue. 3.2 We can save water but not waste the water of reservoir. 4.1 We have enough water, and it will not affect to yield of our rice crop.	1.1-1.4(1) The good result from the activities has not yet fully obtained. 1.1-1.4(2) Meeting concerning on FWUC have been participated smoothly so far, but I am worried that FWUC cannot bring about the success to this project. 1.3 No problem. 1.4 No problem. 2.1-2.3(1) Although 4 FWUC committee members have been selected, but they have not solved the farmers' problems yet. 2.1-2.3(2) 4 FWUC committee members have not integrated well in term of their work coordination. 3.1-3.2 Because there is not enough water, FWUC haven't performed any job.	1.1-1.4 (1) Invite and encourage FWUC members to participate in more meetings and trainings in order to explain them clearly on Ta Kao reservoir development project, to reduce conflict among FWUC member 1.1-1.4(2) We all try our best to conserve the reservoir and its water as much as we can. 2.1-2.3 We have explained about the development work of the project.	This is the first time that we have learned a lot from the project, we did not have such kind project in the past. We learned how to settle the conflict among the member farmers of the FWUC. Meeting with JICA and among the FWUC make the project work going smoothly. Once we organized the FWUC, the FWUC works well. We will have good agricultural out put in the near future. We have known the accurate length of Ta Kao dam because of this project We got to know how to measure the land by using modern technique. On behalf of the leader, we have to deal with the problem fairly.	FWUC member farmers actively participated in the meeting on the development project. FWUC member farmers appreciate the project; agricultural production has increased, and farmers' living standard has improved. The farmers received what they want, it means that they need water for cultivation, and now they got it. Once we organized the FWUC, the FWUC works well. We will have good agricultural out put in the near future. We have explained about the development work of the project. We got to know how to measure the land by using modern technique. On behalf of the leader, we have to deal with the problem fairly.	Farmers will work together to dig canals. Farmers will draw water to their plots of paddy by hiring the pumping machines. We will continue the work of this project through management, monitoring and maintenance of Ta Kao reservoir, repair the damage parts, take mud out of the reservoir regularly, and strengthening the governance of FWUC. We all villagers will work together with FWUC. Even JICA project has finished, we still continue to rehabilitate the canal and conserve the reservoir. We will continue JICA's work to save water and make it clean for community.
2 To participate in selection of 4 FWUC committee members.	2.1 Knowing the objective of JICA project that wants farmers cooperate with each other to conserve the structure. 2.2 We are happy when we have known JICA come to work in our village. They pay attention on villagers. 2.3 After voting, we have selected 4 representatives of farmers to work for FWUC.	2.1 ++ 2.2 ++ 2.3 ++	2.1 JICA project will help farmers have enough water that could increase output of farming for farmers. 2.2 JICA project will help to establish irrigation system in the future and they pay full attention to the farmers' need. 2.3 4 FWUC committee members have been selected as representatives of farmers, but they have not performed their tasks in full scale yet. 3.1 The villagers will see Ta Kao as good reservoir with a plenty of water. 3.2 Before we don't know exactly about how much rice field areas have, now we know. 4.1 There are people who are responsible for managing water issue. 5.1 We can save water but not waste the water of reservoir. 5.2 We have enough water, and it will not affect to yield of our rice crop.	2.1-2.3(1) Although 4 FWUC committee members have been selected, but they have not solved the farmers' problems yet. 2.1-2.3(2) 4 FWUC committee members have not integrated well in term of their work coordination. 3.1-3.2 Because there is not enough water, FWUC haven't performed any job.	2.1-2.3 We have explained about the development work of the project.	2.1-2.3 We have explained about the development work of the project.	2.1-2.3 We have explained about the development work of the project.	2.1-2.3 We have explained about the development work of the project.
3 4 FWUC committee members responded the interview to JICA study team for FWUC work procedure, dam operation and its maintenance.	3.1 Knowing the management issues of FWUC and trying to manage it properly. 3.2 Knowing how to save water of reservoir. 4.1 Villagers expect that village will be developed in the near future because of water from Ta Kao reservoir and its canals.	3.1 ++ 3.2 + 4.1 ++	3.1 There are people who are responsible for managing water issue. 3.2 We can save water but not waste the water of reservoir. 4.1 We have enough water, and it will not affect to yield of our rice crop.	3.1-3.2 Because there is not enough water, FWUC haven't performed any job.	3.1-3.2 We have explained about the development work of the project.	3.1-3.2 We have explained about the development work of the project.	3.1-3.2 We have explained about the development work of the project.	3.1-3.2 We have explained about the development work of the project.
4 To participate in observing the location of Ta Kao reservoir.	4.1 Knowing each plot of paddy fields that will be developed by JICA. 5.1 Knowing which plots can intake water from Ta Kao reservoir.	4.1 ++ 5.1 +	4.1 We have enough water, and it will not affect to yield of our rice crop. 5.1 We know the accurate numbers of each paddy plot and its sizes. 5.2 We know the accurate numbers of each paddy field plot and its sizes.	4.1(1) Some farmers did not use the water properly. 4.1(2) During the establishment of FWUC, if there is no water, the project couldn't implement. 5.1(1) A small number of household did not understand the purpose of this measuring campaign, therefore they did not cooperate with us. 5.1(2) During land measurement of JICA Project, some farmers don't know what has the project been doing.	4.1(1)-(2) We told the farmers to use water properly and carefully. 5.1(1)-(2) We explained them the purpose and importance of knowing the accuracy of each paddy plot.	4.1(1)-(2) We told the farmers to use water properly and carefully. 5.1(1)-(2) We explained them the purpose and importance of knowing the accuracy of each paddy plot.	4.1(1)-(2) We told the farmers to use water properly and carefully. 5.1(1)-(2) We explained them the purpose and importance of knowing the accuracy of each paddy plot.	4.1(1)-(2) We told the farmers to use water properly and carefully. 5.1(1)-(2) We explained them the purpose and importance of knowing the accuracy of each paddy plot.
5 To participate in the work of measuring the plot of paddy field of each household.	5.1 Knowing each plot of paddy fields that will be developed by JICA. 5.2 Knowing which plots can intake water from Ta Kao reservoir.	5.1 + 5.2 +	5.1 We know the accurate numbers of each paddy plot and its sizes. 5.2 We know the accurate numbers of each paddy field plot and its sizes.	5.1(1) A small number of household did not understand the purpose of this measuring campaign, therefore they did not cooperate with us. 5.1(2) During land measurement of JICA Project, some farmers don't know what has the project been doing.	5.1(1)-(2) We explained them the purpose and importance of knowing the accuracy of each paddy plot.	5.1(1)-(2) We explained them the purpose and importance of knowing the accuracy of each paddy plot.	5.1(1)-(2) We explained them the purpose and importance of knowing the accuracy of each paddy plot.	5.1(1)-(2) We explained them the purpose and importance of knowing the accuracy of each paddy plot.

Activities	Outputs/Results	Evaluation	Reason	Problem	Solutions taken by the Participants	Learning	Impacts/ Changes	Future Direction
6 To participate in measuring Ta Kao reservoir: its depth and length	6.1 Knowing size of Ta Kao reservoir and volume of water that it can store.	6.1 ++	6.1 We measure Ta Kao reservoir with a technical standard.	6.1(1) A small number of households had conflict with each other in terms of accuracy of their plots. 6.1(2) In rainy season when water level in the reservoir rose, water must be released through gates for preventing the dam damage. Otherwise, this water will cause flood to some neighboring	6.1(1) In case of conflict, we hold a meeting with the involvement of conflict parties; FWUC committee members, and Commune Council. 6.1(2) When there is too much water in the reservoir, we open the gate to release water for avoiding destroying upstream rice fields.			
7 Members from two household responded an interview with JICA study team on JICA	1-7 (1) Receiving great output from JICA project. 1-7 (2) The result of the activities of the JICA will bring prosperity for local villagers. 1-7 (3) Providing good result for villagers in the future.	1-7 (1) ++ 1-7 (2) ++ 1-7 (3) ++						

Table D-2.8 Outcome of Participatory Evaluation Workshop in Zone-3 Prey Kyeay; Participatory Irrigation Management and Development (PIMD) Activities

Activities	Outputs/Results	Evaluation	Reason	Problem	Solutions taken by the Participants	Learning	Impacts/ Changes	Future Direction	
1 To join the meetings on agricultural work and water usage.	1.1 Knowing SRI technique.	1.1 +	1.1 The results are not yet met the project expectation.	1.1 (1) Facing natural disaster (Drought). 1.1 (2) Farmers have not yet believed in SRI technique. 1.1 (3) Having the problems in the family.	1.1 (1)-1.1 (3) Try to push farmers to join.	Getting high yield. Every work should have a clear community. Farmers' participations are very important for development.	All farmers will follow the SRI technique. Having a clear organization in water management.	Strengthening and continuing the activities. Strengthening the FWUC.	
	1.2 Knowing the benefit of maintaining reservoir.	1.2 +	1.2 The result of water management is over 50%.	1.2 (1) Having the difficulties to explain farmers to understand the water usage.	1.2 (1) Forming sample groups for proof.	Contributing together leads to good maintenance.	Helping farmers understand more agricultural works than before.	Rehabilitating existing canals.	
	2.1 FWUC functions well in managing water.	2.1 +	2.1 Having the committee in charge of water management.	2.1 (1) Farmers have not yet respected the principle of committee. 2.1 (2) Committee has not yet fully understood the water distribution work. 2.1 (3) Committee has not yet understood their own responsibilities.	2.1 (1)-2.1 (3) Committee has meetings more frequently to find out their works.			Farmers become brave enough to speak up their opinions.	Rehabilitating dam.
	2.2 Water is enough to be used.	2.2 +	2.2 Water is protected.	2.2 (1) Having the conflict between farmers and person in charge of water management. 2.2 (2) Committee has not yet provided enough water to farmers. 2.3 (1) Draining water out illicitly. 2.3 (2) Having difficulties to explain farmers to understand.	2.2 (1)-2.2 (2) Leading to have a coordination between committee and farmers.			Having higher yield to sell than before.	Planning to construct gates.
	2.3 Water is not used wastefully.	2.3 +	2.3 Farmers know how to use water properly.	2.3 (1) Lacking farmers' participations of measuring plots. 3.1 (2) Farmers who have far-located plots did not want their plots to be measured. 3.2 (1) Situation of plots is not flat. 3.2 (2) Farmers who have plots that could not be irrigated are not happy.	2.3 (1)-2.3 (2) Advising the guilty people.				Planning to buy pumping machines.
	3.1 Knowing the areas of paddy fields.	3.1 +	3.1 Reducing the conflict among the paddy field owners.	3.1 (1) Knowing how to take water into paddy fields. 3.2 Knowing the areas that have to be irrigated.	3.1 (1)-3.1 (2) Committee decided to measure the plots that can only be irrigated.				
3 To join the activity of measuring the irrigated areas.	3.2 Knowing the areas that have to be irrigated.	3.2 +	3.2 Knowing how to take water into paddy fields.	3.3 (1) Having the proper water distribution. 3.3 (2) Knowing the water requirement for each plot.	3.3 (1)-3.3 (2) Farmers complained the committee. 3.3 (1)-3.3 (2) Committee tried to explain farmers to understand.				
	3.3 Knowing the flow direction from one plot to others.	3.3 +	3.3 (1) Having the proper water distribution. 3.3 (2) Knowing the water requirement for each plot.						

Activities	Outputs/Results	Evaluation	Reason	Problem	Solutions taken by the Participants	Learning	Impacts/ Changes	Future Direction
4 To join the activity of checking the canals and reservoir.	4.1 Canals are able to irrigate the paddy fields.	4.1 +	4.1 Being able to estimate whether water is enough to irrigate.	4.1 (1) Having the activities of eliminating existing canals by filling in.	4.1 (1)-4.1 (2) Rehabilitating the existing canals.			
5 To join the activity of topographical survey.	4.2 Needing to rehabilitate and construct more canals.	4.2 +	4.2 Helping us know how to construct and rehabilitate more canals.	4.2 There is no problem.	4.1 (1)-4.1 (2) Rehabilitating dam and canals.			
6 To join the activity of installing 2 staff-gages.	5.1 Knowing the discharge in the reservoir.	5.1 +	5.1 Knowing the quantity of water and having measurements to protect water properly.	5.1 (1) Farmers are worried about too much water that is stored in the reservoir.	5.1 (1) Committee tried to explain farmers not to do farming in flooded areas in the reservoir.			
7 To join the activity of maintaining the dam when dam was damaged.	6.1 Installing of staff-gages let us know the water level.	6.1 +	6.1 Having staff-gages to check.	6.1 (1) We did not know the water level because there was no staff-gauge.	6.1 (1) Informing farmers to use water carefully.			
	7.1 Water can be stored in the reservoir for long time.	7.1 +	7.1 Farmers help each other to maintain the reservoir.	7.1 (1) Being difficult to gather farmers to repair dam.	7.1 (1)-7.1 (2) Trying to collect money.			
	7.2 Dam is strong to store water.	7.2 +	7.2 Having enough water to use.	7.2 (1) Farmers do not join in maintenance activities more frequently.	7.2 (1)-7.2 (2) Trying to explain farmers about the benefit of dam.			
	7.3 Having enough water in the paddy fields.	7.3 +	7.3 Having a proper water distribution.	7.2 (2) Being difficult to collect money.	7.1 (1)-7.1 (2) Calling for money.			
8 To join the meeting on Irrigation Service Plan.	8.1 Being able to save money for the FWUC.	8.1 +	8.1 Having money to repair dam.	7.3 (1) There is no problem.	8.1 (1) Having explained the determined price for each plot.			
	8.2 Knowing the Irrigation Service Fee (Pumping=5000 Riel/ha, Gravity=20000 Riel/ha, and pumping and gravity=10000 Riel/ha).	8.2 +	8.2 Farmers are satisfied to pay for ISF.	8.1 (1) Farmers do not agree to pay on deadline.	8.2 (1) Farmers pushed committee to work hard.			
9 To join the activity of applying SRI technique.	9.1 Paddy grows well and provides high yield.	9.1 +	9.1 Using less seeds but getting high yield.	8.2 (1) There is no problem.	9.1 (1)-9.1 (3) Forming sample groups.			
				9.1 (1) Facing natural disaster (Drought).	9.1 (1)-9.1 (3) Having tried to push farmers to join.			
				9.1 (2) Farmers have not yet believed in SRI technique.				
				9.1 (3) Having the problems in the family.				

Table D-2.9: Outcome of Participatory Evaluation Workshop in Zone-3; Participatory Agricultural Extension Activities

Activities	Outputs/Results	Evaluation	Reason	Problems	Solutions taken by the Participants	Learning	Impacts/ Changes	Future Direction
1 To join the meeting.	1.1 Knowing how to follow SRI technique.	1.1	1.1 Gaining knowledge but not yet practicing well due to water shortage.	1.1-1.2 (1) No free time to attend the meeting due to housework.	1.1-1.2 (1) Taking time to attend the meetings.	Knowing how to use and make compost.	Improving the farmers' living standard because of getting high yield.	Decided to go on following SRI technique though no support from organizations.
	1.2 Knowing the timing of pulling out seedlings.	1.2	1.2 Early transplanting lets seedlings start to produce tillers early.	1.1-1.2 (1) Some farmers did not attend the meeting because they did not believe SRI.	1.1-1.2 (2) Trying to explain other farmers.	Understanding SRI technique.	Saving money from not buying chemical fertilizer.	Wanting more training on techniques for farming.
	2.1 Knowing how to make composts.	2.1	2.1 Reducing the amount of using chemical fertilizer and applying compost to paddy fields in the larger amount than before.	2.1-2.6 (1) Requiring patience with mixing material to make compost.	2.1-2.6 (1) Taking time to save the materials for making compost.	Knowing how to select good seeds that can provide high yield.	Improvement of the quality of paddy. Before our using fertilizer, paddy was black.	
	2.2 Knowing how to collect and make use of the leaves for making composts.	2.2	2.2 Being easy to find raw materials to make composts that can improve soil quality.	2.1-2.6 (2) Lacking equipment and money for making compost shed.	2.1-2.6 (2) Trying to collect belonging equipment to make compost shed.	Understanding water management before and after transplanting.	Using chemical fertilizer makes soil hard, but using compost makes soil soft and fertile.	
	2.3 Knowing the types of vegetation which can be used for composts.	2.3	2.3 Saving money from not buying chemical fertilizer	2.1-2.6 (3) Lacking time of finding materials to make compost.	2.1-2.6 (3) Telling or explaining other farmers who have not made compost yet.	Knowing how to take care of the rice plants, and how to control weeds.		
3 To learn how to select seeds.	2.4 After applying the composts, having good yield.	2.4	2.4 Being able to increase the quality of rice grains (Having a good taste).	2.1-2.6 (4) Everyone has not made compost yet.	2.1-2.6 (4) Telling or explaining other farmers who have not made compost yet.			
	2.5 Knowing how to build a shed for storing composts.	2.5	2.5 Retaining the soil quality					
	2.6 Knowing materials for making composts besides vegetation.	2.6	2.6 Having the benefit from rubbish and unused things.					
	3.1 Knowing how to select seeds.	3.1	3.1 Getting well-purified seeds.	3.1-3.3 (1) Difficult to keep seeds well due to pests.	3.1-3.3 (1) Trying to find the ways to control pests.			
	3.2 Knowing how to choose suitable tillers for growing seeds.	3.2	3.2 Making the seedlings become bigger very fast.					
	3.3 Good seeds for the following cultivation.	3.3	3.3 Getting rice yields that satisfying the expectation.					
4 To learn how to prepare seed beds.	4.1 Knowing how to prepare seed beds.	4.1	4.1 Having strong and big seedlings.	4.1-4.2 (1) Insufficient rainfall makes seedlings die.	4.1-4.2 (1) Carrying water from well or pond to water the seedlings.			
	4.2 Knowing how to sow.	4.2	4.2 Using less seeds than before.	4.1-4.2 (2) More difficult to prepare nursery bed.	4.1-4.2 (2) Trying very hard to do because this is an obligatory work.			
	5.1 After knowing land preparation, transplanting became easier.	5.1	5.1 Soil is soft and land is flat.	5.1-5.3 (1) Requiring more attention.	5.1-5.3 (1) Hiring tractor to plow in order to reduce labor.			
	5.2 Clean and softened land without weeds.	5.2	5.2 Helping rice plants produce many tillers.	5.1-5.3 (2) Applying basal dressing and transplanting almost happen at the same time.	5.1-5.3 (2) Using leaves to cover on applied fertilizer in paddy field in order to avoid losing quality of fertilizer.			
	5.3 Knowing how to prepare land for transplanting.	5.3	5.3 Saving time.					
	6.1 Knowing how to save water.	6.1	6.1 Having enough water which cannot spoil rice plants.	6.1-6.4 (1) Not enough water.	6.1-6.4 (1) Hiring pumping machine.			

Activities	Outputs/Results	Evaluation	Reason	Problems	Solutions taken by the Participants	Learning	Impacts/ Changes	Future Direction	
7 To learn how to take seedlings and transplant them.	6.2 Easy transplanting.	6.2 +	6.2 Transplanting quickly.	6.1-6.4 (2) Difficult to obtain water because some paddy fields are very far from irrigation facilities.	6.1-6.4 (3) Compromising by telling the reasons.				
	6.3 Healthy seedlings.	6.3 +	6.3 Helping rice plants grow very fast.	6.1-6.4 (3) Some conflicts about water.					
	6.4 Small amount of water can help seedlings well growth.	6.4 ++	6.4 Helping rice plants produce many tillers.						
	7.1 Easy transplanting due smaller # of seedlings.	7.1 +	7.1 Saving labor.	7.1-7.8 (1) Difficult to pulling out the seedlings during transplanting.	7.1-7.8 (1) Helping each other pull out the seedlings for transplanting.				
	7.2 Saving young seedlings.	7.2 ++	7.2 Saving seeds.						
	7.3 Higher yield compared with that by the traditional method.	7.3 ++	7.3 Getting much profit because of high yield and enough amount for self-consumption.						
	7.4 All seedlings bloomed almost simultaneously.	7.4 ++	7.4 Easy harvesting.						
	7.5 One main stem could have many tillers.	7.5 +	7.5 Enough space for growth and being exposed to sunlight.						
	7.6 Easy to select good tillers which would produce good seeds.	7.6 ++	7.6 Being aware of purified or unpurified seeds, easy pulling out unpurified seeds.						
	7.7 Knowing how to transplant with following technique.	7.7 +	7.7 Easy taking care, weeding, and applying fertilizer.						
8 To weed for looking after seedlings.	7.8 Saving time for transplanting.	7.8 ++	7.8 Being able to transplant many plot because a fewer seedlings required.						
	8.1 Well grown seedlings with many tillers.	8.1 ++	8.1 Resulting in high yield.	8.1-8.4 (1) Spending much time to weed.	8.1-8.4 (1) Trying very hard to pull out weeds by own self.				
	8.2 Soften soil.	8.2 +	8.2 Easy producing tillers, and saving time for growth.	8.1-8.4 (2) Following SRI resulted in growth of many grasses.					
	8.3 Easy applying fertilizer.	8.3 ++	8.3 Not losing fertilizer for weeds or grasses.						
	8.4 Rice plants are able to absorb enough fertility from soil.	8.4 +	8.4 Rice plants cannot grow well due to weeds or grasses.						
	9.1 Knowing how to compare the yield of SRI and of the traditional method.	9.1 +	9.1 We have a method to measure paddy, so we can come to know whether we get high or low yield.	9.1 (1) Requiring to pay much attention on counting paddy.	9.1 (1) Not allowing others to come nearby in order to avoid confusion and helping each other count.				
	10.1 Obtained pure and undamaged seeds by insects.	10.1 +	10.1 Providing high yield.	10.1-10.5 (1) Problems with rats and birds.	10.1-10.5 (1) Using rodenticide, pouring water into the hole of rats, using mouse trap and raising cats to catch mice.				
	9 To measure paddy with SRI for comparing that with traditional method.								
	10 To learn how to store seeds for the next season cultivation.								

Activities	Outputs/Results	Evaluation	Reason	Problems	Solutions taken by the Participants	Learning	Impacts/ Changes	Future Direction
	10.2 Easier harvesting compared with the traditional method. 10.3 Knowing how to keep seeds properly. 10.4 Using less the sheaf of rice but getting high yield. 10.5 Getting good seeds that are not broken.	10.2 + 10.3 + 10.4 + 10.5 +	10.1 Seedlings grow and ripen almost simultaneously. 10.3 Easy to keep seeds well. 10.4 Getting more profits and using less labors for transportation. 10.5 Keeping seeds well.					

Table D-2.10 Outcome of Participatory Evaluation Workshop in Zone-4; Participatory Agricultural Extension Activities

Activities	Outputs/Results	Evaluation	Reason	Problems	Solutions taken by the Participants	Learning	Impact/ Changes	Future Direction	
1 To attend the training in SRI technique.	1.1 Knowing the technique of SRI	1.1 ++	1.1 Saving seeds, time, and labor.	1.1-1.6 (1) Most farmers do not want to join.	1.1-1.6 (1) Farmers who already have joined will try to follow SRI technique in order to show to others.	Knowing how to prepare nursery bed (using less seeds, and saving time).	Farmers' living standard is becoming better because of SRI technique.	Planning to withdraw some money from interest to support accounting recorders.	
	1.2 Knowing how to select seeds.	1.2 +	1.2 Rice seeds can be sold at high price.	1.1-1.6 (2) Farmers have not believed in SRI technique yet.	1.1-1.6 (2) Try to show SRI technique to others who have not understood it yet.	Paddies grow simultaneously.	The number of farmers who believe in SRI technique has been increased.	Expanding the group.	
	1.3 Knowing how to sow.	1.3 +	1.3 Easy pulling out and transplanting seedlings.	1.1-1.6 (3) Farmers request snack and money for joining.	1.1-1.6 (3) Try to explain and encourage other farmers to join.	Saved money has been increased every month.	Making farmers to change their old practices (farming and chicken raising).	Continuing to practice what we have learnt from project.	
	1.4 Knowing how to prepare land.	1.4 +	1.4 Helping seedlings grow well because of soft soil.	1.1-1.6 (4) Farmers want to follow their old practice.	1.1-1.6 (4) Try to explain other farmers to understand the advantages of SRI technique.	Trainings are very important for development.	Having enough chickens for eating and selling.	Continuing to change from old way of raising chicken to new techniques or one that have learnt from project.	
	1.5 Knowing how to use fertilizer.	1.5 +	1.5 Reducing the use of chemical fertilizer.			Animals are healthy and grow fast.	Many farmers attend the meeting.	Wanting more experiences.	
	1.6 Transplanting young seedlings.	1.6 ++	1.6 Seedlings have much time to produce tillers.						
	2 To join the study tour on SRI technique, ecological chicken raising, saving group, and group	2.1 Getting good ideas and experiences from host village farmers who were successfully	2.1 +	2.1 Following the successful host village farmers' practice can get good results.	2.1-2.4 (1) All farmers did not join study-tour.	2.1-2.4 (1) After returning, farmers who joined study-tour would try to explain others.			
		2.2 Being able to see the real experiences and activities.	2.2 +	2.2 Host village farmers showed their progress.	2.1-2.4 (2) The time for study-tour was too short.	2.1-2.4 (2) Farmers who joined study-tour paid more attention to monitor.			
		2.3 Practicing what we had seen.	2.3 ++	2.3 Their results were good.	2.1-2.4 (3) Study tour was allowed to visit only one province.	2.1-2.4 (3) Farmers who joined study-tour paid more attention to monitor.			
		2.4 Changing the old practices.	2.4 +	2.4 Easy farming.					
	3 To join the comparative practice of SRI technique and traditional one.	3.1 SRI technique provided higher yield than traditional one.	3.1 ++	3.1 Old practice used many seeds.	3.1-3.3 (1) Not enough water.	3.1-3.3 (1) Doing farming near canal.			
		3.2 SRI technique reduced labor, and provided high yield.	3.2 +	3.2 Reducing the cost of labor.	3.1-3.3 (2) Insects destroyed paddy.	3.1-3.3 (2) Buying pumping machine.			
		3.3 Saving rice seeds.	3.3 +	3.3 Before using 30Kg of seeds but now only 15Kg.	3.1-3.3 (3) Getting low yield because diseases caused paddy die. Farmers did not dare to decide to follow SRI	3.1-3.3 (3) Having followed CEDAC way to control insects.			
		4.1 Knowing how to form a group.	4.1 +	4.1 Being able to help farmers understand and agree to work together.	4.1-4.4 (1) Farmers thought that to join the group got nothing.	4.1-4.4 (1) Deciding to choose volunteers.			
	4 To join the activities of forming a group.	4.2 Having many members makes easy discussing.	4.2 +	4.2 Bringing progress to group.	4.1-4.4 (2) Did not trust each other.	4.1-4.4 (2) Showing the accounting record to all members every month.			
		4.3 Easy studying and experimenting	4.3 +	4.3 Having a chance to learn from each other.	4.1-4.4 (3) Difficult to explain farmers to join the group.	4.1-4.4 (3) Raising many reasons to explain them.			
4.4 Exchanging experiences among members.		4.4 +	4.4 Finding progress for group.	4.1-4.4 (4) Outside members make group inactive. Farmers have low education.	4.1-4.4 (4) Trying to strengthen solidarity in the group.				

Activities	Outputs/Results	Evaluation	Reason	Problems	Solutions taken by the Participants	Learning	Impact/ Changes	Future Direction
5 To save money.	5.1 Getting interest. 5.2 Being able to increase the amount of saved money of the group every month. 5.3 Low interest for members in the group who want to borrow. 5.4 Easy borrowing because of unnecessary of going to other places. 5.5 Earning profit by ourselves. 5.6 Getting much interest for our group. 5.7 Saving money in group can reduce borrowing the credit from outside. 5.8 Saved money can help poor farmers.	5.1 + 5.2 + 5.3 + 5.4 + 5.5 + 5.6 + 5.7 + 5.8 +	5.1 Increasing income. 5.2 Increasing the saved money. 5.3 Reducing the high interest of merchants. 5.4 When necessary, we can borrow money immediately. 5.5 Getting profit for both group and farmers. 5.6 Encouraging us to save. 5.7 Getting interest for our own village. 5.8 Facilitating poor farmers.	5.1-5.8 (1) Not yet know how to record (Accounting record). 5.1-5.8 (2) Group have a problem with money because members do not have enough money to pay. 5.1-5.8 (3) Not yet understand how to deposit the money. 5.1-5.8 (4) Do not trust the group leader.	5.1-5.8 (1) Asking for help from CEDAC to facilitate. 5.1-5.8 (2) Forming activity of raising animal. 5.1-5.8 (3) Allowing to deposit the money based on members' possibilities. 5.1-5.8 (4) Trying to explain all members. Preparing regulation and preventing bad influences from outside.			
6 To learn how to raise chicken.	6.1 Knowing how to raise chicken. 6.2 Reducing the death rate of chicken. 6.3 Knowing how to prepare cage. 6.4 Knowing how to take care of chickens. 7.1 Fattening chickens quickly. 7.2 Reducing the cost of buying feed from market. 7.3 Knowing which plant can be made for chicken feed. 8.1 Reducing the death rate of chicken. 8.2 Learning how to raise chickens preparing cage, and making feed, and medicine. 8.3 Getting much profit from raising chicken.	6.1 + 6.2 + 6.3 + 6.4 + 7.1 + 7.2 + 7.3 + 8.1 + 8.2 + 8.3 +	6.1 Raising chicken is not difficult as before. 6.2 Getting high profit from raising chicken. 6.3 Easy preparing cage. 6.4 Reducing the death rate of chicken. 7.1 Selling chickens earlier and getting more profit. 7.2 Reducing the expenditure. 7.3 Easy finding of all plants for medicine. 8.1 Income is increased. 8.2 Being able to raise chickens by ourselves. 8.3 Improving living standard.	6.1-6.4 (1) We do not have enough money to buy materials for preparing cage. 6.1-6.4 (2) We do not have enough space for preparing cage. 6.1-6.4 (3) Backyard of house is too small. 6.1-6.4 (4) We do not have good breeds of chicken. 7.1-7.3 (1) We have not yet understood how to save feed. 7.1-7.3 (2) Lacking money of buying feed that tastes meat. 7.1-7.3 (3) Farmers do not believe in some plants that can fatten chicken. 8.1-8.3 (1) Lacking money to buy ingredients. 8.1-8.3 (2) Other farmers do not believe in the new way to make medicine.	6.1-6.4 (1) Borrowing money from saving group to buy materials for preparing cage. 6.1-6.4 (2) Following some techniques. 6.1-6.3 (3) Following some techniques. 6.1-6.4 (4) Selling bad species in order to get some money to buy good breeds of chicken. 7.1-7.3 (1) Trying to some documents especially CEDAC document. 7.1-7.3 (2) Trying to strengthen saving group. 7.1-7.3 (3) Encouraging others to follow. 8.1-8.3 (1) Trying to do based on money that we have. 8.1-8.3 (2) Encouraging others to follow.			
7 To join activity on how to fatten and feed chicken.								
8 To join activity for learning how to make medicine to prevent chicken from diseases.								

**Table D-2.11 Results of Questionnaire Survey on Non-Participants
Irrigated Agriculture Improvement Pilot Project Zone-1 (No. of respondents; 10)**

Q1.	Have you ever heard JICA's project implementation in your vicinity (commune/villages)?	Yes	No	Q3.	If "Yes" for Q1, why you have not joined in JICA's project? (Continued)	Applicable (%)
		100%	0%			
Q2.	If "Yes" for Q1, how have you heard about JICA's project?	Applicable (%)		3.6	I was not called for the first meeting.	40%
1	JICA trains farmers how to use irrigation system effectively.	50%		3.7	I am afraid of introducing a new farming technique (SRI).	0%
2	JICA trains farmers how to organize and manage FWUC.	50%		3.8	I do not like people who join in the project.	0%
3	JICA trains farmers how to save irrigation water.	20%		3.9	I wanted to join in but I was not selected as a participant of the project.	50%
4	JICA trains farmers how to manage irrigation water with FWUC.	80%		3.10	I do not like the communal works.	0%
5	JICA made a measurement.	10%		3.11	Joining in the project is against the rules of the community/ village.	0%
6	JICA trains farmers on how to construct field irrigation facilities (water courses, intakes, etc.).	50%		3.12	Joining in the project is against the religion I follow.	0%
7	JICA constructed field irrigation facilities.	10%		3.13	It is difficult to work with the person of different races.	0%
8	JICA trains farmers on ecological SRI (land preparation, compost, seedling, transplanting, water use and etc.).	90%		3.14	I was not permitted to join in the project by my family because I'm a woman.	20%
9	JICA trains farmers on improved farming practice (land preparation, compost, seedling, transplanting, water use and etc.).	50%		3.15	I don't have enough land.	10%
10	JICA gives farmers agricultural inputs.	20%		3.16	My farming field is far from the irrigation system in the project area.	20%
11	JICA introduces Saving Group.	80%		3.17	I don't have enough labor force.	30%
12	Others (Specify): The technique of planting vegetables Training on chicken, pig, cattle, and fish raising, vegetable cultivation, and looking after paddy. Training about raising chicken, pig and cattle.			3.18	I have limited education.	10%
				3.19	In stead of JICA, I want to learn something new from the farmers.	30%
Q3.	If "Yes" for Q1, why you have not joined in JICA's project?	Applicable(%)		3.20	Others (Specify): I wanted to practice SIR, but one plot faces poor drainage so I'm afraid that crabs destroy the paddy. Other plot locates far from the others' plots and lacks water. So I could not do SRI. The yield of SRI is the same as traditional one. SRI makes cattle raising difficult due to smaller amount of straw. Transplanting of SRI is time consuming and much more difficult than traditional one. If we follow the traditional technique, we can do other things besides rice planting. I don't have money to save in the saving group because my parents are sick, and so I have to spend money for their medicine. It takes times to transplant. One seedling transplanting is risky when there are many crabs in rice fields. The SRI yield is the same with traditional one but I need using more labor forces. I don't have time to meet JICA's staff, so they should have come more often to village. My land is not proper for doing SRI because it is too large (2ha). I am sick, so I could not join in the meetings or other activities in the village. I want to see the result of other farmers first, and then if SRI provides high yield, I will do it later on. I think saving group is not useful. Saving group is not so useful for farmers. I am afraid that doing the new technique will not provide high yield. I don't join in the saving group because I don't earn enough money to save in the group. Saving group doesn't collection money timely.	
1	Project components are not interesting.	0%				
1.1	Irrigation management is not interesting.	0%				
1.2	Ecological SRI is not interesting.	20%				
1.3	Improved farming practice is not interesting.	20%				
2	Project components do not seem profitable.	20%		Q4.	If Answer 3.1 - 3.20 for Q3., how should have the JICA dealt with your constraints for joining in the project?	Applicable (%)
2.1	Irrigation management does not seem profitable.	0%		1	Show the profit from the project visually.	70%
2.2	Ecological SRI does not seem profitable.	10%		2	Show the profit from the project in more easily understanding way.	60%
2.3	Improved farming practice does not seem profitable.	0%		3	Change the meeting/ gathering time based on the request.	60%
3	The project components are interesting/ seem profitable but	/		4	Explain more about the projects before starting.	20%
3.1	Meetings/ gathering times were not convenient.	10%		5	Hold the meeting for explaining the benefits of the project in the middle of the project.	0%
3.2	I am busy with farming.	30%		6	Invite as many as farmers for the first meeting.	70%
3.3	I am busy with side jobs.	40%		7	Give the other opportunities for joining in the project even after the first meeting.	40%
3.4	Joining in the project takes too much time.	20%		8	Others (Specify): Invite farmers for meetings repeatedly. Select participated farmers fairly. Help deal with crabs. Find simple SRI technique for all farmers can apply it. Invite all farmers for meetings. Inform farmers meetings 2-3 days in advance. Hold meetings up to farmers' convenience. Hold more frequent meetings.	
3.5	I am busy with public/ social works.	0%				

Q5.	Do you find any change before and after (due to) the project's implementation?	Applicable (%)	Q6. Other comments
1	Nothing has changed yet.	10%	<p>JICA should choose the days that all farmers can attend meetings.</p> <p>I want the good canal system reserving water in all seasons and help for rehabilitating the canal.</p> <p>I want the leader of the saving group to explain the importants of saving group to my husband.</p> <p>I want JICA to build check structures in each canal because we don't need water in some places.</p> <p>I want JICA to provide me fertilizer.</p> <p>I want JICA to dig wells for the villagers in the village.</p> <p>I want JICA to train all farmers how to apply SRI in the village.</p> <p>I want JICA to install irrigation system in many places, to build bridges and also to train farmers on how to grow other crops.</p> <p>I want to have enough water in the canal in both dry and rainy seasons for I can grow other crops. Please build more canals in the village and also provide electricity, good road and toilets.</p> <p>I want JICA to provide fertilizer and also water in both dry and rainy season.</p>
2	Villagers have become more cooperative.	20%	
3	Our village realized the substantial living.	70%	
4	More water comes to the fields timely based on the actual demand.	60%	
5	Less/ no conflict on water among farmers.	60%	
6	Environmental degradation.	0%	
7	More conflict on water among farmers.	10%	
8	Breakout of harmful insects.	0%	
9	Increase of agricultural inputs' price.	0%	
10	Double cropping (harvest in both dry and rainy seasons.)	10%	
11	Higher yield.	50%	
12	Started to grow vegetables.	20%	
13	More people become willingly to join in village meetings/ discussion.	30%	
14	Others (Specify): Using a fewer seeds. Obtaining filled grains. Reliable saving group; people can borrow money at low interest rate to improve living standard and help run small business. Some farmers continue practicing SRI but some stopped because it takes times to weed, drain, and irrigate. Some farmers start to adapt the transplanting method. Practicing SRI helps reduce use of seeds, insecticide, and fertilizer. Borrowing money at low interest rate. Easy intake of water. Knowing the new technique of drawing water. Saving many seeds. Still facing the shortage of water. The farmers in the other villages obtain all water.		

**Table D-2.12 Results of Questionnaire Survey on Non-Participants
Irrigated Agriculture Improvement Pilot Project Zone-3 (No. of respondents; 10)**

Q1.	Have you ever heard JICA's project implementation in your vicinity (commune/ villages)?	Yes	No	Q3.	If "Yes" for Q1, why you have not joined in JICA's project? (Continued)	Applicable (%)	
		100%	0%				
Q2.	If "Yes" for Q1, how have you heard about JICA's project?	Applicable (%)		3.6	I was not called for the first meeting.	70%	
1	JICA trains farmers how to use irrigation system effectively.	0%		3.7	I am afraid of introducing a new farming technique (SRI).	0%	
2	JICA trains farmers how to organize and manage FWUC.	60%		3.8	I do not like people who join in the project.	0%	
3	JICA trains farmers how to save irrigation water.	0%		3.9	I wanted to join in but I was not selected as a participant of the project.	20%	
4	JICA trains farmers how to manage irrigation water with FWUC.	30%		3.10	I do not like the communal works.	0%	
5	JICA made a measurement.	70%		3.11	Joining in the project is against the rules of the community/ village.	0%	
6	JICA trains farmers on how to construct field irrigation facilities (water courses, intakes, etc.).	0%		3.12	Joining in the project is against the religion I follow.	0%	
7	JICA constructed field irrigation facilities.	10%		3.13	It is difficult to work with the person of different races.	0%	
8	JICA trains farmers on ecological SRI (land preparation, compost, seedling, transplanting, water use and etc.).	50%		3.14	I was not permitted to join in the project by my family because I'm a woman.	0%	
9	JICA trains farmers on improved farming practice (land preparation, compost, seedling, transplanting, water use and etc.).	50%		3.15	I don't have enough land.	0%	
10	JICA gives farmers agricultural inputs.	10%		3.16	My farming field is far from the irrigation system in the project area.	60%	
11	JICA introduces Saving Group.	30%		3.17	I don't have enough labor force.	0%	
12	Others (Specify): JICA trains farmers on how to raise animals (cow and pig) and cultivate vegetables.			3.18	I have limited education.	0%	
				3.19	In stead of JICA, I want to learn something new from the farmers.	40%	
Q3.	If "Yes" for Q1, why you have not joined in JICA's project?	Applicable (%)		3.20	Others (Specify): I had finished transplanting before the project came in this season. So, I could not join in. But the next season, I will join in experiment SRI because I heard less sheaves of rice is used. I am sick so I cannot join in. I am afraid that I could not prepare money for the saving group. I have just moved to live here 1 year ago.		
1	Project components are not interesting.	0%					
1.1	Irrigation management is not interesting.	0%					
1.2	Ecological SRI is not interesting.	0%					
1.3	Improved farming practice is not interesting.	0%					
2	Project components do not seem profitable.	0%		Q4.	JICA dealt with your constraints for joining in the project?	Applicable(%)	
2.1	Irrigation management does not seem profitable.	0%		1	Show the profit from the project visually.	90%	
2.2	Ecological SRI does not seem profitable.	0%		2	Show the profit from the project in more easily understanding way.	60%	
2.3	Improved farming practice does not seem profitable.	0%		3	Change the meeting/ gathering time based on the request.	30%	
3	The project components are interesting/ seem profitable but	/		4	Explain more about the projects before starting.	40%	
3.1	Meetings/ gathering times were not convenient.			10%	5	Hold the meeting for explaining the benefits of the project in the middle of the project.	0%
3.2	I am busy with farming.			30%	6	Invite as many as farmers for the first meeting.	90%
3.3	I am busy with side jobs.			60%	7	Give the other opportunities for joining in the project even after the first meeting.	30%
3.4	Joining in the project takes too much time.			0%	8	Others (Specify): After seeing the result of experiments, farmers started to trust and want to join in the project. Farmers have to unite together. At least one member from one family needs to attend the training. Explain the importance of water. When there is enough water, we can cultivate rice and the other crops. If you hold a meeting, please inform me 2 days in advance. If holding a next meeting, JICA should inform farmers 2-3 days in advance. JICA should explain farmers to spread out information to other farmers. Build canals in many places. Train all farmers about the benefits of SRI and tell farmers to share the knowledge of SRI with other farmers who don't know. Building canals in the village; so farmers could apply SRI.	
3.5	I am busy with public/ social works.	0%					

Q5.	Do you find any change before and after (due to) the project's implementation?	Applicable (%)	Q6. Other comments
1	Nothing has changed yet.	40%	<p>Request the project to construct canals soon, and provide training on how to make compost to farmers in our village (Mohalumpiang I). Request JICA to construct canals and repair a reservoir so that JICA can help farmers be easy to do farming.</p> <p>Request JICA to provide canals that can reach to all paddy fields so we can do farming twice per year, and provide pumping machine for high land.</p> <p>I want the embankment of the reservoir make higher for much water can be stored and the reservoir can irrigate my plot.</p> <p>I want the project to construct canals and repair the reservoir soon because there is not much rainfall causing the lower yield. I can contribute my land to canal construction.</p> <p>Request JICA to construct one canal and rehabilitate the reservoir for bigger and deeper, so much water can be stored in the reservoir.</p> <p>Request JICA to build concrete lining canals, reservoir, gates in order to help farmers taking water easily and to rehabilitate the reservoir.</p> <p>I want JICA to build the large canals and rehabilitate the reservoir to have more water in the rice field. Build shelters for monks.</p> <p>I want the project to build deep canals that can store much water, so w</p> <p>Build canals, rehabilitate the reservoir storing much water, so farmers</p> <p>Build a big and deep reservoir.</p>
2	Villagers have become more cooperative.	30%	
3	Our village realized the substantial living.	10%	
4	More water comes to the fields timely based on the actual demand.	30%	
5	Less/ no conflict on water among farmers.	40%	
6	Environmental degradation.	0%	
7	More conflict on water among farmers.	0%	
8	Breakout of harmful insects.	0%	
9	Increase of agricultural inputs' price.	0%	
10	Double cropping (harvest in both dry and rainy seasons.)	0%	
11	Higher yield.	50%	
12	Started to grow vegetables.	0%	
13	More people become willingly to join in village meetings/ discussion.	10%	
14	Others (Specify): SRI can save seed. SRI decreases insect damage. SRI can save a lot of seeds. I hit on the idea of organizing one farmers' group that collect rice seeds to sell to NGOs. SRI requires small amount of agricultural inputs. SRI realizes saving a lot of seeds. One main stem can have many tillers. Farmers started to use compost instead of chemical fertilizer.		

**Table D-2.13 Results of Questionnaire Survey on Non-Participants
Irrigated Agriculture Improvement Pilot Project Zone-4 (No. of respondents; 10)**

Q1.	Have you ever heard JICA's project implementation in your vicinity (commune/ villages)?	Yes	No	Q3.	If "Yes" for Q1, why you have not joined in JICA's project? (Continued)	Applicable (%)
		100%	0%			
Q2.	If "Yes" for Q1, how have you heard about JICA's project?	Applicable (%)		3.8	I do not like people who join in the project.	0%
1	JICA trains farmers how to use irrigation system effectively.	0%		3.9	I wanted to join in but I was not selected as a participant of the project.	20%
2	JICA trains farmers how to organize and manage FWUC.	0%		3.10	I do not like the communal works.	0%
3	JICA trains farmers how to save irrigation water.	0%		3.11	Joining in the project is against the rules of the community/ village.	0%
4	JICA trains farmers how to manage irrigation water with FWUC.	0%		3.12	Joining in the project is against the religion I follow.	0%
5	JICA made a measurement.	0%		3.13	It is difficult to work with the person of different races.	0%
6	JICA trains farmers on how to construct field irrigation facilities (water courses, intakes, etc.).	0%		3.14	I was not permitted to join in the project by my family because I'm a woman.	0%
7	JICA constructed field irrigation facilities.	0%		3.15	I don't have enough land.	30%
8	JICA trains farmers on ecological SRI (land preparation, compost, seedling, transplanting, water use and etc.).	90%		3.16	My farming field is far from the irrigation system in the project area.	10%
9	JICA trains farmers on improved farming practice (land preparation, compost, seedling, transplanting, water use and etc.).	40%		3.17	I don't have enough labor force.	60%
10	JICA gives farmers agricultural inputs.	40%		3.18	I have limited education.	10%
11	JICA introduces Saving Group.	20%		3.19	In stead of JICA, I want to learn something new from the farmers.	10%
12	Others (Specify): Providing a weeding tool to farmers.			3.19	Others (Specify): The technique is very complicated. I am afraid that following technique results in low productivity when there is not enough water. Applying SRI technique spends much time with the same yield as traditional practice, so it is difficult to follow. My wife has already joined in project so I can ask her about the project. Moreover, my jobs (making a fishing tool and farming) save time and are more beneficial than my wife's. Soil condition is not appropriate for SRI technique. I am afraid of crabs that can cut or eat seedlings, and floods that can spoil seedlings. Lack of water due to no water sources. I am afraid of lacking rice stubbles for feeding cows. For saving group, it spends much time and I have no money to save because it is used for curing illness. I have many paddy plots so I cannot follow SRI technique due to difficulty of transplanting and time limitation. SRI experiment results in lower yield than that from traditional practice. There is not enough water. Paddy fields depend on rainfall, so yield is decreasing. This area is not suitable for SRI practice because much fertilizer is needed. The head of family is disabled, so no one helps me. I do not understand SRI and do not have many plots. I am afraid that if I try SRI and it fails, I would get nothing. Moreover, I always want to follow the traditional way.	
Q3.	If "Yes" for Q1, why you have not joined in JICA's project?	Applicable (%)		3.20	<p>Q4. If Answer 3.1 - 3.20 for Q3., how should have the JICA dealt with your constraints for joining in the project?</p> <p>1 Show the profit from the project visually. 70%</p> <p>2 Show the profit from the project in more easily understanding way. 50%</p> <p>3 Change the meeting/ gathering time based on the request. 20%</p> <p>4 Explain more about the projects before starting. 40%</p> <p>5 Hold the meeting for explaining the benefits of the project in the middle of the project. 0%</p> <p>6 Invite as many as farmers for the first meeting. 60%</p> <p>7 Give the other opportunities for joining in the project even after the first meeting. 10%</p> <p>8 Others (Specify): Request JICA to rehabilitate canals, so there will be water to irrigate. I will explain about the benefit of practicing SRI: it can save a sheaf of rice, seed, and be productive. If there is a meeting, please inform one day before. Ask village chiefs to make farmers being aware of the project components. Explain more clearly how to practice SRI. If JICA wants farmers to participate in the projects, it should provide canals first because farming in this area depends on rainfall. We need to see the experimental yields first. If it is higher than that of traditional one, farmers will follow and explain the technique to other farmers in case there is no meeting. Provide fertilizer or agricultural equipment. If there is a meeting or training on experimental rice, please inform one week before.</p>	
1	Project components are not interesting.	40%				
1.1	Irrigation management is not interesting.	0%				
1.2	Ecological SRI is not interesting.	20%				
1.3	Improved farming practice is not interesting.	0%				
2	Project components do not seem profitable.	10%		Q4.		Applicable (%)
2.1	Irrigation management does not seem profitable.	0%		1	Show the profit from the project visually.	70%
2.2	Ecological SRI does not seem profitable.	10%		2	Show the profit from the project in more easily understanding way.	50%
2.3	Improved farming practice does not seem profitable.	0%		3	Change the meeting/ gathering time based on the request.	20%
3	The project components are interesting/ seem profitable but	/		4	Explain more about the projects before starting.	40%
3.1	Meetings/ gathering times were not convenient.	10%		5	Hold the meeting for explaining the benefits of the project in the middle of the project.	0%
3.2	I am busy with farming.	20%		6	Invite as many as farmers for the first meeting.	60%
3.3	I am busy with side jobs.	60%		7	Give the other opportunities for joining in the project even after the first meeting.	10%
3.4	Joining in the project takes too much time.	40%		8	<p>Others (Specify): Request JICA to rehabilitate canals, so there will be water to irrigate. I will explain about the benefit of practicing SRI: it can save a sheaf of rice, seed, and be productive. If there is a meeting, please inform one day before. Ask village chiefs to make farmers being aware of the project components. Explain more clearly how to practice SRI. If JICA wants farmers to participate in the projects, it should provide canals first because farming in this area depends on rainfall. We need to see the experimental yields first. If it is higher than that of traditional one, farmers will follow and explain the technique to other farmers in case there is no meeting. Provide fertilizer or agricultural equipment. If there is a meeting or training on experimental rice, please inform one week before.</p>	
3.5	I am busy with public/ social works.	0%				
3.6	I was not called for the first meeting.	20%				
3.7	I am afraid of introducing a new farming technique (SRI).	0%				

Q5.	Do you find any change before and after (due to) the project's implementation?	Applicable (%)	Q6. Other comments
1	Nothing has changed yet.	30%	<p>I request JICA to construct canal, reservoir, and provide pumping machine to irrigate paddy field that is very far. If there is enough water, all farmers will be able to do farming.</p> <p>I request the project to construct canals in village and improve the road. I would like to request JICA to: provide seed because other villages was provided good seeds, construct canals that can provide enough water for paddy fields, provide pumping machine for paddy fields being far, provide fertilizer because SRI practice requires much fertilizer or training on how to make compost, how to flatten land, and so water can be distributed evenly and how to control insects and weeds.</p> <p>I would like to request one canal.</p> <p>If JICA wants farmers to work in experimental plots, please provide more trainings, or meetings on how to work in experimental plots.</p> <p>I would like to request JICA to provide more rice seeds and to rehabilitate existing canals for we can do farming twice per year, and to construct road.</p> <p>I would like to request the project to dig wells (1 well for 10 houses), provide pumping machines because canals cannot be constructed due to increasing land.</p> <p>I would like to request JICA to construct canals.</p> <p>I would like to request JICA to provide trainings on new techniques before doing.</p> <p>Please construct canals in village, provide agricultural input such as pesticide, and</p> <p>I would like to request JICA to provide more trainings to farmers on new techniques.</p> <p>I would like to request JICA to explain more about the project to farmers in order to have enough water for irrigation.</p>
2	Villagers have become more cooperative.	10%	
3	Our village realized the substantial living.	40%	
4	More water comes to the fields timely based on the actual demand.	0%	
5	Less/ no conflict on water among farmers.	0%	
6	Environmental degradation.	0%	
7	More conflict on water among farmers.	0%	
8	Breakout of harmful insects.	0%	
9	Increase of agricultural inputs' price.	20%	
10	Double cropping (harvest in both dry and rainy seasons.)	0%	
11	Higher yield.	60%	
12	Started to grow vegetables.	10%	
13	More people become willingly to join in village meetings/ discussion.	20%	
14	Others (Specify): SRI can save seed. SRI can save seed. SRI can help farmers know how to select seeds. Farmers know how to reduce the number of insects and diseases. SRI spends more time for buying fertilizer but can save seeds and time so that we can do other works. SRI can save seed, labor for transplanting, and time. I see that farmers who work in experimental plots have better living standard. Losing rice stubble for cows but saving seed. Reducing chemical fertilizer use due to use of natural fertilizer. SRI technique can reduce diseases of rice, increase the attention on taking care paddy. Lowering agricultural inputs-saving seeds, knowing new techniques of cultivation, and knowing how to make composts. SRI can save the sheaves of rice, but the yield is lower than that of traditional method due to lack of water. SRI can save seed.		