CHAPTER 5 FY 2008/09 PILOT PROJECT

This Chapter 5 discusses the pilot projects which were commenced in FY 2008/9. In this fiscal year, in addition to such projects which had been tried in the target 6 villages of FY 2007/08, component-wide type projects have also been tried. The component-wide type pilot projects were tried in the sectors of agriculture and livestock by giving a serious of trainings to the TS extension staff. Following sessions present implementation methodology, consensus making process, activities undertaken and those outputs, contents of trainings, latest status as of February 2010, etc. Evaluation for the project is to be discussed in the last sub-chapter, and also lessons which have been deduced and thereby can apply to other projects are to be elaborated in the Main Report.

5.1 Implementation Methodology by Project Type

Following table indicates proposed contents of the pilot project and their implementing approaches (whether project oriented or component-wide) and the interrelationship showing that in which type each individual pilot project has higher priority. The Study Area is subdivided into 5 categories: the type 1 represents the area along Bago Hills where the climate is driest and people suffer from high degree of poverty, vice versa the type V indicates the area where paddy area accounts for more than 40% and more than 40% of the paddy land is irrigated with the highest average income (whereas big disparity may persist between paddy farmers and the landless). According to the ranking order marked in the table with ○, ◎ and ●, the priority of the project is getting higher.

Table 5.1.1 Components of Pilot Projects in FY 2008/09

Candidates of Pilot Project			Type I	Type II	Type III	Type IV	Type V
Pilot Project	Project type	Component-wide	Number of TS covered in (in total 6TS)				
			1	1	2	1	1
A1. Improved Paddy Cultivation		○		○	○	◎	●
A2. Organic Farming Promotion		○	●	●	◎	◎	○
A3. Improved Seed Regeneration	○(3villages)		○	◎	◎	◎	○
A4. Mushroom Culture	○(2villages)		○	○	○	○	○
A5. Small-Scale Irrigation	○(2villages)		No water	○	◎	○	
A6. Crop Storage Depot	○(2villages)				○	○	◎
A7. Minimum Tillage Promotion	○(2villages)		◎	◎	◎	○	○
A8. New Variety Adaptability Trial Test	○(6villages)		○	○	○	○	○
L1. Goats Revolving		○	●	◎	○	○	
L2. Piggery Revolving		○				○	◎
L3. Livestock Feeding Improvement		○	○	○	○	○	○
C1. Village Revolving Fund	○(3villages)		○	○	◎	◎	◎
I1-1. Firewood Substituting Bio-fuel I1-2. Improved Cooking Stove	○(3villages)		◎	◎	◎	◎	◎
I2. Paddy Husk Power Generation	○(1village)					○	◎
I3. Children's Nutrition Improvement	○(1village)		◎				

Note: *Minimum tillage cropping promotion and new varieties testing trial can in principle be implemented through component-wide approach. However, implementation of these is planned in limited villages or with project-oriented approach because they have major character of test trials.

5.1.1 Quantity of Implementation Sites in the Project Type Approach

In the case that the pilot project is implemented through project type, 6 villages (6TS) implemented in FY 2007/08, or their neighboring villages in the same TS, are as a rule selected as the target villages. Such a selection not only facilitates follow-up and monitoring by the Study Team and also it is envisaged evaluating the effect of integrated rural development oriented approach that is implemented along with plural components in an area.

As to the quantities of implementation (target villages covered by implementation), they are shown in the above table. Basic principles of implementation are: 1) rice husk power generation incurring

enormous construction cost will be implemented in only one village, 2) all other projects should be carried out at least in 2 villages for comparative evaluation and 3) new variety test trials are conducted in different villages because it is required to make them try under various conditions.

As regards concrete sites (TS and villages) of implementation by pilot project, they are basically determined at the TS (and a village therein) with higher priority of the project. That is to say, villages located in TS labeled with their priority of a particular project in the order ●→◎→○ in the previous table are chosen as the targets of their pilot project.

Yet, adjustment must be made taking into account the balance among target TSs because it is impossible to carry out all the necessary projects across the types from the viewpoint of both the amount of fund availability and logistics of implementation. As such, the number of pilot villages where the project is carried out with project type approach and their relationship with types that are to be covered with project type approach is briefed in the following table:

Table 5.1.2 Number of Target Villages under Project Type Approach in FY 2008/09

Candidates of Pilot Project			Type I	Type II	Type III	Type IV	Type V
Pilot Project	Nr. of Project	Priority in TS	Number of TS covered in (in total 6TS)				
		Pilot Implem'd	1	1	2*	1	1
A3. Improved Seed Regeneration	3 villages	Priority in TS	○	◎	◎	◎	○
		Pilot Implem'd		done in 2007	✔✔	✔	
A4. Mushroom Culture	2 Villages	Priority in TS	○	○	○	○	○
		Pilot Implem'd	✔		done in 2007	✔	Done in 2007
A5. Small-scale Irrigation	2 Villages	Priority in TS	No water	○	◎	○	
		Pilot Implem'd		✔	✔		
A6. Crop Storage Depots	2 Villages	Priority in TS			○	○	◎
		Pilot Implem'd				✔	✔
A7. Minimum Tillage Promotion	2 Villages	Priority in TS	◎	◎	◎	○	○
		Pilot Implem'd		✔	✔		
A8. New Variety Adaptability Tests	6 Villages	Priority in TS	○	○	○	○	○
		Pilot Implem'd	✔	✔	✔	✔	✔
C1. Village Revolving Fund	3 Villages	Priority in TS	○	○	◎	◎	◎
		Pilot Implem'd		✔**	✔	✔	
I1-1. Firewood Substituting I1-2. Improved Cooking Stove	3 Villages	Priority in TS	◎	◎	◎	◎	◎
		Pilot Implem'd	3 Villages from those with high production output of Jatropha				
I2. Paddy Husk Power Generation	1 Village	Priority in TS				○	◎
		Pilot Implem'd					✔
I3. Nutrition Improvement Centre	1 village	Priority in TS	◎				
		Pilot Implem'd	✔				

Note:*As to Type III, one village each to Sagaing Division and Mandalay Division, namely 2 villages are included.
** It was planned in Type V, but participants in the kick-off meeting suggested to move this component from Type V to Type I since Type V villages are already somewhat developed.

5.1.2 Quantity of Implementation in the Component-Wide Approach

The other type of approach, i.e., component-wide one, is realized in providing MAS and LBVD extension staff stationed in 6 (or 12 in case of MAS) TSs with trainings. Thus, the extension workers who participated in the training are to individually extend extension activities based on what they have learned during the training, given minimum inputs and logistics support from JICA after they return to their jurisdictional TSs.

The table below indicates kinds of individual project to be promoted with component-wide approach and their relationship with the types that have higher priority on their implementation. For example, as regards paddy cropping improvement, type I, with the most rigorous natural conditions, doesn't have priority on project implementation thereof because it doesn't have substantial paddy area, whereas type V, with tracts of irrigated farmland, has the highest priority. Likewise, in case of

livestock, higher priority is attached to those where higher degree of dryness prevails (i.e., type I and type II), while type V has higher priority in introducing piggery revolving because rice bran and other by-products can be utilized as feed:

Table 5.1.3 Number of Target Villages under Component Wide Approach in FY2008/09

Candidates of Pilot Project			Type I	Type II	Type III	Type IV	Type V
Pilot Project	Number of Project	Priority in TS	Number of TS covered in (in total 6TS)				
		Pilot Implemented	1	1	2	1	1
A1. Improved Paddy	12 TSs	Priority in TS		○	○	✔	●
A2. Organic farming			●	●	✔	✔	○
		Pilot Implem'd	✔	✔	✔ ✔	✔	✔
L1. Goat Revolving	6 TSs	Priority in TS	●	✔	○	○	
L2. Piggery Revolving						○	✔
L3. Livestock Feeding			○	○	○	○	○
		Pilot Implem'd	✔	✔	✔ ✔	✔	✔

Source: JICA Study Team

Despite the fact that the projects have individual priorities according to the types they are classified, all the types should be adopted as the targets of the pilot project to be promoted with component-wide approach by the following reasons:

1) In implementing projects with component-wide approach, training for extension staff concerned comes at the first step, while training per batch can accommodate 30 to maximum 60 trainees,

2) The trained staff happen to be transferred through personnel transfer to another TS with different type (that is to say, there is future possibility of being transferred from a place without suitable land for paddy cropping to another area abundant with paddy), and

3) For certain subjects of training like IMO utilization and livestock feeding improvement, it is desirable for every staff to attend training lectures/ exercises because these are the components commonly required irrespective of the type.

About 16 extension staff on average are stationed in an agricultural extension office at TS level, and 4 staffs on average belong to a livestock extension office, LBVD TS office, at the said level. It is planned to provide training at the rate of 3 staff each for target 12 TSs in terms of agriculture, and all 4 staff in terms of livestock. Districts and divisions are placed superior to TS level, and the participation of these staff in the training is requested at the rate of one staff per office.]

Table 5.1.4 summarizes number of staff in terms of agriculture planned to join the training, while Table 5.1.5 does those in terms of livestock. So, it is planned to invite to the training altogether 45 staff from agricultural offices and in total 33 staff from LBVD ones.

Table 5.1.4 List of Agricultural Extension Staff for the Training

Division	TS level (Agricultural side)			District	Division	Grand Total
	TS	Extension staff	Total			
Sagaing	4	3	12	1×2 District	1	15
Mandalay	4	3	12	1×2 District	1	15
Magway	4	3	12	1×2 District	1	15
Total						45

Table 5.1.5 List of Livestock Extension Staff for the Training

Division	TS level (Livestock side)			District	Division	Grand Total
	TS	Extension staff	Total			
Sagaing	2	4	8	1×2 District	1	11
Mandalay	2	4	8	1×2 District	1	11
Magway	2	4	8	1×2 District	1	11
Total						33

The training is scheduled dividing into two courses. The second course is characterized as a refresher course in which the trainees report what they actually extended in their service village areas after receiving the first training course so that their experiences can be shared among the attendants.

The subjects of training include A1. Paddy cropping improvement and A2. Agriculture utilizing soil microorganisms in agricultural field and these courses are provided dividing into 2 times. Livestock field covers L1. Goat revolving, L2. Piggery revolving and L3. Livestock feeding improvement and these courses are combined as one. The table below briefs days of training per course, total days of training, number of trainees and cumulative man-days of participation in the training. The total training is anticipated at 1,386 man-days.

Table 5.1.6 Expected Person-days for the Trainings in FY 2008/09

Training Subject（draft）	The 1st course	The 2nd course	Total No. of days	Number of participants	Cumulative man-days
A1. Improved Paddy	7（net 5）	6（net 4）	13（net 8）	45	585
A2. Organic Farming	7（net 5）	5（net 3）	12（net 8）	45	540
Sub-Total					1,125
L1. Goat Revolving	Simultaneously implemented 7（net 5）	Simultaneously implemented 5（net 3）	Simultaneously implemented 12（net 8）	Simultaneously implemented 33	Simultaneously implemented 396
L2. Piggery Revolving					
L3. Livestock Feeding					
Sub-Total					396
Grand Total					1,521

Source: JICA Study Team

5.2 Consensus Making on the Components of the FY 2008/09 Pilot Project

In order for concerned officers to arrive at a consensus on the components of the pilot projects in FY 2008/09, 2 kick-off workshops were held in Mandalay; the first one from June 16 to June 17, 2008 and the other on June 26 and 27, 2008. The workshops invited concerned officers from divisional offices, district offices and township offices covering MAS, LBVD, and Cooperative, including PDC offices at TS level. The first kick-off was meant to introduce the participants the components and activities in the pilot projects in FY 2008/09 and the second kick-off was done to arrive at the consensus for the participants concerned.

5.2.1 First Kick-off Workshop (on June 16 and June 17, 2008)

1) Workshop Mechanics

To start the pilot projects in FY 2008/09, there was a felt need for the relevant officers to know the components, overall schedule, modus operandi, implementation mechanism, etc. As well, locations (villages) in which pilot projects are to be implemented had to be discussed and agreed, and therefore this first kick-off work was arranged for the following objectives:

1) To know the contents of the pilot projects to be carried out in 2008/09,
2) To know the overall schedule and modus operandi of the pilot project implementation,
3) To agree the locations (townships) where pilot projects are to be implemented (specific villages by pilot project will be decided after consultation with the concerned villagers).
4) To agree way-forward toward the 2nd kick-off workshop.

Participants came from relevant offices such as MAS, LBVD, and Cooperative at 3 government cadres of divisional, district and township levels. PDCs at TS level were also invited to the workshop. There were total 39 officers to have attended the workshop apart from the JICA Team members and its counterpart personnel. Brief schedule is given of the following:

Table 5.2.1 Brief Schedule of the First Kick-off Workshop

Date	Activities	Person in Charge
DAY 1	Announcement of WS Objectives, Schedule, Norms	NPD (Chief CP)
	Brief Review of the Study, Situation Analysis of the CDZ, Questions & Answers	JICA TL
	Results of Pilot Projects in 2007/08, Questions & Answers	NPD (Chief CP)
	Presentation of the Pilot Projects in 2008/09, Questions & Answers	NPD (Chief CP)
	Discussion & Agreement for Township by Pilot Project in 2008/09	NPD (Chief CP)
DAY 2	Selection Criteria for Villages by Pilot Project in 2008/09	NPD (Chief CP)
	Selection Criteria for Project (through workshop discussion)	Facilitator
	Clarification, Questions and Answers	NPD, JICA
	Way-forward, and Closing	NPD (Chief CP)

Source: JICA Study Team

JICA Team Leader is now presenting situation analysis of CDZ as the lead up session to the plenary.

It is noted that during the brief review session, the Team Leader had focused on situation analysis of the CDZ share of agricultural production in the Union; namely, rice, sesame, green gram and chick pea in terms of crop production, annual consumption, local and export price trend of rice, etc. as:

1) Having potential to produce rice, but becoming less competitive in international rice market from the price point of view,
2) Oil crops being not much competitive in economic term due to cheap palm oil import, and
3) Having potential to further increase pulses and beans thanks to Indian market and its economic transformation having taken place since 1991.

In addition, the Leader presented the Poverty Profile of the study area, by explaining Poverty Line, based on cost of basic needs method, ratio of landless people in rural area, inequitable income distribution represented by Gini Index, deepness of debt and reason, etc. Following the presentation by the JICA TL, the National Project Director (chief counterpart) undertook the sessions of; 1) review of the pilot projects carried out in FY 2007/08, 2) presentation of the pilot projects to be carried out in FY 2008/09, 3) discussion and agreement for the townships by project, 4) selection criteria for villages by pilot project, etc.

2) Selection Criteria for Villages by Pilot Project

Since pilot projects in FY 2008/09 were proposed by the JICA Team together with central office counterparts, there should be a need to decide which villages should be selected in carrying out what pilot projects. The first step for this consideration is in fact to set up criteria by what villages where pilot projects are to be introduced should be selected. The criteria were presented as below by JICA Team and agreed upon by the floor for the pilot projects in FY 2008/09: the villages;

1) Should be selected from nearby villages from the ones where 1st stage pilot projects were implemented (either within same village tract or from neighboring village tract), for the purpose of facilitating the monitoring of the 1st stage pilot projects commenced in FY 2007/08,
2) Should have a demonstration effect to not only the villagers but also people from other villages; namely, endorsed with good accessibility and/or locational advantage,
3) Should not have had much donor/government assistances so far, so as to avoid concentration of supports on just one place, and
4) As long as a project is feasible to implement, planned pilot projects should be implemented in one

village within the TS, which may contribute to promoting synergy effects amongst pilot activities and also help the project team, joint force of JICA Team and counterparts, to carry out close monitoring.

Taken into consideration of the above selection criteria, the township level extension staffs, with the assistant of the facilitator, collectively proposed and agreed upon the detailed selection criteria for the villages by pilot project as below:

Table 5.2.2 Detail Criteria Set up by the Participants for Selecting Pilot Villages

Pilot Project (only by project type)	Township	Criteria for the target villages
08A3. Improved Seed Regeneration	Tada-U Myinmu Ayadaw	1. The Village must be interested in Chickpea Growing. 2. The Village must be free from inundated land. 3. Growing land must be at a stretch. 4. The Village must be a harmonious / united one. 5. The Village must have a maintenance place of seeds and responsible person.
08A4. Mushroom Culture	Chauk Ayadaw	1. The Village must be close to the market. 2. Raw materials must be available plentifully. 3. Trade-minded Villagers must be in the village. 4. The village must have facility to be able to buy mushroom seed. 5. Availability of water which is suitable for mushroom cultivation must be in the village.
08A5. Small-scale Irrigation	Ngazun Tada-U	1. The Village must have water source suitable for using treadle pump. 2. The village must have had experience of onion growing.
08A6. Crop Storage Depot	Ayadaw Pwintbyu	1. Crop production must be more than consumption (Abundant Yield). 2. The village must have a construction site for depot.
08A7. Minimum Tillage Promotion	Ngazun Myinmu	1. The village must have an interest for introduction of new land preparation method. 2. (The village must have difficulty in getting feeding stuffs or fodder. 3. There must be a multi-cropping practices in the village. 4. There must be sorghum & maize growing in the village. 5. For this kind of implement, the soil must be suitable.
08A8. New Varieties Adaptability		NA during this workshop
08L1. Goat	(6) Township	1. The village must have pastures, which is good for goats, and feedstuffs for pigs. 2. The village must have had no infectious animal diseases. 3. For animal housings, raw materials must be available plentifully. 4. The villagers must follow the instructions of respective LBVD. 5. There must be many poor families or households in the village.
08L2. Pig	(4) Townships	
C1 Village Revolving Fund	Myinmu Ayadaw	1. The village must have prospects to improve cottage industry. 2. The village must need this kind of Assistance. The whole village is united.
08I1-1. Firewood Substituting 08I1-2. Impr'd Stove	Chauk Tada-U Ayadaw	1. The village must be successful in Jatropha (Physic Nut) growing. 2. The village must be the one which uses much firewood (including palm sugar making)
08I2. Paddy Husk Power Generation	Pwintbyu	1. The village must have a site / place for construction of bio-gas power plant. 2. The village must have no main power line (electricity). 3. Paddy husk must be available in abundance. 4. The village must have facility to avail water.
08I3. Nutrition Improvement Center	Chauk	1. The village, in which there are many underweight children, should be selected. 2. The village must be affordable for the site. 3. The Centre should be in the place where there is a monastery or a primary school. 4. The village must have easy access to avail water.

Source: JICA Study Team, summarized from criteria given by the participants to the 2nd kick-off workshop.

3) Comments by the Participants on the First Kick-off Workshop

JICA team requested the participants to give comments by major sessions as; 1) situation analysis and poverty profile, 2) review of the pilot projects in FY 2007/08, 3) pilot project to be carried out in FY 2008/09, and 4) townships and villages for the pilot implementation in FY 2008/09 including discussions and agreement.

Following are the excerpts from which one may notice that; 1) most of the participants appreciated the opportunity to have participated in the workshop, 2) some may have felt further need to widen their views thanks to situation analysis made in comparison with other countries, 3) they felt more cooperation to be needed in implementing the pilot projects in FY 2008/09 due to increased villages to undertake, etc.

Table 5.2.3 Comments by the Participants who Participated in the 1st Kick-off Workshop

Session	Comments (major comment only)	Respondents
1. Comments on situation analysis and poverty profile	We gained general knowledge. The presentation is good.	29
	It will be better if other sectors in addition to agriculture are presented more.	2
	Our country's paddy production should be compared with other rice production countries in the world.	1
	Emphasis should also be laid on IEC	1
2. Comments on brief review of Pilot Projects carried out in FY 2007/08.	Explanation with photographs and slide show is excellent.	9
	To make the Workshop more active, the presenter should learn the facts in advance.	3
	Field supervision may have been a little bit weak.	3
	We should find the solution to some projects, which gain only a few progress, and necessary efforts should be made to make projects further successful.	3
	In connection with livestock sector, selection of good breed and scientific rearing should be disseminated rather than just goat and pig raising.	1
	The project from livestock sector may have not been appropriate for some villages, as it is seen in Khaungkawe village for goat.	1
3. Comments on Pilot Projects to be carried out in FY 2008/09	Presentation and explanation is perfect.	18
	Presentation is just OK.	6
	More cooperation with respective ministries is needed in this FY 2008/09.	3
	Specific negotiation with the villagers and exact implementation are needed.	2
	Trainees for agriculture training, 08A1 and 08A2, should be selected not only from the target townships but also from the neighboring townships.	1
4. Comments on discussion and agreement for the townships and villages.	The programme was good.	17
	Fair and correct way of doing was administered.	5
	Monitoring should be done in cooperation with responsible person from townships.	2
	In connection with getting agreement, JICA should lead the discussion as it has last year's experience. Now, JICA pampers the townships too much.	1
	Detailed discussion and negotiation with the target beneficiaries are required.	1

Source: JICA Study Team, summarized from comments given by the participants to the 2nd kick-off workshop.

5.2.2 Second Kick-off Workshop (on June 26 and June 27, 2008)

During the 1st Kick-off Workshop, held on June 16 & 17, the participants had an idea of what pilot projects are to be undertaken in FY 2008/09. Upon completion of the 1st kick-off workshop, the relevant TS officers were fielded back to their jurisdictional TS areas to; 1) follow up/ monitor the pilot projects done in the last financial year 2007/08, 2) select villages by pilot project with reference to the criteria they had agreed during the 1st kick-off workshop, and 3) collect basic data about the selected village.

1) Workshop Mechanics

To report back the aforementioned activities, 2nd kick-off workshop was held on June 26 and June 27, 2008. During this 2nd kick-off workshop, there was also a need to discuss the training contents and mechanics for agriculture (Pilot Project 08A1 and 8A2) and livestock (Pilot Project 08L1, 08L2, and 08L3) to be administered mainly to the frontline extension officers, namely TS officers. The objectives of the 2nd kick-off workshop were therefore set as follows:

1) To know the situation, outputs and issues (problems) of the pilot projects carried out in the previous financial year 2007/08,
2) To clarify and have common understandings for all the pilot projects (especially in terms of expected outputs, objectives, concept, etc.),
3) To report and agree the villages selected for the pilot projects in this financial year 2008/09,
4) To share the basic information of the selected villages for the pilot projects, and
5) To agree the way-forward, what to do next, on 1) the training for agriculture and livestock, 2) the activities for the pilot villages, etc.

Participants once again came from the relevant offices such as MAS, LBVD, and Cooperative at 3 government cadres of divisional, district and township levels. PDCs at TS level were also invited to

the workshop. Apart from the original 6 townships who had been participating in the pilot projects since FY 2007/08, there were additional 6 TSs who newly came to the 2nd kick-off workshop. Including these additional officers, total 44 officers participated in the 2nd workshop, excluding JICA Team members and its counterpart personnel. Brief schedule is given of the following:

Table 5.2.4 Brief Schedule of the Second Kick-off Workshop

Date	Activities	Person in Charge
DAY 1 (June 26)	Announcement of WS Objectives, Schedule, Norms	NPD (Chief CP)
	Recap (Review) of the 1st Kick-off WS	NPD (Chief CP)
	Report of the Villages Selected for the Pilot Project with basic Data and the Reason Why Selected	Relevant TS Officers (Workshop style)
	Discussion of Training Sessions on Agriculture and Livestock including participant numbers by TS	NPD (Chief CP)
DAY 2 (June 27)	Presentation of the Monitoring Results of Pilot Projects in FY 2007/08	Relevant TS Officers
	Presentation of the Villages Selected for the Pilot Projects, with basic data and the reason why selected	Representatives from TS Officers
	Submission of Training Schedule on Agriculture & Livestock including Major Session Titles	NPD (Chief CP)
	Way-forward, and Closing	NPD (Chief CP)

Source: JICA Study Team

They are exchanging ideas and views about villages which have been selected for the pilot projects in FY 2008/09.

He is now briefing the floor about what villages have been selected for the pilot projects and the reason as well.

2) Trainees for Agriculture (08A1 & 08A2) and Livestock (08L1, 08L2 and 08L3) Trainings

Following the recapitulation of the 1st kick-off workshop, the NPD (chief CP) carried out the confirmation of the original townships and additional townships to participate in 08A1 "Improved paddy cultivation promotion programme" and 08A2 "Organic farming promotion programme (with indigenous microorganism: IMO)". He also discussed with the floor about the participants of the livestock training covering 08L1, 08L2 and 08L3 pilot projects. Arrived consensus was that there would be total 45 participants in the agriculture training from 12 TSs, original 6 TSs + additional 6 TSs, and total 33 participants from the original 6 TSs for livestock training.

With regard to 08A2 "Organic Farming promotion training", an INGO called OISCA is to be involved in providing organic farming related technologies. OISCA has a training centre in Ye Za Gyo TS in Magway Division. Due to limited capacity in the center's lodging, it was agreed that the above 45 participants were to be divided in 2 batches. First batch covers 24 participants from Sagaing Division (4 townships) & Mandalay Division (2 townships), while the second batch training invites 21 participants from Magway (4 townships) and Mandalay (2 townships). It was then agreed to conduct the training for 08A1 "Improved paddy cultivation promotion programme" in January 2009, according

to the availability of the participants[1].

3) Villages Selected for the Pilot Projects in FY 2008/09

At the last session, the township officers together with the district and division level officers had arrived at villages for the pilot projects to be carried out in FY 2008/09. They clarified and shared basic information about the villages selected, and gained common understandings on all the pilot project activities. Now there are total 22 villages where pilot projects are carried out in FY 2008/09, excluding component-wide pilot projects such as 08A1, 08A2, 08L1, 08L2 and 08L3 (for villages selected see Table 3.2.1 and Table 3.2.2 aforementioned).

5.3 Overall Progress and Components Changed

5.3.1 Overall Progress at Activity Level by Sector

Pilot projects started with the kick-off workshop held at Mandalay and also upon consensus making at each of the villages with the concerned TS officers. Progress percentage at activity level by sector during FY 2008/09 is illustrated in Figure 5.3.1. Progress at activity level does not necessarily include project operation and maintenance stage. It shows only how much planned project activities have been completed by that time.

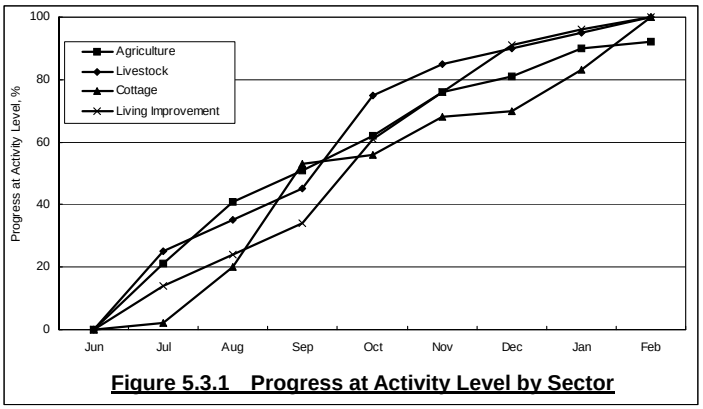


Figure 5.3.1 Progress at Activity Level by Sector

As the figure shows, all the sectors have proceeded very smoothly as compared with the FY 2007/08. This is because not only Study Team but also concerned officers got used to the implementation of the pilot project based upon what we all learned during the previous year. One thing, which could not be completed as designed, was the refresher training course designed under 08A1 Improved Paddy Cultivation Promotion project. This training course was postponed to the FY 2009/10 due mainly to the delay of the JICA team's arrival to Myanmar.

5.3.2 Components Changed

Most of the pilot projects have been implemented as designed with minor changes only. The changes taken place are as follows:

1) For 08A1 Improved Paddy Cultivation Promotion and 08A2 Organic Farming Promotion, the original 6 TSs were extended to 12 TSs according to a request from concerned officers. This was notified during the 1st kick-off WS as aforementioned, and accepted thereby the target TSs became 12 in number.

2) Training required under 08A1 Improved Paddy Cultivation Promotion was very much delayed. The original plan was to carry out the training in May which can target rainy paddy cultivation of Year 2008. However, the Team's arrival was delayed due to the aftermath of Nargis and also national referendum carried out in May 2008. Hence, the first batch of the training was agreed during the kick-off workshop to postpone till January 2009. Accordingly, the refresher course of the same training was carried over to the next financial year of FY 2009/10.

[1] In fact this training was planned in May 2008 which is before or just at onset of the rainy season of year 2008. However, due to the aftermath of Cyclone Nargis, the JICA Team could not come back to Myanmar as scheduled and finally arrived in early June 2008, missing the chance to carry out the training. Therefore, this training was rescheduled to be in January 2009.

5.4 Trainings on 08A1 Improved Paddy Promotion Pilot Project

Under pilot project "08A1. Improved paddy promotion programme, 2 training courses are planned and one of the two was administered in FY 2008/09, that is in January 2009. The 2nd one is scheduled after the summer paddy harvest of year 2009, which is May – July 2009. The first one carried out in January 2009 is the session proper and the latter is for follow-up and refresher. Through the trainings, various techniques related to improved paddy cultivation were transferred to the trainees. The contents and the results of the trainings are outlined in the following:

5.4.1 First Training Course (Training Proper)

1) Rationale and Objectives of the Training (the first training)

Rice, the staple food of Myanmar People, is given the highest priority in the country's national policy. In fact, Myanmar once used to be the biggest rice export country in the world until early 1960s, but now produces only a little surplus than what the nation requires. The present production does not reach the potential level, resulting in far lower yield than what is expected. Here, there is a need to widely extend good paddy production practices to meet the national desire.

In relation to above, there is another training course which covers a part of the good practices such as Dapog, IMO fertilizer, etc. carried out in June/July 2008, collaborated by OISCA (refer to "5.5 Trainings on 08A2 Organic farming promotion pilot project". To further strengthen the practice, there should be a training course focusing specifically on integrated crop management (ICM) based rice production technologies. Participants are expected to acquire the knowledge, skills, and attitude necessary in discharging their duties and responsibilities of promoting the ICM based rice production technologies. Following are the objectives to be achieved during the training:

1) Discuss problems and solutions in paddy production in the CDZ,
2) Acquire necessary skills and knowledge of ICM based rice production technologies as:
    2.1) to increase the number of panicles per unit area,
    2.2) to increase the number of grains per panicle,
    2.3) to increase the percentage of ripened grains,
    2.4) to increase the 1000 grains weight,
    2.5) to apply integrated weed management,
    2.6) to apply post harvest management,
    2.7) to apply specific growth stages based nutrient management,
    2.8) to make reduced area wet-bed nursery,
    2.9) to adopt the mid-season dried-up during cultivation,
    2.10) to regulate the heading time to coincide with the sunny period, e.g., 15 days before heading and 25 days after heading
3) Discharge extension activities with, as needed, demonstrations on the above technologies,
4) Facilitate the farmer beneficiaries to put the knowledge on the practices on their own,
5) Monitor the activities of farmer beneficiaries and report the result to the Project Office, and
6) Discuss way-forward for ICM based rice production in the CDZ.

2) Training Mechanics and Topic Tackled

This training course was carried out at State Agriculture Institute located at Pathin Gyi TS, located at a suburb of Mandalay City. The methodology employed was lecture style live-in training, interactive learning discussion, practices, and field study tour, etc. Since the course was carried out in January,

which is in dry season, there were limitations as far as practices were concerned.

However the institute as well as the trainer tried to arrange such opportunities as soaking of seed to promote good germination, seeding practices, preparation of reduced wed-bed seed nursery, and also a study tour to a paddy filed where the participants could observe dry season paddy cultivation assisted by irrigation. At the end of the training session, the participants prepared an action plan covering both 2009 pre-monsoon (summer) paddy cropping and also 2009 monsoon paddy cropping. The modules of the training include the following:

Module 1 Program Orientation (Day-1)

- Registration, Pre-Training Knowledge Test, and Pre-Training Experience Inventory
- Opening and Overview of this Training
- Surfacing of Participant's Expectation
- Field report on organic farming extension (e.g. yield, extension problems, and lesson)
- Problems sharing (e.g. natural condition, cropping pattern, yield, and so on.)
- Practice on how to make reduced area wet-bed nursery (preparation only)
- Trainer- Participants Interactive Clarification

Module 2 Introduction of Yield Components for Rice (1)(Day-2)

- Recapitulation
- Introduction of Integrated Crop Management (ICM) based rice production technologies reflecting on problems and solutions identified by the trainees
- Lecture on definition of yield components
- Lecture on how to increase the number of panicles
- Lecture on how to raise healthy seedlings
- Lecture on how to make reduced area wet-bed nursery
- Lecture on how to modify mat nursery
- Lecture on how to use locally adaptable variety and good seeds
- Practice on seed selections (e.g. using clean water, salt water, bamboo sieve)
- Lecture on how to make tillers larger and stronger
- Lecture on how to reduce transplanting damage
- Lecture on how to suppress late tillers
- Trainer- Participants Interactive Clarification

Module 3 Introduction of Yield Components for Rice (2)(Day-3)

- Recapitulation
- Lecture on how to determine the number of grains per panicle, the percentage of ripened grains, the weight of 1,000 grains.
- Lecture on how to increase the number of grains per panicle, to control the development of excessive number of panicles, to make tillers larger and stronger at neck-node differentiation stage, to promote positive differentiation of spike-lets, to increase the percentage of ripened grains.
- Lecture on how to increase the percentage of ripened grains, to prevent an excessive number of spike-lets, to select varieties with high percentage of ripened grains, to keep rice plants healthy, to promote root activity, to prevent plant from lodging, and to regulate the heading time
- Lecture on how to meet the potential limit of the 1,000 grains weight, to enlarge hull size, to promote the caryopsis (endosperm) development, to increase the rate of carbon assimilation and CH2COOH translocation

- Lecture on specific growth stages based nutrient management by organic matter, NPK application, Gypsum application, and Zn application
- Lecture on integrated weed management (e.g. cultural, manual, mechanical weed control)
- Lecture on post harvest management (minimizing of losses covering from harvest operations to storage)
- Practice on how to use pre-germinated seed
- Trainer- Participants Interactive Clarification

Module 4 Study Tour (Day-4)

- Study Tour to Amarapura TS, farm of an advanced farmer
- Lecture (continued)
- Practical training on the establishment of reduced area wet-bed nursery
- Post-training Test
- Extension education Video show (Paddy Cultivation Promotion)

Module 5 Evaluation Review (Day-5)

- Recapitulation
- Evaluation of Post-training Test (answer trend analysis)
- Evaluation of Post-training Test (trainer-participants clarification)

Module 6 Action Plan Formulation (Day-6)

- Identification of Extension Activities, and Explanation of Action Plan
- Action Plan Formulation by TS
- Presentation and Discussion of Action Plan
- Overall Action Reflection
- Post-training Evaluation

Module 1 was administered on the 1st day of the training course. In module 1, reception of trainees, testing prior to the training and questionnaire inquiry, explanation on the training modules and their objectives, replies to the expectations towards the training obtained from the questionnaire and the explanation on this project were conducted. Then, the participants presented the outcome achieved under the pilot project 08A2 “Organic farming promotion project”, which had been undertaken since July 2008 to the date of this training (carried out in January, 2009).

In fact, the training under 08A2 pilot project was carried out in June/July 2008 including some technologies concerning paddy cultivation. Reported were number of villages covered by extension as well as by demonstration against their targets set during the training, comparison between conventional cultivation and improved cultivation, e.g. Dapog nursery, and early & sparse transplanting, etc. Thereafter, the participants shared what they have faced in the course of the extensions. These results, namely, the achievements from the training carried out under 08A2 “Organic farming promotion project” is summarized in the following sub-chapter “5.5 Trainings on Organic Agriculture Promotion Project.

Day-2 undertook module 2 and Day-3 dealt with module 3. Module 2 discussed the introduction of improved paddy cultivation that is based on integrated crop management (ICM). The basic lecture centered on the pre-requisite of growing paddy strong and healthy, selection of good seeds, good nursery preparation, promotion of many tillering, factors of increasing yield, etc. The module 3, given on Day-3, undertook detail discussion on paddy cultivation method by growing stage.

Day-4 carried out a study tour, where the participants visited a field of pre-monsoon paddy cultivated by a lead farmer. Discussions were made between the participants and the lead farmer on various topics including diseases taking place in the field. Module 5, given on Day-5, carried out

post-training test, which is same as the pre-training test in questions, to know how much they have acquired new technologies, etc. Based on the results of the test, further clarifications were made between the trainer and trainees. Day-6, the last day of training, requested the participants to put up their targets in terms of village numbers to be covered by extension and demonstration.

3) Participants in the Training

3.1) Number of participant trainees

A training on 08A2 "Organic farming promotion pilot project" was carried out prior to this training inviting MAS officers form 12 TSs and concerned district and divisional officers. The participants to this training are basically same those who participated in the previous training. However, there were some changes due to personnel transfer and also there was a request during the previous training, that was to include MAS TS managers. Upon this request, all the managers of the 12 TSs were included in this training. Following table summarizes the participants; total 33 from 12 TSs, 6 from 6 districts and 3 from 3 divisions, totaling 42.

Table 5.4.1 Participant List for 08A1 Improved Paddy Cultivation Promotion PP

Division	Township	Participants				Remark
		Township	District	Division	Total	
Mandalay	Kyaukse	4	1	1	**13**	Kyaukse District
	Myittha	4				
	Tada-U	1				
	Ngazun	2				
Sagaing	Ayadaw	3		1	**14**	
	Myinmu	3	1			Sagaing District
	Monywa	2	1			Monywa District
	Wetlet	2	1			Shwebo District
Magway	Chauk	2	1	1	**15**	Magway District
	Pwintbyu	3				
	Salin	3				
	Minbu	4	1			Minbu District
Total		**33**	**6**	**3**	**42**	

Source: JICA Study Team

3.2) Characters of the training participants

Figure 5.4.1 indicates years of service for the participants as staff of the Government. It is observed that those whose experience ranges from 11 years period and 15 years period show the greatest number, which is 13. The average service year arrives at 19 years period, while the shortest one is 6 years period and longest one was 32 years period.

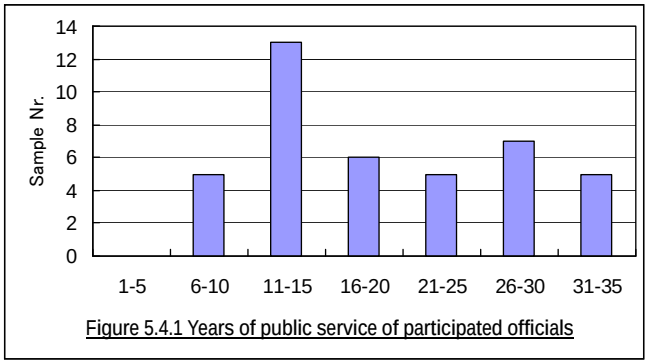


Figure 5.4.1 Years of public service of participated officials

Also, asked to the participants was if they have been engaged in any project aside from recurrent extension services. Out of 33 participants, there were 3 participants who had been engaged in UNDP project promoting food security, 10 in oil crop and/or cotton production projects. The remaining participants, 29, gave no answer, probably not engaged in any project type activities except for recurrent extension.

Table 5.4.2 summarizes problems they have faced and solutions they have applied in extending paddy cultivation in the past. The top problem listed was "Farmers rely more on inputs than improved technologies", followed by "Farmers cannot get quality seeds easily", "Farmers resist to change from conventional method", "Water management is difficult", and so on so forth.

On the other hand, the extension staff tried to overcome the difficulties by promoting organic farming such as IMO bokashi, doing demonstration and also extension, encouraging farmers through contact farmers who are mostly lead farmers in their areas. Several staff raised lack of technologies for themselves and they seemed to have got necessary extension knowledge through training as well as depending on traninnig materials provided.

Table 5.4.2 Problems encountered by the participants and their solutions

Nr.	Problems or difficulties in extension	Solution
9	Farmers rely more on inputs than improved technologies	Carry out organic farming promotion such as IMO Bokashi.
8	Farmers cannot get quality seeds easily	Demo and Extension of seed production procedure at farmers level
8	Farmers resist to change from conventional method	Encourage through contact farmers (advanced farmers)
6	Water management is difficult	Manage through local authorities
5	Farmers prefer growing marketable and profitable crops (e.g. chickpea) to rice	Organize farmers throughtlocal authorities
5	Farmers weak in using natural fertilizer	Demonstration of model plots
Others	Extension workers are lack of new and advanced technologies. Extension lacks Information Education Communication	Learned new technologies on attending training and training materials

Source: Questionnaire interviews administered during the training, JICA Study team

Table 5.4.3 summarizes the result of the questionnaire to the participants for inquiring best moment as the government staff. What came first is “Soil conservation through organic farming”, followed by “Introduction of organic farming such as Dapog result with high yield”, “Introduction of proper cropping pattern for farmers to improve farmers’ income”, etc. These are all related to what they have learned during the training administered under 08A2 Organic farming promotion pilot project. It may look qulious why few raised best moment out of what they had done before the training. Most of the participants may have not been given enough opportunity to learn till that training.

Table 5.4.3 Best moment as government staff

Nr	Best moment as government staff
8	Soil conservation through organic farming
7	Introduction of organic farming such as *Dapog* nursery result with high yield
5	Introduction of proper cropping pattern for farmers to mporve farmers’ income
4	Introduction of early planting of high yield variety increased yield and convinced farmers.
3	Success in transformation from Ya land to Le land
3	Introduction of new high yield variety by good practice on paddy cultivation

Source: Questionnaire interviews administered during the training, JICA Study team

3.3) Participant’s expectation of the training

At the commencement of the training course, questions were given to the participants asking what they expect from the training itself. They were asked to answer two subjects they were expecting. Table 5.4.4 gives the summarized expectations, which in turn were replied by trainers by indicating expectations would be met in such sessions on such day, etc. Top expectation was to obtain modern technologies (e.g. locally adaptable paddy cultivation tech., ICM) by far. Most of the expectations entails contributions to improving farming for their farmers. Some participants listed an expectation as to be able to share experience and methods of different townships. Since 12 TSs are involved in this training, the participnats expected peer-peer learning.

Table 5.4.4 What the participants in the training expect for the training

Nr.	Expectation
26	To obtain modern technologies (e.g. locally adaptable paddy cultivation tech., ICM)
15	To be able to disseminate actually applicable technologies for farmers
8	To increase yield
4	To improve living standard of farmers by better yield
4	To improve connection between farmers and MAS with agricultural technologies
4	To know detail technologies of water management and weeding control
2	To apply the technologies of paddy cultivation practically in field
2	To be able to share experience and methods of different townships

Source: Questionnaire interviews administered during the training, JICA Study team

4) Excerpt from the Training

4.1) Problem sharing amongst participants

In Day 1 training, the participants were requested to list the problems of what they have faced in the course of their extension work so far. This session was meant to share the problems amongst the participants and also make the trainer's lecture more responsive to their particular problems. Following table summarizes the problems they have faced, which are pre-categorized into; Seed, Land preparation, Nursery, Fertilization (Manure), Fertilization (Chemical), Water management, Weedingcontrol, Pest control, Harvesting / Storage, Natural condition, Soil toxicity, Farm labor, Draught cattle.

The participants raised, for example, that farmers have difficulties of purchasing good paddy seeds and also of selecting or regenerating good paddy seeds though procurement of good seeds is a pre-requisite to grow good paddy. Concerning main field preparation, they said there is time shortage to well prepare the field because many farmers grow chickpea right after monsoon paddy, which occupies the field right before the pre-monsoon paddy, resulting in very short time for the preparation of pre-monsoon paddy. Lack of machineries to level off the field was also a problem they noticed in their extension areas.

The Problem Sharing Session facilitated by the chief counterpart.

As per nursery, they raised that there are no enough area for nursery to obtain healthy seedling, and also farmers broadcast seeds more than necessity, resulting in not eough space for healthy growing of paddy seedlings, and also just broadcast seeds without selection of good seeds. On fertilizer, they commented that manure is not systematically stored and applied, resulting in loss of its nutrient. One thing notified is its irregular effectiveness of chemical fertilizer. The fertilizer's effect is very much affected right pattern of rainfall but it is not all the case in CDZ. Also, some fertilizers are not as effective as it is mentioned on the label. Water management was listed as problems, however this issue in most cases go beyond the farmers' hand since it is associated with irrigation system controlled by authority/ ID.

Concerning weeding, raised are that the price of herbicide is high and farmers do not know how to use it systematically. This kind of problem, sided with farmer knowledge, can be seen in pest control as well, e.g. farmers need a technology to differentiate insect/ pest and disease. Other problems, though not much emphasized, are lots of waste in harvesting, irregular rainfall as is expected in CDZ, lack of technology of turning saline soil into arable one, lack of farm labors, etc.

Table 5.4.5 Problems encountered by the Participants

Category	Problems
Seed	It is difficult to obtain quality varieties such as Ma Naw Thu Kha, Shwe Thwe Yin, and Ayar Min. It is difiicult for farmers to select the right variety which produces good yield.
Land preparation	Farmers have no enough time and money for land preparation, owing to paddy-chickepea cultivation. There are no enough farm tools for levelling.
Nursery	There are no enough area for nursery to obtain healthy seedling Broadcasting of seeds more than necessity and broadcasting of seeds without selection of good seeds.
Fertilization (Manure)	Cow-dung is not stored systematically and so there is loss of its nutrient.
Fertilization (Chemical)	Irregular effectiveness of chemical fertilizer. The price is high.
Watermanagement	Problem of water management.
Weeding control	The price of herbicide is high and farmers do not know how to use it systematically. Lack of farm labors.

Pest control	Farmers need a technology to differentiate insect/ pest and disease. Owing to excessive application of chemical fertilizer, there brings about red short disease.
Harvesting / Storage	There is a lot of waste.
Natural condition	Rain is irregular. Owing to drought rainy season paddy plants die.
Soil toxicity	Lack of technology to turn saline soil into arable soil.
Farm labor	Owing to lack of farm labors, harvesting is not irregular. Labor charge of transplanting is high.
Draught cattle	There is no enough draught cattle. The hiring charge for draught cattle is high.

Source: Workshop carried out in the training of 08A1 Improved Paddy Promotion Pilot Project

4.2) Integrated Crop Management (ICM)

The main part of this training lies on lectures of ICM (integrated crop management) for paddy cultivation. In essence, ICM referred in this training is to well manage the cultivation by paddy growing stage. The growing stage is composed of germination stage, nursery stage, active tillering stage, panicle formation stage, initial reduction division stage, heading and flowering stage, and active ripening stage. Points to be taken have been well lectured by the stage. In addition, what was strengthened was how to increase the yield and also what factors affect the yield to what extent.

A Lecture Session on ICM for Paddy. There is continuous discussion between the trainer and the participants.

First step of paddy cultivation starts with selection of good paddy seeds. Good paddy seed means heavy seeds filled with contents inside. Selection by using salt water is a recommendable method to select good seeds. Light ones are to float and therefore the good seeds are the ones which remain at the bottom of the container. To soak the seeds well into water for a prescribed time-period leads to improvement of germination rate. Growing itself is done in main field at which the land should be leveled as evenly as possible. Otherwise, water cannot be distributed evenly, giving deeper and shallower patches in one field, resulting in uneven growth of paddy plants. Rainfall is not even and not predictable either in CDZ, and the fields should be leveled as evenly as possible, making water management better.

Nursery starts with preparation of the bed and then casting the seeds. Good seedlings lead to the successive good and healthy growing, and therefore growing of healthy seedlings is one of the most important process in paddy cultivation. Good seedlings need good nursery, e.g. reduced wet-bed nursery, and also period of the cultivation in the nursery should be 15 days to 25 days, and not more than that. If seedlings more than 30 days, the tillering in the main field would no longer take place. Recommended number of plants per hill in this ICM lecture was taught to be around 3. In case where main field is not fertile, a narrower spacing like 6” x 6” or 9”x 4” is recommended while where soils are fertile, the spacing can be extended to 8” x 8” or even to 9” x 9”. The water depth when the seedlings are to be transplanted to the main filed should be around 1 inch.

After a seedling has been transplanted to the main field, tillering is to start. Tillerings come out from a part between the stem and roots, growing to panicles. The period till panicles have been formed is called active tillering stage. Top dressing fertilizer or organic fertilizer may be required at this stage if panicle formation is not well being developed or number of tillerings is less. Panicle formation stage covers up to the time initial panicle shows up, length of which is usually 2 mm. After that, reduction starts and still the paddy grows until heading stage.

When the panicles have been formed, flowering starts and self-pollination is done. To increase the number of seeds top dressing fertilizer is required. Drying-up the paddy field is also required if it can be done associated with good drainage system, which can facilitate giving nutrition to roots.

Weeding must be done regularly.

4.3) Study Tour

A Study Tour to a Lead Farmer's Field wherein there were lots of interactive discussions among the farmer, trainer and participants.

A study tour was carried out visiting a lead farmer in Amarapura TS. January when the training was carried out lies in winter according to Myanmar calendar. There are therefore very few farmers who are doing paddy cultivation in this season. The paddy area they visited is located in a lower land where rainwater can stand until this winter season. In fact, during the monsoon season the farmers can hardly cultivate paddy due to flooding and deep standing water. On the other hand, as moving to winter which comes after monsoon season, the water is getting retarded and thereby the farmers can start paddy cultivation. In this area, they usually start nursery in mid November and transplant to the main field in end December.

The trainer compared the plants remaining in the nursery and the others already transplanted in the main field to explain the situation of tillering. There is a disease, called mexocoty, hindering the tillering. A symptom of this disease is identical by white color dots showing up in lower parts of stem of the plants. The trainer showed it to the participants, and explained why the disease took place, the measures to prevent, etc. According to the trainer's experiences, mexocoty can take place covering as much as 50% of the plants provided that there are deep standing water and also the paddy plants are densely located, e.g. 4" x 6", 6"x6", etc. Discussion continued and the trainer raised one possibility, saying effluent from a nearby factory producing animal feed may have contributed to the disease.

Another discussion was made on the amount of seeds the farmers actually used. He, the lead farmer, used as much as 6 baskets of seed per 0.1 acre of nursery. Commonly experienced ones in CDZ is to apply 2 – 3 baskets per 0.1 acre which is much small amount. According to what the lead farmer said, there are risks for the nursery not to grow well due to the coldness in this winter season, urging him to produce much amount of nursery seedling to prepare such case. There may be another option that he can buy nursery seedlings from outside, but in this case he has to pay as much as 2 times more than what is sold in normal season. This led the farmer to grow much more seedlings in this season. This kind of flexibility applied in fields by farmers must have contributed to enriching the participant extension norms.

5) Pre- and Post-Training Test

In this training session, 2 times test was carried out to the participants, by using same questionnaires (for the questions, refer to the box right). Figure 5.4.2. shows the result of the pre-training test. The bottom bars show the percentage of 'right answer', mid parts percentage of the 'wrong answer' and the top parts 'no-answer'. For example, no right answer was made for question No.1, about 70% gave wrong answer and the remaining 30% gave no-answer. On the other hand, for question No.2, more than 80% of the participants gave right answer and about 15% of the participants gave wrong answer. There is a general tendency the more no-answer is showing up the latter question they go.

Figure 5.4.3 summarizes the post-training test results. Question No.3 got the lowest right answer, only 5%, for which they were asked when is the right time to apply nitrogen fertilizer to increase grain seeds. On the other hand, question No.10 got the highest right answer, and 81% of the participants were with the right answer. One of the reasons why the right answers were so few may lie on the

various condition wherein the participants carry out their extension. Since they came from different areas, there might not be sole right answer but possibility of varieties in the right answers. However, the test took only standard case as correct answers, which may have resulted in this low percentage of correct answers through the questions.

As for percentage of right answers, the average has increased to 38% from 11 % while the percentage of wrong answer did the same to 48% from 40%. This is however the results of reduction of 'no-answer' in case of post-training test. The percentage of the 'no-answer' was reduced to 13% from 50%. Taking this tendency into account, we can conclude that the participants have increased their knowledge about ICM for improved paddy cultivation through this training course. As aforementioned, since condition varies by place where they are, the percentage of right answers may have been higher than what was given provided that we considered not only the standard answers but also the variations. With regard to this, the participants and the trainer exchanged opinions and experiences when the test results were opened to the floor.

Pre/ Post Evaluation Test Question and Answer

1. In rice farming operation, which practice does contribute towards the fully utilization of rice field?
   A: Land leveling
2. At what stage do you give Nitrogen top-dressing to make tillers large & strong?
   A: From rooting stage to just before the end of effective tillering stage.
3. At what stage do you give nitrogen top-dressing to enlarge the hull size?
   A: Just before the emergence of flag leaf
4. At what stage do you give nitrogen top-dressing to increase the percentage of ripened grains?
   A: About 5 days before heading stage
5. Among 4 yield components of rice, which one can reduce the yield most?
   A: Percentage of ripened grains
6. In case of percentage of ripened grains is less than 75%, what component should be promoted?
   A: To promote percentage of ripened grains
7. In case of percentage of ripened grains being more than 85% and the yield is still low, what components should be promoted?
   A: To promote number of panicles per square meter and to promote number of grains per panicle
8. What will happen if unfavorable conditions prevail during the period of reduction division stage?
   A: Degeneration of spike-lets
9. What advantages can be obtained, if mid season drying practice is adopted?
   A: Roots will be healthy, late tillers will not emerge, and nitrogen absorption by the plant will be restricted.
10. How much percentage of weeds can be reduced and how much percentage of yield can be increased if the land is perfectly leveled?
    A: Weeds can be reduced by 40%, yield can be increased by 24%
11. What should be developed to promote rice yield?
    A: To promote value of 4 yield components of rice
12. When is the number of panicles determined?
    A: From time of germination to time of formation of spike-lets
13. From where does the first tiller branch out and when?
    A: First tiller branch out between second leaf and main stem, when the plant is having 5 numbers of leaves
14. How can a tiller be defined as bearing tiller?
    A: A tiller which has 3 to 4 dark-green leaves and the height is around 2/3 of the highest main stem of the hill.
15. How many tillers can be produced from (1) transplanted rice and (2) direct seeding rice, under normal condition?
    A (1): transplanted rice- 10-30 tillers, A (2): direct seeding rice- 2-5 tillers
16. When is the number of grains per panicle determined?
    A: Time between initiation of neck node and termination of reproduction stage
17. What organs does a panicle of rice plant consist of?
    A: Neck node, primary rachis-branch, secondary rachis-branch, and spikelet or grains
18. When do the greater number of spike-lets degenerated and why?
    A: During reproduction stage, due to nitrogen deficiency
19. When is the percentage of ripened grains determined?
    A: During initiation of neck node and the time when seeds start turning to yellowish color
20. When is the weight of 1000 grains determined?
    A: During initiation of spike-lets and the time when seeds start turning to yellowish color

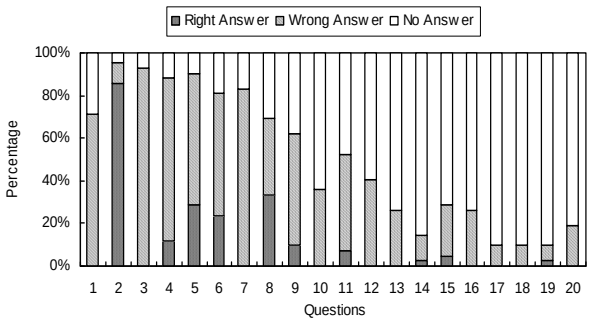


Figure 5.4.2 Pre-training Test Results, 20 questions

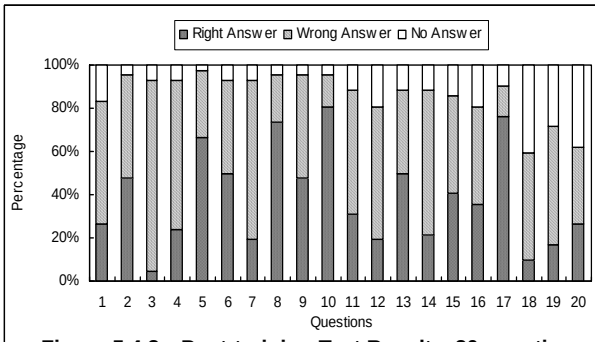


Figure 5.4.3 Post-training Test Results, 20 questions

6) Action Plan for Pre-monsoon Paddy and Monsoon Paddy in year 2009

The participants formulated an action plan for extending techniques they had acquired in the training to beneficiary farmers at the last day of the training course. It consisted of 1) contents of extension activities, 2) key responsible staff for extension activities, 3) number of target villages where extension activities (demonstration and extension) are to be implemented, 4) period of developing extension activities, 5) expected fruit/ effect, 6) inputs required for the planned activities, 7) supporters of the planned activities etc. The action plans formulated are summarized in Tables 5.4.6 and 5.4.7. The former shows the action plan for pre-monsoon paddy (March – July 2009) and the latter for monsoon paddy (July – November 2009).

As the table shows, 13 activities are to be implemented. Numbers in parenthesis indicates number of

demonstration plot for integrated crop management technology. With regard to pre-monsoon paddy, the extension is planned in 178 villages, out of which there will be demonstrations in 84 villages. For monsoon paddy, the extension will cover 239 villages and of them 111 villages will have demonstration activities. As one can see, technologies to be extended are 13 in total

Table 5.4.6 Number of Villages Planned for Extension Activities (Pre-monsoon Paddy)

Division	Mandalay								Sagaing			
Typology	Type II		Type III		Type V		Type V		Type III		Type III	
TS	Nagzun TS		Tada-U TS		Kyaukse TS		Myittha		Myinmu TS		Monywa TS	
Demonstration & Extension	Ext'n	Demo	Ext'n	Demo	Ext'n	Demo	Ext'n	Demo	Ext'n	Demo	Ext'n	Demo
ICM-Paddy Demonstration	12	1 (2)	4	2 (2)	10	1 (2)	17	1 (2)	3	1 (2)	10	2 (2)
IMO Seed Extraction	12	6	4	4	10	3	16	6	3	3	10	10
IMO Bokashi Making	12	12	4	4	10	3	16	6	3	3	10	3
Seed Selection	12	12	8	4	10	6	11	4	5	5	10	3
Proper Land Preparation Practice	12	12	10	4	10	3	6	1	5	3	10	3
Reduced Area Wet-bed Nursery	12	2	10	4	10	2	18	3	3	1	10	3
Early Transplanting	12	2	10	4	10	2	18	3	5	1	10	3
Proper Fertilizer Application Practice	12	2	10	4	10	2	6	1	7	3	10	3
Proper Water Management	12	2	10	4	10	2	6	1	3	1	10	3
Dapog Method	12	2	10	3	10	0	10	3	0	0	10	2
Rice Husk Charcoal Making	12	2	8	2	10	0	10	5	0	0	10	0
Weeding Practice	12	2	10	4	10	3	6	1	5	5	10	2
Harvesting with Minimum Waste	12	2	10	4	10	3	7	1	5	1	10	2
Nr. of Villages by TS (Ext' n)	12		10		10		18		7		10	
Nr. of Villages by TS (+Demo)	12		4		6		6		5		10	

Division	Sagaing				Magway							
Typology	Type IV		Type V		Type I		Type IV		Type IV		Type V	
TS	Ayadaw TS		Wetlet TS		Chauk TS		Minbu TS		Salin TS		Pwintbyu TS	
Demonstration & Extension	Ext'n	Demo	Ext'n	Demo	Ext'n	Demo	Ext'n	Demo	Ext'n	Demo	Ext'n	Demo
ICM-Paddy Demonstration	11	1 (2)	11	2 (2)	8	1 (2)	3	3 (3)	20	2 (2)	2	2 (2)
IMO Seed Extraction	15	15	17	3	10	10	19	2	20	3	15	3
IMO Bokashi Making	10	10	17	3	10	5	19	2	15	3	15	3
Seed Selection	11	5	17	2	10	5	19	3	15	5	30	5
Proper Land Preparation Practice	11	2	17	2	10	2	19	3	15	3	20	3
Reduced Area Wet-bed Nursery	11	5	17	2	10	5	19	2	20	3	20	3
Early Transplanting	11	5	17	2	10	5	19	2	20	3	20	3
Proper Fertilizer Application Practice	11	5	17	2	10	5	19	3	15	5	15	3
Proper Water Management	11	5	17	2	10	2	19	3	15	5	15	4
Dapog Method	11	3	17	1	10	0	19	2	15	0	0	0
Rice Husk Charcoal Making	15	8	17	0	0	0	19	2	15	0	20	0
Weeding Practice	11	5	17	1	10	2	19	3	15	5	30	3
Harvesting with Minimum Waste	11	5	17	1	10	2	19	2	15	5	30	5
Nr. of Villages by TS (Ext' n)	15		17		10		19		20		30	
Nr. of Villages by TS (+Demo)	15		3		10		3		5		5	
Nr. of Villages by TS (Ext' n)									178			
Nr. of Villages by TS (+Demo)									84			

Table 5.4.7 Number of Villages Planned for Extension Activities (Monsoon Paddy)

Division	Mandalay								Sagaing			
Typology	Type II		Type III		Type V		Type V		Type III		Type III	
TS	Nagzun TS		Tada-U TS		Kyaukse TS		Myitta		Myinmu TS		Monywa TS	
Demonstration & Extension	Ext'n	Demo	Ext'n	Demo	Ext'n	Demo	Ext'n	Demo	Ext'n	Demo	Ext'n	Demo
ICM-Paddy Demonstration	20	1 (3)	7	2 (2)	20	1 (2)	20	1 (2)	20	1 (2)	20	2 (2)
IMO Seed Extraction	20	10	10	6	20	2	18	8	20	5	20	15
IMO Bokashi Making	20	15	10	6	20	2	18	8	20	3	20	5
Seed Selection	20	3	10	6	20	10	15	13	20	5	20	5
Proper Land Preparation Practice	20	3	10	6	20	5	15	1	20	3	20	5
Reduced Area Wet-bed Nursery	20	3	10	6	20	3	15	2	20	2	20	5
Early Transplanting	20	3	10	6	20	3	17	2	20	3	20	5
Proper Fertilizer Application Practice	20	3	10	6	20	3	8	1	20	5	20	5
Proper Water Management	20	3	10	4	20	3	8	1	20	2	20	5
Dapog Method	20	3	12	6	20	0	10	2	0	0	20	3
Rice Husk Charcoal Making	20	10	15	6	20	0	15	5	0	0	20	0
Weeding Practice	20	3	15	6	20	3	6	1	20	10	20	5
Harvesting with Minimum Waste	20	3	15	6	20	3	8	1	20	1	20	5
Nr. of Villages by TS (Ext' n)	20		15		20		20		20		20	
Nr. of Villages by TS (+Demo)	15		6		10		13		10		15	

Division	Sagaing				Magway							
ypology	Type IV		Type V		Type I		Type IV		Type IV		Type V	

TS	Ayadaw TS		Wetlet TS		Chauk TS		Minbu TS		Salin TS		Pwintbyu TS	
Demonstration & Extension	Ext'n	Demo	Ext'n	Demo	Ext'n	Demo	Ext'n	Demo	Ext'n	Demo	Ext'n	Demo
ICM-Paddy Demonstration	20	2 (2)	20	2 (2)	10	2 (2)	3	3 (3)	25	2 (2)	2	2 (2)
IMO Seed Extraction	15	15	20	5	10	2	19	2	25	3	15	3
IMO Bokashi Making	10	10	20	5	10	2	19	2	20	3	15	3
Seed Selection	20	10	20	5	10	2	19	3	20	7	30	5
Proper Land Preparation Practice	20	10	20	3	10	2	19	3	20	5	20	3
Reduced Area Wet-bed Nursery	20	10	20	3	10	2	19	3	25	3	20	3
Early Transplanting	20	10	20	3	10	2	19	3	25	3	20	3
Proper Fertilizer Application Practice	20	10	20	3	10	2	19	5	20	5	25	3
Proper Water Management	20	10	20	3	10	2	19	3	20	5	25	4
Dapog Method	20	10	20	1	10	0	19	2	20	0	15	0
Rice Husk Charcoal Making	20	10	20	0	0	0	19	2	20	0	15	0
Weeding Practice	20	10	20	3	10	2	19	3	20	5	30	3
Harvesting with Minimum Waste	20	10	20	3	10	2	19	3	20	10	30	5
Nr. of Villages by TS (Ext' n)	20		20		10		19		25		30	
Nr. of Villages by TS (+Demo)	15		5		2		5		10		5	
Nr. of Villages by TS (Ext' n)									239			
Nr. of Villages by TS (+Demo)									111			

7) Achievement of the Training Objectives

An inquiry was applied to the participants on the last day of the training on the extent of fulfillment of training objectives. The extent of fulfillment was numerically expressed with the lowest evaluation ranked at Level 1 and the highest ranked at Level 5. Figures 5.4.4 give graph showing the extent of fulfillment of training objectives of the participants. No participants rated lower than level-3. Even level-3 did not show up in such issues of 2-1, 2-2, 2-3, 2-7, which imply high achievement in these objectives. Objectives where about 60% of the participants gave the highest level-5 are also 2-1, 2-2, 2-3, 2-7 and 5 (monitoring), which are very much corresponding to the aforementioned replies. These topics are related to realizing of high yield. What they are confident in these achievements ould contribute to enhancing their extension activities and also may promote better relationship with the farmers.

1) Discuss problems and solutions in paddy production in the CDZ,
2) Acquire necessary skills and knowledge of ICM based rice production technologies as:
   - 2.1 to increase the number of panicles per unit area,
   - 2.2 to increase the number of grains per panicle,
   - 2.3 to increase the percentage of ripened grains,
   - 2.4 to increase the 1000 grains weighted,
   - 2.5 to apply integrated weed management,
   - 2.6 to apply post harvest management,
   - 2.7 to apply specific growth stages based nutrient management,
   - 2.8 to make reduced area wet-bed nursery,
   - 2.9 to adopt the mid-season dried up during cultivation,
   - 2.10 to regulate the heading time to coincide with the sunny period, e.g., 15 days before heading and 25 days after heading
3) Discharge extension activities with, as needed, demonstrations on the above technologies,
4) Facilitate the farmer beneficiaries to put the knowledge on the practices on their own,
5) Monitor the activities of farmer beneficiaries and report the result to the Project Office, and
6) Discuss way-forward for ICM based rice production in the CDZ.

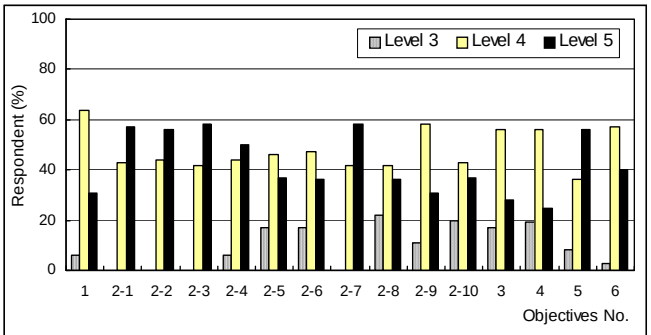


Figure 5.4.4 Achievement of training objectives

On the other hand, objectives given many level-3s are 2-5, 2-6, 2-8, 2-10, 3, 4. Though these achievements are in fact not bad but just a little lower than the others. Included are 3 'Discharge extension activities with, as needed, demonstrations on the above technologies' and 'Facilitate the farmer beneficiaries to put the knowledge on the practices on their own'. They may think actual extension on the ground is much difficult than what they learned in theory.

8) Participants Satisfaction by Module

The participants were requested to record their extent of satisfaction every time at the completion of each module on the contents of what they learned every day. Figure 5.4.5 shows the degree of their

satisfaction by module. In these figures, level 1 indicates the lowest extent of satisfaction whereas level 5 gives the highest one. No participants marked with level 1 and level 2, and even level 3 was rated by less than 20 % of the participnats. The highest satisfaction can be seen in module 3 where over 60% participants rated level 5 and about 30% rated level 4. In this module, the core parts of ICM were undertaken covering how to increase the number of grains per panicle, to make tillers larger and stronger at neck-node differentiation stage, to promote positive differentiation of spike-lets, to increase the percentage of ripened grains, to meet the potential limit of the 1,000 grains weight, etc.

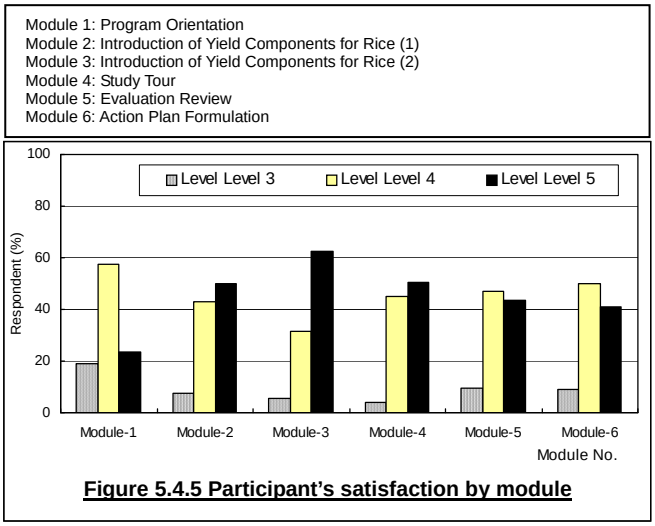


Figure 5.4.5 Participant's satisfaction by module

Followed are module 2, module 4, module 5, and module 6 in its order from higher satisfaction. Module 2 also undertook a part of ICM as an introduction to the module 3. Module 4 was for study tour, module 5 for evaluation, and module 6 for action plan formulation. It seems the participants learned good practices during the study tour and also did feedback to themselves through discussion with the lead farmers as well as through a clarification session done during the module 5 of 'evaluation'. These feed back activities may have contributed to such high satisfaction level in module 4 and module 5.

9) Satisfaction by as a Whole, Logistics, Theory, and Own Participants

The participants were asked about degree of their satisfaction with training as a whole, logistics, theory, practice and their own participation. Figure 5.4.6 shows the degree of their satisfaction with a scale from level 1 to level 5. No participants gave level 2 or level 1 in their satisfaction, showing no dissatisfaction to the training. Specifically, looking at satisfaction as a whole, no participants rated level 3 either. Those who rated level 4 or more than that reach around 60 % or more of the participants (25 participants or more).

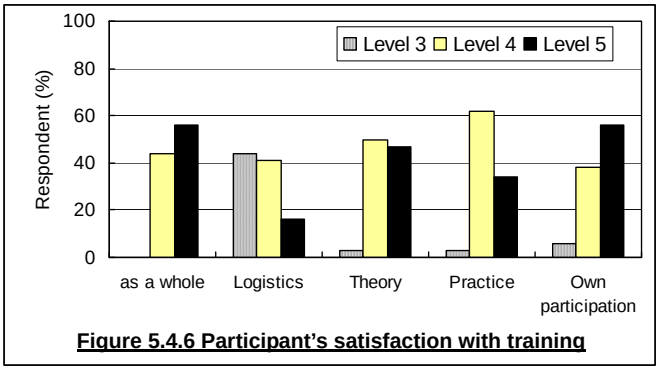


Figure 5.4.6 Participant's satisfaction with training

One thing noticed is that the participants who gave level 3 satisfaction to the logistics are nearly 40%. This implies dissatisfaction to the logistic to some extent. In fact, the participants stayed at the training dormitory where minimum level of facilities were provided. However there was a problem in bedding. Though the training institute provided blanket to the participants, the blanket was not enough to over stay there because the season is January, which is the coldest month in Myanmar. Some participants complained the coldness during midnight, telling not good sleeping. This situation leads to such lower satisfaction in logistics (no participant got sick fortunately).

10) Participants' Comments to Improve

In parallel with evaluating degree of trainee's satisfaction, they were requested to give comments on the training as a whole, logistics, theory and practice as well as their participation for providing better

training course for the next training. Following are the summary of their comments, some of which can be incorporated in any of future trainings.

1) About 80% of the participants commented that there were not much difficulties to learn new technologies for improved paddy cultivation and in fact improved their knowledge and expertise, thanks to good theoretical teaching by the trainer. Also, most comments mentioned that the training contents were good as a whole, and the participants acquired knowledge than what they had expected. More than half of the participants raised a request that similar training should be carried out periodically.

2) Most comments mentioned that it is necessary to combine theory and practice in teaching. Due to the training carried out in this dry season, it was difficult for training to provide enough practices. On the other hand, some comments mentioned that participants could come to know about paddy cultivation and production very well.

3) Some comments referred to the accommodation. They said there should have been better lodging, because some participants had difficulties to sleep due to coldness night time. The blanket provided by the training institute was not enough to get them warm in this cold season.

4) Some commented that it is necessary to select training venue at a convenient place (having better access). The training institute is located in a rural area, so that they had a bit of difficulty to come by. In fact, the training provided bus to ferry the participants from Mandalay to the institute, however those who gave above comment came by their own motorbike.

5) Several participants requested that the handouts used during the training should have been delivered in advance. In fact, the training team intentionally did not deliver the materials in advance. This is because once the materials are in hand they may loose attention to what the trainer is teaching at that time already. Also, 2 participants commented lecturing should always accompany Power Point slide presentation.

6) There were a lot of comments mentioning that the training needed practical style. This suggests that the participants prefer practice to lecture, but in fact there was difficulty of carrying out many practices in this dry winter season. On the other hand, despite the limitation the training provided such practices as soaking of seed, seeding, preparation of reduced-area bed nursery, which earned appreciation from many participants. The comment of more practices with theoretical lecturing could raise the participants understanding shall be referred to in any future training courses.

7) Some comments mentioned that the training needed more interactive talk between the trainer and the trainees. With regard to this, there were interactive discussions not only during the training sessions but also even after the training almost every day. It indicates the participants eagerness to learn more.

8) There were requests of inviting contact farmers to this kind of training together with extension staff. They said that some farmers have Diploma in Agriculture and even Bachelor of Agriculture, and therefore their knowledge accumulated through actual experiences would be useful for participants to facilitate learning deeply. Also, inviting farmers is beneficial for not only participants but also farmers. If one farmer per TS is invited at least, they think their extension would be much easier because the farmer can play a role of entry point.

9) The participants gathered from different places, then they exchanged different topics taking place in each of their places. They communicated each other, peer – peer, so that they could share individual constraints and their experiences, thereby getting collective insight. All the

participants provided the same comment during the session of problem sharing. Considering these comments, it is very much important to provide a venue wherein the participants discuss each other and thereby share problems.

5.4.2 Second Training Course (Follow up and Refresher)

This second training was conducted as a refresher course for 08A1 Improved Paddy Cultivation Promotion Pilot Project for net 3 days in August 2009. In the first training carried out in January 2009, participants learned improved paddy cultivation technologies based on Integrated Crop Management (ICM), formulated action plans to disseminate what they have learnt technique in their jurisdiction.

This training course, therefore, aims at following up and reviewing action plans according to the outcome of extension activities in the participants' service areas. At the same time, since the participants themselves have shared experiences so far made, the training can foster generating individual learning through exchanging their experiences. Furthermore, not only extension staff but also advanced farmers in the CDZ area were invited to the training and so more developed discussions on the real situations encountered by the participants could be held with much effect.

1) Rationale and Objectives of the Training

This training envisages mutual discussions of the participants among themselves on the performances shown in the action plans formulated in January 2009, experiences, issues of their extension activities and lessons learnt through the process of solving these issues and also review of their targets (number of villages) by activity. The participated people are expected to achieve the following objectives through this training:

1) Sum up experiences of the participants on the improvement of agriculture in CDZ,
2) Share the skills and attitude to solve the problems encountered during the extension,
3) Gain collective insights on what needs to be further improved for agriculture development,
4) Review, and modify if needed, the action plans prepared during the first training,
5) Prepare extension materials which fit in the context of the beneficiaries of CDZ, and
6) Discuss way-forward for agriculture development in the CDZ.

2) Training Schedule and the Participants

This training course was held at MAS Mandalay divisional office for net 3 days as shown in the table below. The participants are altogether 48, 43 from MAS staff and 5 from advanced farmers. The MAS staff were basically the same as those who attended in the first training, but some participants were different as a result of personnel transfer. Five advanced farmers were invited; 3 farmers from Mandalay division, 1 farmer from Sagaing division, and 1 farmer from Magway division.

Table 5.4.8 Training Schedule for the Refresher Course of 08A2 PP

Date	Time	Activities	Remarks
Day-1	08:30 – 09:00	Registration, Pre-training questionnaire	
	09:00 – 09:30	Opening and Overview of the Training	
	09:30 – 11:30	Preparation of the progress, problems, lessons	Group work
	12:30 – 14:30	Presentation of the group work	
	14:30 – 15:00	Identification of common problems	Interactive discussion
	15:00 – 17:00	Measures to tackle the common problems	Interactive discussion
Day-2	08:00 – 08:30	Recapitulation	
	08:30 – 12:30	Review/ modification of action plan	By TS
	13:30 – 17:00	Presentation of the revised action plan	By TS
Day-3	08:00 – 08:30	Recapitulation	
	08:30 – 12:00	Preparation of extension materials (one-point illustration)	By TS
	13:00 – 14:00	Preparation of extension materials, continued	By TS

	14:00 – 16:00	Presentation of the extension materials	
	16:00 – 17:00	Interactive top-up lecture on issues identified	
	17:00 -	Post training evaluation, and Closing	

In this training, the participants shared experiences of paddy cultivation that had been done by good practices such as early and sparse transplanting, seedlings by Dapog, pure seeds selection, reduced area wet-bed nursery, systematic land preparation, and systematic application of fertilizer practiced in the previous training, state of extension on the improved paddy cultivation promoting activities based on the action plans, clarification of their outcome, progress of the implemented activities, issues/ problems and their solutions etc.

Especially, in the problem solution discussion, the participants actively exchanged their opinions and lessons gained from the problems and solutions. The participants were separated by TS being provided with tables in each session, on which they presented their results. The Table 5.4.8 also shows the contents/schedule of the session.

3) Experiences of the participants in their extension activities

A preliminary questionnaire survey was applied prior to the start of the training. The items surveyed in the questionnaire are given in the right box. In this questionnaire, the questions focused on the extension activities for the paddy cultivation extension for summer paddy, asking issues and their solutions faced in the process of the extension activities, the most proud performance amongst activity experiences, materials used for extension activities and contents and reasons why the inhabitants are most interested in. Table 5.4.9 shows problems encountered by the participants and their solutions, and Table 5.4.10 shows the best experience of participants.

1) issues in extension/ demonstration activities
2) methods of solving issues
3) the most proud experience in one's activities
4) with/ without provision of extension manual
5) what kind of manual provided
6) activity inhabitants pleased/ interested in
7) why inhabitants pleased/ interested in the above listed activity

Table 5.4.9 Problems encountered by the participants and their solutions

Encounterd Problem	How to solve it	Nr.
Farmers cannot do some activities (e.g. Making IMO) easily.	Helpe them to get raw materials and domonstration were done several times.	6
It was difficult to mobilize farmers.	Got the help of monthly meeting by TPDC (Township Peace and Development Council).	5
It was difficult to obtain rice bran for IMO bokashi making.	Provided farmers with raw materials.	5
Farmers are sticking to conventional practice.	Explained effectiveness of the technologies and shared own experiences.	4
For demonstraion, it needs financial assistance.	Reduced cost by using locally available materials.	4
For extension field, it lacks for irrigation water.	Coordinated with WRUD (Water Resource Utilization Department) and ID (Irrigation Department)	4
Farmers don't accept what extension staff advised	Got the help of a contact farmer	Others

Table 5.4.10 The best experience you can be proud of

The best experince you can be proud of	Nr.
Nursery preparation by Dapog method	7
Transplanting of young seelding (about 20-day-old)	6
Application of chemical fertilizer systematically	4
ICM-based paddy cultivation	4
Reduced area wet-bed nursery	4
Discussions on high-yield paddy cultivation, demonstration for 10 pyi of seed per acre (32 pyi for conventional one)	Others

As the most frequently confronted issue, the MAS staff experienced that farmers could not easily carry out the activities such as Bokashi making and rice husk vinegar making. Their solution mostly tried to these issues / problems was to cooperate with farmers to gather necessary materials, and MAS staff carried out several demonstrations. The second issue arisen is that the farmers were not interested in

what they tried to diffuse, dealing with these issues, they tried extension with a help of pamphlets made by township-wise and demonstration after village PDC chairmen participating in monthly TPDC meeting.

Response to the question asking the most proud performance among their extension activities included Dapog, early and sparse transplanting, which have been extended since Organic Farming Training, systematic application of fertilizer, and reduced area wet-bed nursery, because the farmers could reduce cost for agriculture inputs such as purchasing seeds and fertilizer

As regards the extension materials, the extension staff themselves prepared, it was reported that, pamphlets in 12 TSs and were distributed through their extension activities to their target farmers. In this regard, some TSs such as Minbu and Kyaukse made a crop calendar mentioned necessary matters according to paddy life stage by using an A1 size plastic sheet like a big advertisement poster. Some of TSs themselves purchased technical handbooks, distributed them to farmers, which was produced by trainer U Ba Hein and was used in the first training. Similarly, it is found that some advanced farmers themselves purchased the technical handbooks, and distributed them to farmers by own ideas.

Table 5.4.11 shows the best extension activities that the concerned villagers were most interested in. The activity was systematic application of fertilizer, because they could reduce the amount of chemical fertilizer and costs of them to purchase. There were a lot of villagers who mixed chemical fertilizer and bokashi, and they were pleased with considerable effectiveness of soil improvement by the mixed fertilizer, because the effectiveness could prove for costs reduction to purchase fertilizers.

The villagers were also interested in the technique to select good seeds by salt water, because they evaluated that they could easily carry out the technique and hope to germinate seeds increasingly as well. Likewise, they were interested in the early transplanting with 20-day seedlings which could make more tillers compared with conventional practice by using 40-day seedlings.

Table 5.4.11 Activities which the villagers were most interceded in

Activities which the villagers were most interceded in	Nr.
Systematic application of chemical fertilizer	12
Making IMO Bokashi compost	9
Seeking seeds	8
Early transplanting yourng seedlings	7
Making reduced area wet-bed nursery	4
Application of chemical fertilizer and compost mixed	Others

4) Problems and solutions shared among participants

Summarized of the issues which the participants encountered, all participants discussed the problems and their solutions. Right picture shows discussions on issues amongst participants. They summarized similar problems; the issues were identified into 5. Those are that 1) the farmers do not follow the extension provided, 2) it is difficult for farmers to do water management and land preparation, because of lack of mobilization among farmers, 3) farmers cannot keep good seeds in hand for long, 4) farmers cannot afford to try new techniques due to lack of money, and 5) farm labors and agriculture

Discussion among participants: A male who has a microphone is an advanced farmer in Mandalay Division.

machines are not enough for farmers. Extension staff thought that the farmers caused every problem, for example, 1) the farmers do not follow the extension provided because they have no motivation to try.

However, those 5 advanced farmers who are specially invited to this training and the chief counterpart have different opinions. According to the chief counterpart, the problems do not depend on their motivation, because there is weakness in extension by MAS staff or their extension ways were not clear enough for farmers, so problems have happened, he pointed out.

Besides, one of the advanced farmers suggested based on his own experiences that the locally adaptable technique such as shorter life period paddy variety was to be cultivated if regular sowing time was late due to unavoidable circumstances, instead of sowing long life period paddy variety. Only then would it be possible to produce paddy regularly. Therefore, it is necessary for MAS to give extension more clearly to farmers.

5) State of progress in extension activities

Table 5.4.12 gives the number of target villages and that of actually realized the planned extension services and demonstration in terms of paddy summer cultivation as of August 2009, in which achievements in each TS were presented as a total by item. In the training, the participants were subdivided into groups by TS to identify number of targeted villages for extension and that of achieved ones, later the representatives of each TS presented their progress individually. In their presentations, how to identify the number of achievement was also explained to the attendants.

Table 5.4.12 Number of Villages where Extension/ Demonstration are deployed as of August 2009 (Summer Paddy)

Activity		Target (Nr. of Villages)		Accomplishment (Nr. of Villages)		Accomplishment (%)	
		Ext.	+Demo.	Ext.	+Demo.	Ext.	+Demo.
1	ICM-Paddy Demonstration	111	20	177	26	**159**	**130**
2	IMO Seed Extraction	151	68	165	71	**109**	**104**
3	IMO Bokashi Making	141	57	143	55	**101**	**96**
4	Seed Selection	158	59	173	53	**109**	**90**
5	Proper Land Preparation Practice	145	41	169	34	**117**	**83**
6	Reduced Area Wet-bed Nursery	160	35	169	33	**106**	**94**
7	Early Transplanting	162	35	170	32	**105**	**91**
8	Proper Fertilizer Application Practice	142	38	177	42	**125**	**111**
9	Proper Water Management	138	34	157	39	**114**	**115**
10	Dapog Method	124	16	115	17	**93**	**106**
11	Rice Husk Charcoal Making	136	19	102	21	**75**	**111**
12	Weeding Practice	155	36	166	45	**107**	**125**
13	Harvesting with Minimum Waste	156	33	174	33	**112**	**100**

Source: TS records of extension, JICA Study Team

As to the state of progress during the period from January 2009 until end-July, most activities except for paddy seedlings with *Dapog* nursery, and rice husk charcoal making were over-fulfilled the plan beyond 100% in terms of demonstration. Whereas, the progress of demonstrations related to such activities as paddy seedlings with *Dapog* nursery and the preparation of paddy husk charcoal did not exceed 100%. Extension concerning ICM paddy demonstration reached nearly 159 % achievement especially, since explanation and pamphlet distribution of ICM toward representative villagers in village tract have been carried out through monthly TPDC meeting.

Accomplishment rate of proper fertilizer application practice extension is 125 % and the rate of weeding practice with demonstration is 125 %. These two accomplishment rates are the biggest in the activities, extension staff explained that because the farmers can carry out these activities more easily than other activities, such a reason gave birth to high accomplishment.

6) Extension performances (Actual Practice)

Table 5.4.13 shows the number of villages and their villagers as the targets of extension / demonstration activities concerning summer paddy where the extended techniques were actually put into practice. The number of villages was 94, the number of villagers was total net 458. The number of villagers who actually put the learned techniques into practice in harvesting with minimum loss shows an outstanding number as compared to that of other activities.

This is related to the fact that for example Ayadaw TS and Wetlet TS farmers hired threshing machines, and the farmers who learnt the technique voluntarily tried to use the machines. Aside from harvesting with minimum loss, we can see there were many villagers as many as 335 and villages as many as 44 in seed selection. Because MAS staff have extended seed selection activity since before, this may have caused a higher accomplishment and a large number of villagers who tried to practice.

Table 5.4.13 Number of Villages & Villagers Tried against Target of Extension / Demonstration (Summer Paddy)

Activity		Accomplishment to Date Nr. of Villages		Of which how many villagers actually tried (After Demo)	
		Ext.	Demo.	No. of Villages	No. of Villagers
1	ICM-Paddy Demonstration	177	26	33	41
2	IMO Seed Extraction	165	71	37	46
3	IMO Bokashi Making	143	55	32	35
4	Seed Selection	173	53	44	335
5	Proper Land Preparation Practice	169	34	45	225
6	Reduced Area Wet-bed Nursery	169	33	44	137
7	Early Transplanting	170	32	46	127
8	Proper Fertilizer Application Practice	177	42	48	255
9	Proper Water Management	157	39	40	147
10	Dapog Method	115	17	18	45
11	Rice Husk Charcoal Making	102	21	26	7
12	Weeding Practice	166	45	60	278
13	Harvesting with Minimum Waste	174	33	46	344
Nr. of Villages / Villagers		190	190	94	458

Source: TS records of extension, JICA Study Team

Table 5.4.14 shows the number of villages and their villagers as the targets of extension / demonstration activities concerning rainy paddy where the extended techniques were actually put into practice. This result shows as of the end of July 2009, the extension / demonstration activities of rainy paddy have been carried out so far, because the rainy paddy is cultivated during rainy season, which starts at the end of May and ends in October. As we can see, total 239 villages were covered by extension activities, out of which there were demonstrations in 111 villages, which account at 193 % accomplishment and 75 % accomplishment against the targets respectively. Follow up survey is still being carried out.

Table 5.4.14 Number of Villages where Extension/ Demonstration are deployed as of August 2009 (Rainy Paddy)

Activity		Target (Nr. of Villages)		Accomplishment (Nr. of Villages)		Accomplishment (%)	
		Ext.	+Demo.	Ext.	+Demo.	Ext.	+Demo.
1	ICM-Paddy Demonstration	187	20	161	12	86	60
2	IMO Seed Extraction	212	76	158	46	75	61
3	IMO Bokashi Making	202	64	155	29	77	45
4	Seed Selection	224	74	170	56	76	76
5	Proper Land Preparation Practice	214	49	170	32	79	65
6	Reduced Area Wet-bed Nursery	219	45	158	25	72	56
7	Early Transplanting	221	46	160	10	72	22
8	Proper Fertilizer Application Practice	212	51	151	13	71	25
9	Proper Water Management	212	45	153	10	72	22
10	Dapog Method	186	27	128	11	69	41
11	Rice Husk Charcoal Making	184	33	101	7	55	21
12	Weeding Practice	220	54	155	12	70	22
13	Harvesting with Minimum Waste	222	52	143	1	64	2
Nr. of Villages (Net)		239	111	193	75	81	68

Source: TS records of extension, JICA Study Team

7) Outputs from the Extension Activities

In the pilot projects fiscal year 2008, the organic farming training was carried out, and a refresher course was also held as well. In the course, discussions on technical matter concerning extension outputs such as locally available materials should be used in the case of bokashi making were held, a topic about extension applied for farmers in fields was popular. On the other hand, in this training it is focused that it is not concerned with what technique was used, but how technique was to be conveyed to farmers. The following show acquisition of output through their field work, and these are their lessons learnt to develop their extension for way-forward:

1) Methodology of extension varies from TS to TS. It is considered for them that extension activities are performed standing on the farmers side by explanation with pamphlet containing figures and tables or explanation visualized with pictures and movies prepared, even their extension does not include demonstration. In common extension way among most TSs, they made a paddy calendar as an extension material to clarify fertilizer amount and its timing for use according to paddy stage, which is illustrated on A1 size plastic sheet. They explained to farmers coming to demonstration farm that farmers can decide the amount of fertilizer and its timing for use in accordance the ways of the calendar.

2) Extension staff take pride in their extension way, in addition to the pride few of them care whether the way is suitable for farmers or not. Some extension staff think that farmers do not understand their extension because farmers' understanding is poor. The chief counterpart suggested that the staff should not blame the farmers for the reason why they cannot understand their extension, but consider whether the way of extension is suitable for farmers or not. So the staff can always improve their extension much more ever before, due to reviewing their works.

3) The staff have to carry out their extension to a lot of farmers within the limited budget and time. In order to carry out their extension effectively in the situations, although the staff do not access to every village there are villagers who can do extension in the same way in villages, suggested as one of ideas. Extension staff make efforts to solve problems encountered in their field through contact farmers, on the other hand, they make their extension increase through them. Therefore, it is possible for them not only to accelerate their extension but also to produce villagers' interactive learning by means of contact farmers.

8) Extension material prepared by TS MAS

The participants provided extension material as a final task of the training. While agricultural extension staff had already prepared extension material of their original ideas for their extension sites such as pamphlets provided by folding sheets of the size A4 in thirds, crop calendar which mentions necessary matters according to paddy life stage by using an A1 size plastic sheet. In this training, the participants tried to make extension materials for the better extension to farmers and to have competitive presentation of their extension materials made by themselves in this training, because the participants need to care of actual useful extension. Some participants tried to show their presentation with their actually-used extension materials.

Extension materials made by Kyaukse TS MAS. There are many kinds of materials including MP-4 player.

A next picture is examples of the extension materials that Kyaukse TS actually uses in its extension sites. The background of the picture shows a crop calendar mentioned necessary matters according to paddy life stage by using an A1 size plastic sheet. In the picture, a CD recording extension staff's activities in digital pictures, clockwise from the CD, a large vinyl sheet described a method of providing paddy husk charcoal with kinds of material and their required quantities, a MP4 player, a book of pictures, a technical hand book distributed in the last training, a crop calendar in A4 size, and a leaflet. According to extension staff of Kyaukse TS, they considered that as much as farmers can be interested in their extension services and they made those materials. For example, the extension staff talked about how to make bokashi to farmers by using a MP4 player to show a movie of the bokashi making.

Representatives of each TS presented their extension materials prepared by themselves, and the advanced farmers, counterparts, and the Study Team also joined to identify/ evaluate the materials on whether sufficient contents were included and presented or not. Considering good extension services for farmers, the participants were given 5 minutes' presentation time. Because it is thought that the farmers are so busy that they cannot afford to listen to extension explanation for a long time, the extension staff need simple and understandable presentation skill. Therefore, the presentation time was limited.

Big Picture: Presentation by Extension Staff (Salin TS) Small Picture: An Extension Material mad by Participant during the Training (about Reduced Area Wet-bed Nursery)

It is suggested that since farmers may have problems because of poor extension way, the participants including advanced farmers discussed the relevance for their extensions. It must be good for farmers that the materials they have made with a lot of pictures make farmers easily understand their extension. However, it needs not only the quality of extension materials but also skill to convey the point in their extension and to express it simply and clearly so that the participants can understand accordingly.

9) Achievement of the Training Objectives

Figure 5.4.7 shows the degrees of the fulfillment by each participant in contrast with the training objectives. Covering from the objective 1 to the objective 6, each of the participant evaluate his achievement by 5-level ranking. The participants marked high ranked evaluation for the objectives 1 to 4 ranging 4 – 5. Particularly, concerning the objective 3 to gain collective insights on what needs to be further improved for agriculture development, the number of participants giving Level 5 reached 40 %. Therefore, it is thought that a lot of participants acquired necessary matters for better extensions through this training.

1. Sum up experiences of the participants on the improvement of agriculture in CDZ,
2. Share the skills and attitude to solve the problems encountered during the extension,
3. Gain collective insights on what needs to be further improved for agriculture development,
4. Review, and modify if needed, the action plans prepared during the first training,
5. Prepare extension materials which fit in the context of the beneficiaries of CDZ, and
6. Discuss way-forward for agriculture development in the CDZ.

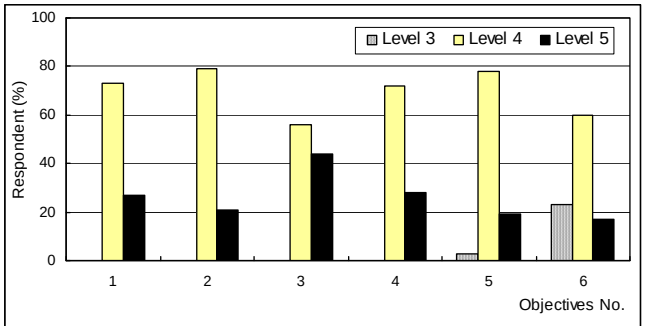


Figure 5.4.7 Achievement by Objectives(level 1-5)

This training contents were planned based on participants' contribution on questionnaires in the last training and participants shared

problems and lessons with farmers in addition to with their peers, which they encountered and learned in their service field. Some comments mentioned that such a place is effective for advanced farmers as well as extension staff and that participants could spread their discussions. Some commented that most extension staff who participated in this training could think farmers' thinking against their extension, the opportunity to think so is effective in their extension. Some feed backed that inviting not only advanced farmers but also just farmers makes discussions between extension staff and farmers more aggressively.

10) Achievement in Summer Paddy 2009

The participants learnt improved paddy cultivation techniques based on Integrated Crop Management (ICM), and have been disseminating their learnt techniques to farmers in their field. The participants compared their yield of summer paddy cultivated in their ICM plot with the yield data in conventional plot, discussed effectiveness and difference between the ICM practice and conventional one.

10.1) Cultivation Improvement by Good Practice

Figure 5.4.8 shows cost carried out by good practice such as Dapog nursery, sparse transplanting, and systematic land preparation as compared to conventional method. Concerning cost in nursery, the average cost arrives at 15,237 Kyats/acre by good practice, and at 26,508 Kyats/acre by conventional method. This indicates good practice can reduce the nursery preparation cost by about 11,000 Kyats/acre.

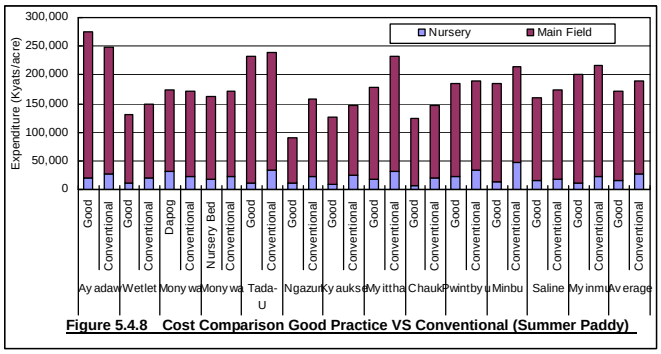


Figure 5.4.8 Cost Comparison Good Practice VS Conventional (Summer Paddy)

Comparing the used seed amount of between good practice and conventional one, the former is three – quarter as many as the latter. Reducing nursery area according to the seed amount, costs to purchase not only seeds but also the other materials for nursery was reduced, as the result, the cost for nursery is reduced to 11,271 Kyats/acre. Concerning good practice in Monywa TS, on the contrary, the nursery cost increased, because a lot of fertilizer input for nursery preparation caused the cost increased.

Figure 5.4.9 shows difference of yield between good practice and conventional one by TS, and the yield by good practice was increased by about 10 basket/acre in Ayadaw TS, Wetlet TS, Tada-U TS, Kyaukse TS, Myittha TS, Pwitnbyu TS, Salin TS, Myinmu TS. Those TSs have in the common, which is concerned that cost for nursery is less than 10 % of total cost for paddy cultivation. Extension staff achieved cost reduction in nursery preparation, due to carrying out the good practice such as Dapog nursery and reduced area wet-bed nursery. On the other hand, they could save a lot of cost in systematic application of fertilizer, because they hoped the practice such as early and sparse transplanting might effect positively on many tillering producing in main field.

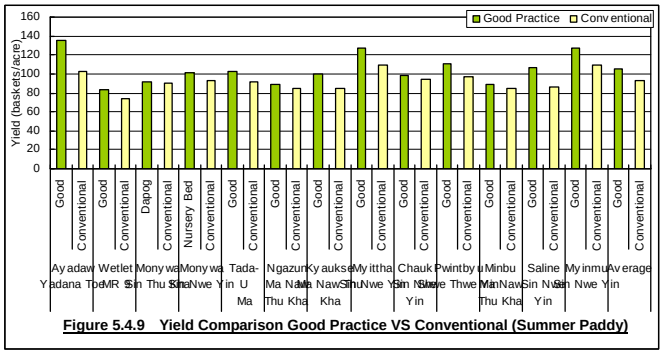


Figure 5.4.9 Yield Comparison Good Practice VS Conventional (Summer Paddy)

It is known that roots can hardly be damaged under Dapog method. It is thought that young seedlings from 15 days to 25 days old in nursery fields, in well-prepared nursery and reduced area wet-bed nursery, can be healthy. Young seedlings grown by good practice can argue more tillering in

main field, can increase the number of tillers with panicle as well. Therefore, systematic fertilizer using might do achievement of increase on yield. Some TSs, however, could not succeed in increasing yield and this was due mainly to improper water management or water could not be well managed due to lack of irrigation facilities.

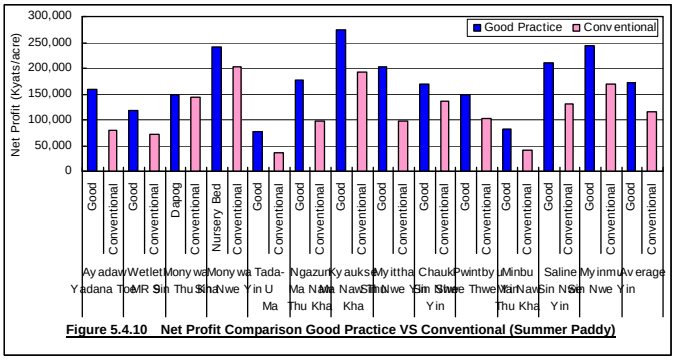


Figure 5.4.10 Net Profit Comparison Good Practice VS Conventional (Summer Paddy)

Figure 5.4.10 shows difference of net benefit between good practice and conversional method. Concerning an average of net profit, good practice gained 173,076 Kyats / acre, conventional one gained 115,507 Kyats / acre respectively. The achievement of good practice is to increase 57,570 Kyats / acre net profit balance. In Ayadaw TS, yield by good practice increased by 30basket / acre, in Myittha TS yield by good practice increased by 17 basket/ acre, and furthermore expenditure generated 53,250 Kyats / acre in cost reduction. Considering the average of yield increase in 12 TSs, good practice generated an increase of 12 basket / acre. Supposing the sales price is 3,200 Kyats / basket, it generates 38,400 Kyats / acre benefit. On the other hand, Cost estimation of good practice is lower than conventional one as 17,710 Kyats / acre balance. It is hopefully expected that good practice generates 56,110 Kyats / acre net profit (38,400+17,710).

10.2) Comparison between Good Practice and Conventional One

Table 5.4.15 shows a comparison between good practice and conventional one. Here, good practice includes Dapog, early and sparse transplanting, and other practices based on ICM while conventional ones are what nearby farmers have tried in the vicinity. Note is that since this trial was not carried out in any research farms but in farmers' actual field, no condition in terms of, e.g., fertilizer application, is same.

The participants picked up examples by Ayadaw TS and Kyaukse TS, which showed big difference between their yields, on the other hand, picked up example about Ngazune TS because of no difference. Technologies tried are Dapog, early transplanting and sparse transplanting, of which actually tried ones in those particular fields are marked with 'Yes'. Items compared are; Life Period, Seed applied per Acre, Seedling Period, Spacing, Plant per Hill, Plant Height, Length of Panicle, Nr. of Tillers with Panicle, Matured Seeds per Panicle, 1,000 Seeds Weight, etc. though some were not recorded.

Table 5.4.15 Comparison between Improved One and Conventional One (Summer Paddy)

Particular	Kyaukse TS (Mandalay) Variety: Ma Naw Thu Kha		Ayadaw TS (Sagaing) Variety: Yadana Toe		Ngazun TS (Magway) Variety: Ma Naw Thu Kha	
Dapog	Yes		Yes		Yes	
Early Transplanting	Yes		Yes		Yes	
Sparse Transplanting			Yes		Yes	
Pure Variety Selection			Yes	Yes		
Reduced Area Wet-bed Nursery	Yes		Yes	Yes		
Systematic Land Preparation			Yes	Yes		
Water Management			Yes			
Systematic Fertilizer Using			Yes			
Systematic Weeding			Yes	Yes		
Harvesting with Minimum Waste			Yes	Yes		
Life Period	135 days	135 days	132 days	132 days	135 days	135 days
Seed per Acre	10 pyi	40 pyi	10 pyi	10 pyi	8 pyi	32 pyi
Transplanting Date	Mar. 6, 2009	Mar. 6, 2009	Mar. 27, 2009	Apr. 10, 2009	Mar. 15, 2009	Mar. 1, 2009
Seedling Period	20 days	45 days	17 days	30 days	15 days	30 days
Spacing	9" X 9"	8" X 6"	9" X 7"	6" X 6"	10" X 10"	9" X 4"

Plant per Hill	2-3 plants	5-10 plants	2-3 plants	5-6 plants	2-3 plants	3-4 plants
Plant Height	2.5' – 3'	2.5' – 3'	3'10"	3'11"	3'5"	3'
Length of Panicle	9" - 10"	9" – 10"	10"	9.5"	8.5"	8"
Nr. of Tillers with Panicle	13-15	10-13	14.5	9.3	12	6
Matured Seeds per Panicle	120-140	90-110	88	82	130	90
1,000 Seeds Weight	19g	19g	27.3g	27.3g	19g	19g
Harvested Date	Jul. 16, 2009	Jul. 16, 2009	Jul. 21, 2009	Jul. 23, 2009	Jul. 29, 2009	Jul. 5, 2009
Input						
Cow dung	3 carts	10 carts	15 carts	5 carts	10 carts	3 carts
Chicken dung						
Compost (Bokashi)						
Urea	1 bag	2 bag	224 lb	224 lb	1 bag	2 bags
P205 (T-super)						
Compound	0.5 bags	0.5 bags			1 bag	2 bags
Foliar Fertilizer						
Rice Husk Ash			2 carts	1 carts		
Rotted Paddy Straw			2 carts	1 carts		
Pesticide						
Yield per Acre	100 baskets (dry)	85 baskets (dry)	136 baskets (dry)	102 baskets (dry)	89 baskets (dry)	85 baskets (dry)

It can be seen that paddy variety varies life period, seed amount is less than 10 pyi on the practice including Dapog method or reduced area wet-bed nursery. On the other hand, it can be seen in conventional way that seeds are used 32 pyi and 40 pyi, here it can be seen 3 times difference in the use of seeds. In case early transplanting tried, 20 days seedling period is the longest and others are 15 and 17 days. On the other hand, conventional method used seedlings of about 1 month and 1 month and half old age.

Spacing applied under sparse transplanting with 30 days seedling is more narrower than good practice. Spacing applied should be adaptable to soil condition, judging from whether the condition is poor or not. In the case of poor soil, recommendable sparse transplanting is 6" x 6" or 9" x 4", while in fertile soil it can be 8" x 8" or 9" x 9".

Ayadaw TS could provide good practice with not only systematic application of fertilizer and systematic weeding but also water management regularly. In conventional method at Ayadaw TS, on the other hand, systematic weeding was carried out regularly, but the timing of fertilizer input was not suitable for paddy required, and so systematic application of fertilizer and water management could not be carried out. Therefore, it caused big difference by more than 30 baskets/ acre in yield between the 2 methods, explained Ayadaw staff. The staff tried a lot of good practices as much as they could try in their demonstration plots; as a result, they achieved getting 136 basket/ acre yield.

11) Achievement in Monsoon Paddy 2009

The trained extension officers carried out the dissemination of ICM also into the monsoon paddy of year 2009, which usually starts from June/July and gets harvested in November/December. The results were reported back to the Team's office at Mandalay in by mid of February 2010. Following discussions elaborate the detail of the extension and also demonstration results of ICM tried for the monsoon paddy of year 2009.

11.1) Extension performances (Actual Practice)

Table 5.4.16 shows the number of villages which were targeted for extension and demonstration concerning monsoon paddy cultivation as of December 2009, and the number of villages where ICM extension and demonstration were actually carried out by extension officers. And also, in this table achievements of each TS, except Ngazun TS, were presented as a total by item. For Ngazun TS, demonstration plots were ruined by flood and so data were not available. In the course of paddy cultivation improvement training, the participants were divided into small groups by TS to identify the number of targeted villages for ICM extension and demonstration. According to their accomplishment, it is learnt that extension activities could be implemented more than the targeted

number in all activities-13 in total. However, as for demonstration with those 13 activities, early transplanting activity and rice husk charcoal making activity could not reach the targeted number while all the other activities clearly exceeded their targeted numbers. In other words, those 2 activities did not exceeded 100 % while all the other activities exceeded 100% with minimum111 %/ and maximum 169%. Therefore, it is found that early transplanting and rice husk charcoal making activities for demonstration were a little weaker than other activities. ICM Paddy Demonstration achieved even 153%. This was because through monthly TPDC meetings pamphlets and A1-size big plastic sheets on which ICM methods to be carried out according to paddy life stages were shown, were distributed to representative villagers in village-tracts side by side with oral explanations, it is learnt.

Table 5.4.16 Number of Villages where Extension/ Demonstration are deployed (Monsoon Paddy)

Activity		Target (Nr. of Villages)		Accomplishment (Nr. of Villages)		Accomplishment (%)	
		Ext.	+Demo.	Ext.	+Demo.	Ext.	+Demo.
1	ICM-Paddy Demonstration	189	15	212	23	112	153
2	IMO Seed Extraction	178	52	200	69	112	133
3	IMO Bokashi Making	173	45	206	58	119	129
4	Seed Selection	202	68	224	87	111	128
5	Proper Land Preparation Practice	195	47	198	54	102	115
6	Reduced Area Wet-bed Nursery	176	27	200	33	114	122
7	Early Transplanting	188	40	191	38	102	95
8	Proper Fertilizer Application Practice	207	51	216	63	104	124
9	Proper Water Management	207	47	226	53	109	113
10	Dapog Method	163	13	192	22	118	169
11	Rice Husk Charcoal Making	101	13	151	11	150	85
12	Weeding Practice	202	66	215	73	106	111
13	Harvesting with Minimum Waste	200	47	218	63	109	134

Source: TS records of extension, JICA Study Team

Table 5.4.17 shows the number of villages where extension and demonstration activities concerning monsoon paddy with extended techniques were carried out and the number of villages and villagers which/who actually tried (imitated) the extended techniques. Totally, 970 villagers from 109 villages actually put extended paddy cultivation techniques into practice after demonstration. Out of 13 extended techniques, villagers tried their locally adaptable and applicable ones only. Therefore the number varies from one technique to another. For example, there are only 8 villagers from 6 villages who followed rice husk charcoal making. This maybe because most villagers could not make rice husk charcoal making materials at their own expense. On the contrary, it is heartening to learn that 828 villagers from 98 villages tried seed selection. It can be assumed that this technique is the most applicable without having to spend much money on one hand, and the process can be done with ease on the other hand. Besides, taking into account of the fact 632 villagers from 62 villages actually tried the technique 'Harvesting with Minimum Waste', it can be assumed lessons taught at the paddy, cultivation improvement training for 'Post-harvest technology' were successfully practiced.

Table 5.4.17 Number of Villages & Villagers Tried against Target of Extension / Demonstration (Monsoon Paddy)

Activity		Accomplishment to Date Nr. of Villages		Of which how many villagers actually tried (After Demo)	
		Ext.	Demo.	No. of Villages	No. of Villagers
1	ICM-Paddy Demonstration	212	23	21	35
2	IMO Seed Extraction	200	69	33	50
3	IMO Bokashi Making	206	58	40	64
4	Seed Selection	224	87	98	828
5	Proper Land Preparation Practice	198	54	66	425
6	Reduced Area Wet-bed Nursery	200	33	23	106
7	Early Transplanting	191	38	34	155
8	Proper Fertilizer Application Practice	216	63	67	528
9	Proper Water Management	226	53	43	208
10	Dapog Method	192	22	17	72

11	Rice Husk Charcoal Making	151	11	6	8
12	Weeding Practice	215	73	71	590
13	Harvesting with Minimum Waste	218	63	62	632
Nr. of Villages / Villagers		274	123	109	970

Source: TS records of extension, JICA Study Team

11.2) Cultivation Improvement by Good Practice

Figure 5.4.11 shows the Cost Comparison between Good Practice is composed of modern agricultural technologies such as reduced area wet-bed nursery or Dapog method nursery, systematic land preparation, seed selection by soaking in salt water, early and sparse transplanting, systematic application of nature and chemical fertilizers, etc that were not practiced in conventional practice. Concerning cost for nursery preparation, the average cost arrives at 16,593 Kyats / acre by good practice and 24,700 Kyats / acre by conventional practice. This means good practice can reduce the nursery preparation cost by about 8,100 Kyats/acre.

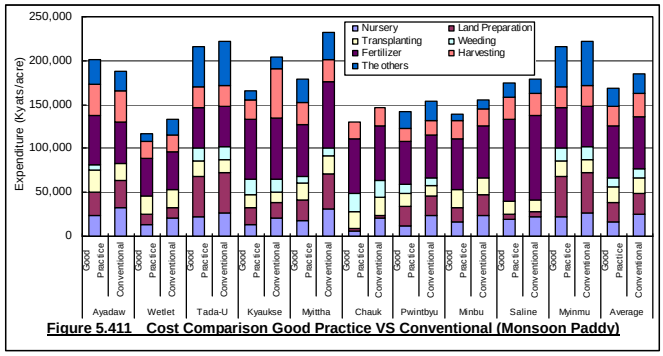


Figure 5.411 Cost Comparison Good Practice VS Conventional (Monsoon Paddy)

Comparing the used or required amount of seed between good practice and conventional one, the former is as many as half of the latter. Due to reduced area wet-bed nursery preparation, costs to purchase seeds and other materials could be reduced about 8,100 Kyats/acre. However, the cost for transplanting by good practice was 1,700 Kyats / acre more than that by conventional one, because female transplanters hated transplanting seedlings smaller (younger) and fewer in number than they used to do transplanting. So, they had to be hired at higher charge than they were paid for convention practice.

Figure 5.4.12 shows yield comparison between good practice and conventional one. The table shows the yield by good practice was increased by about over 10 basket/acre in Ayadaw TS, Tada-U TS, Kyaukse TS, Myittha TS, Chauk TS, Salin TS. In those TSs, the cost for nursery preparation is less than 15 % of total cost for paddy cultivation. They could also reduce the cost of chemical fertilizer by applying natural and chemical fertilizer systematically.

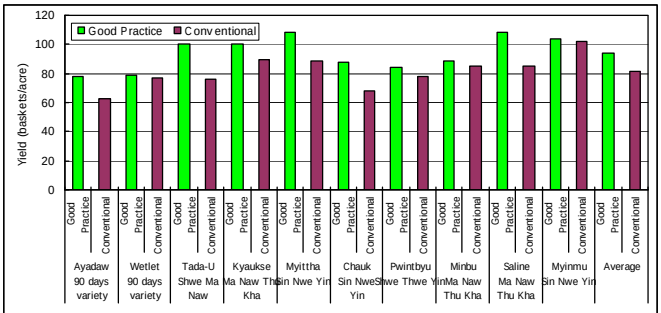


Figure 5.4.12 Yield Comparison Good Practice VS Conventional (Monsoon Paddy)

Figure 5.4.13 shows net profit comparison between good practice and conversional one. Concerning an average of net profit, good practice gained 104,247 Kyats / acre, conventional one gained 61,758 Kyats / acre respectively. The achievement of good practice is to increase 42,489 Kyats / acre net profit balance. In Kyaukse TS, yield by good practice increased by 11 basket / acre and in Saline TS by 23 basket/ acre. Considering the average of

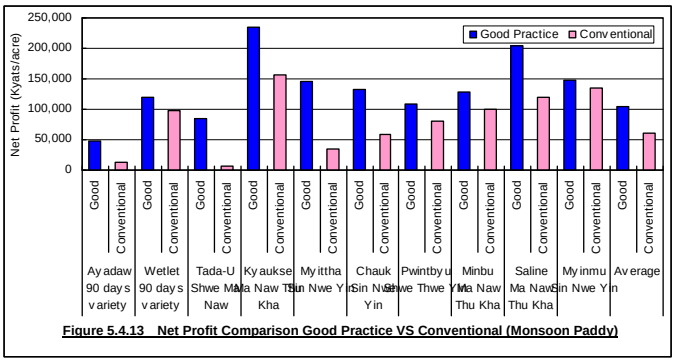


Figure 5.4.13 Net Profit Comparison Good Practice VS Conventional (Monsoon Paddy)

yield increase in 11 TSs (except Ngazun TSs), good practice generated an increase of 10 basket / acre. Supposing the sales price is 3,200 Kyats / basket, it generates 32,000 Kyats / acre benefit. On the other hand, cost by good practice is 15,190 Kyats / acre lower than that by conventional one. This means good practice generates 47,190 Kyats / acre net profit (32,000+15,190).

10.2) Comparison between Good Practice and Conventional One

Table 5.4.18 shows a comparison between good practice and conventional one. Three representative examples by Myittha TS and Chauk TS, which showed big difference between their yields, on the other hand, picked up example about Myinmu TS because of no difference. Techniques tried are Dapog, early transplanting and sparse transplanting, of which actually tried ones in those particular fields are marked with 'Yes'. Items compared are; Life Period, Seed applied per Acre, Seedling Period, Spacing, Plant per Hill, Plant Height, Length of Panicle, Nr. of Tillers with Panicle, Matured Seeds per Panicle, 1,000 Seeds Weight, etc. though some were not recorded.

Table 5.4.18 Comparison between Improved One and Conventional One (Monsoon paddy)

Particular	Myittha TS (Mandalay) Variety: Sin Nwe Yin		ChaukTS (Magway) Variety: Sin Nwe Yin		Myinmu TS (Sagaing) Variety: Sin Nwe Yin	
Dapog			Yes			
Early Transplanting	Yes		Yes			
Sparse Transplanting	Yes					
Pure Variety Selection	Yes	Yes	Yes		Yes	Yes
Reduced Area Wet-bed Nursery			Yes		Yes	
Systematic Land Preparation	Yes	Yes	Yes		Yes	Yes
Water Management			Yes		Yes	Yes
Systematic Fertilizer Using	Yes	Yes	Yes		Yes	Yes
Systematic Weeding			Yes		Yes	Yes
Harvesting with Minimum Waste	Yes	Yes	Yes		Yes	Yes
Life Period	115 days	115 days	115 days	115 days	115 days	115 days
Seed per Acre	10 pyi	32 pyi	10 pyi	32 pyi	5 pyi	32 pyi
Transplanting Date	Aug.146, 2009	Aug. 14, 2009	-	-	Aug. 10, 2009	Aug. 10, 2009
Seedling Period	18 days	35 days	20 days	31 days	23 days	35 days
Spacing	10" X 10"	9" X 4"	9" X 4"	9" X 4"	8" X 6"	9" X 4"
Plant per Hill	2 plants	4-5 plants	3-4 plants	7 plants	2-3 plants	4-5 plants
Plant Height	–	–	3.5'	3.5'	66.8 cm	50 cm
Length of Panicle	–	–	7"	7"	19.9 cm	19.9 cm
Nr. of Tillers with Panicle	18	7	6	5	12	7
Matured Seeds per Panicle	92	70	88	82	90.4	82
1,000 Seeds Weight	22.5 g	22.5 g	23g	23g	22.5g	22.5g
Harvested Date	–	–	Dec. 10, 2009	Dec. 26, 2009	-	-
Input						
Cow dung	4 carts	4 carts	2 carts	2 carts	4 carts	4 carts
Chicken dung			10 baskets			
Compost (Bokashi)	2 carts	2 carts			20 baskets	
Urea	2 1/2 basket	2 basket	1.5 bags	2.5 bags	1 1/2 basket	2 basket
P205 (T-super)						
Compound	2 baskets	2 baskets	1 bags		1 1/2 basket	1 1/2 basket
Foliar Fertilizer						
Rice Husk Ash	100 g x 5 times	100 g x 5 times			200 gm	200 gm
Rotted Paddy Straw	4 carts	4 carts			4 carts	4 carts
Pesticide						
Yield per Acre	100 baskets (dry)	85 baskets (dry)	87.5 baskets (dry)	68 baskets (dry)	104 baskets (dry)	102 baskets (dry)

It can be seen that paddy variety varies life period, seed amount is less than 10 pyi on the practice including Dapog method or reduced area wet-bed nursery. On the other hand, it can be seen in conventional way that seeds are used 32 pyi. In case early transplanting tried, 23 days seedling period is the longest and others are 18 and 20 days. On the other hand, conventional method used seedlings of about 1 month or over 1 month of age.

Spacing applied under sparse transplanting with 30 days seedling is more narrower than good practice. Spacing applied should be adaptable to soil condition, judging from whether the condition is poor or not. In the case of poor soil, recommendable sparse transplanting is 6" x 6" or 9" x 4", while in fertile soil it can be 8" x 8" or 9" x 9".

Chauk TS could provide good practice with not only systematic application of fertilizer and systematic weeding but also water management regularly. In conventional method at Chauk TS, on the other hand, systematic weeding was carried out regularly, but the timing of fertilizer input was not suitable for paddy required, and so systematic application of fertilizer and water management could not be carried out. Therefore, it caused big difference by more than 19 baskets/ acre in yield between the 2 methods according to MAS staff in Chauk.

5.5 Trainings on 08A2 Organic Farming Promotion Pilot Project

Under pilot project "08A2. Organic farming promotion programme (with indigenous microorganism: IMO), 2 training courses were administered; one in late July and the other in late October to early November. The first one was the session proper and the latter was for follow-up and refresher. In these training courses, 44 MAS staffs were trained. Through these training courses, various techniques related to indigenous microorganism utilization as well as paddy improvement were transferred to the trainees. The contents and the results of the trainings are outlined in the following:

5.5.1 First Training Course (Training Proper)

1) Rationale and Objectives of the Training

It is important for the trainees to consider first of all how to retain moisture and components of plant nutrition in cultivated soils against severe natural conditions prevailing in CDZ with meager annual precipitation itself and its precarious rainfall pattern. It is considered necessary to improve soil environment based on soil management and therefore it is proposed to introduce organic farming making use of organic matters available in the zone.

As media of available soil organic matters, soil microorganisms can be made use of, for their diversified actions/ effects make soils fertile leading to a stabilized soil environment. Their biological actions enable farmers to control (reduce or save) inputs of chemical fertilizers, thereby make it possible to mitigate risk of drought damages. In other words, practicing organic farming is capable of ameliorating soil physical properties, eventually resulting in a capacity of engaging in a farming immune to the peril of drought and other natural vagaries.

In this training course, the trainees were mainly to learn 1) organic farming applicable to mainly upland (of course, it is also applicable to paddy land) and 2) advanced techniques supporting a part of organic farming principally for cropping paddy, expecting the following objectives to be achieved during the training:

1) Discuss the MAS's objectives, bases and development direction to improve the CDZ agriculture,
2) Discuss constraints and opportunities on agriculture development in the CDZ,
3) Acquire necessary skills and knowledge of promoting the technologies taught during the training,
4) Understand the TS MAS officers' roles and responsibilities in disseminating the technologies learned during the training,
5) Familiarize with the Pilot Projects now being carried out under the Study in the following areas of;
   5.1) Organizing of farmer beneficiaries for demonstration of new technologies learned,
   5.2) Training of farmer beneficiaries to acquire necessary knowledge through the demonstration and in cases lecture-style-teaching,
   5.3) Facilitate of farmer beneficiaries to put the knowledge on the practice on their own,
   5.4) Monitor the activities of farmer beneficiaries and report to the Project Office, and when needs arise give necessary advices, and
6) Discuss way forward for agricultural development focusing on organic farming.

2) Training Mechanics and Topic Tackled

This training course was carried out in collaboration with OISCA International Myanmar. OISCA International is one of the international NGOs that extends activities from the base in Japan, and the staff have experiences on their activities of extending agricultural techniques in Myanmar for over a decade.

In this training course, trainees were accommodated in a training facility with lodging dormitory managed by OISCA International Myanmar (OISCA) where training was carried out to the staying trainees. Prior to the training a Kick-off Meeting had been held twice, on 16th - 17th July 2008 and on 26th - 27th July 2008, where name of Township (TS) and number of trainees to be invited to the training were decided. Considering accommodating capacity of the facility OISCA, it was determined that the training course was divided into 2 times to accommodate the scheduled number of trainees.

Trying to offering the practical training modules to the participants so that they can acquire ability to demonstrate what they have learnt immediately after the training course, modules were provided in a way giving equal weight to theoretical lectures and field practices. In addition, trainees were oriented to formulate their action plans for disseminating the fruits of training to their extension areas on the 4th day of the training, and on the 5th day they went on a study tour to the villages in the vicinity of OISCA where OISCA deploys its technical extension activities. The modules of the training include the following:

Module 1 Program Orientation (Day-1)
- Registration, Pre-Training Knowledge Test, and Pre-Training Experience Inventory
- Opening and Overview of this Training
- Surfacing of Participant's Expectation
- Introduction of the Study/ Pilot Project

Module 2 Organic Manure Making with IMO (Day-1)
- Lecture on Introduction of Organic Farming
- Practice on IMO Culture (4 groups divided, 6 people in a group)
- Lecture on Organic Manure, e.g. difference between EM based and IMO based
- Practice on how to Extract IMO (by using soil on irrigation canal and in farmland)
- Trainer- Participants Interactive Clarification

Module 3 Organic Manure Making with Paddy Husk Charcoal (Day-2)
- Recapitulation
- Turning of Organic Manure (made in the session on IMO culture)
- Lecture on how to Make Paddy Husk Charcoal and Rice Bran Vinegar
- Practice on Kindling of Paddy Husk
- Lecture on the Effect of Organic Farming on Soil Environment
- Practice on how to Make Paddy Husk Charcoal and Rice Bran Vinegar, and Practice on how to Make Organic Pesticide
- Discussion on Organic Farming
- Trainer- Participants Interactive Clarification

Module 4 Nursery Preparation including Dapog Method and Early and Sparse Transplanting Technology
- Recapitulation (Day-3)
- Turning of Organic Manure
- Practice on Nursery Preparation with Dapog Method

Module 5 Good Practice with Early and Sparse Transplanting Technology (Day-3)
- Practice on Early and Sparse Transplanting Technology
- Lecture on Organic Farming and Paddy Cultivation Based on OISCA Experience
- Q & A about Organic Farming and Good Practice with Dapog method and Early and Sparse Transplanting Technology
- Trainer- Participants Interactive Clarification

Module 6 Action Plan Formulation (Day-4)
- Recapitulation
- Turning of Organic Manure
- Explanation of Action Plan Formulation
- Action Plan Formulation by TS
- Presentation and Discussion of Action Plan
- Clarification of Action Plan
- Trainer- Participants Interactive Clarification

Module 7 Study Tour/ Self-learning Practice (Day-5)
- Recapitulation
- Turning of Organic Manure
- Study Tour
- Practice on IMO Culture
- Overall Action Reflection
- Post-training Test, Post-training Evaluation, and Closing

Module 1 and module 2 were administered on the 1st day of the training course. In module 1, reception of trainees, testing prior to the training and questionnaire inquiry, explanation on the training modules and their targets/ objectives, replies to the expectations towards the training obtained from the questionnaire and the explanation on this Project were conducted. Module 2 covered lecture on organic farming, field practice on preparation of EM manure by means of indigenous soil microorganisms (IMO), lecture on organic fertilizers upon clarifying distinct characters in terms of EM and IMO, field practice on collection of IMO and their incubation as well as Q and A thereon.

Module 3 was given on the 2nd day of the course. In module 3, summarization of the modules cleared in the previous day by the participants, field practice on reversal mixing of fermenting EM manure (in which practiced EM manure had been prepared in module 2), lecture on the preparation of rice husk charcoal and rice husk vinegar, lecture on organic farming and related soil environment, field practice on the preparation of organic chemicals derived from rice husk vinegar and related Q and A were conducted.

Module 4 and 5 were conducted on the 3rd day of the course. In module 4, resume of what was trained on the previous day by the participants, field practice on reversal mixing of fermenting EM manure (in which practiced EM manure had been prepared in module 2) and field practice on raising nursery seedlings by way of Dapog technique on nursery preparation were conducted. In module 5, field practice on paddy field transplanting by early, single seedling hill using Dapog seedlings, lecture on organic farming and paddy cultivation approached by OISCA, Q and A concerning Dapog technique and transplanting of early, single seedling as well as Q and A among lecturers and participated trainees were carried out.

As for 4th and 5th days of the course, formulation of action plans was practiced in module 6, while in module 7 study tour was offered and self-study on the techniques learnt in the training course by the participants themselves was practiced.

3) Participants in the Training

3.1) Number of participant trainees

At first it was scheduled to hold a training course targeting 6 TSs related to the villages implementing the Pilot Project since last year, however, TPDC hardly approved the TS MAS staff, to whom the training was planned, to altogether leave their service because paddy crop in rainy season already

started. Similarly, divisional managers advised that opportunity of participating in the training is also given to the staff responsible for other paddy producing TS than these 6 TS, since paddy crop that is also dealt in this training constitutes the top priority crop in Myanmar.

Participants scheduled in the original plan included 36 staff from 6 TS at the rate of 6 staff per TS, 6 official staff from 6 districts at the rate of 1 staff per district and 3 officers from 3 divisions at the rate 1 officer per division, in total 45 trainees. Accompanying with the increase of target TSs from 6 to 12, 35 staff from 12 TSs, 8 official staff from 8 districts concerned and 2 officers from 3 divisions concerned, or totally 44 trainees participated in the training.

Table 5.5.1 Participant List (First batch)

Division	Township	Participants				Remark
		Township	District	Division	Total	
Sagaing	Ayadaw	3		1	**14**	
	Myinmu	3	1			Sagaing District
	Monywa	2	1			Monywa District
	Wetlet	2	1			Shewebo District
Mandalay	Kyaukse	4	1		**10**	
	Myitta	5				
Total		**19**	**4**	**1**	**24**	

Table 5.5.2 Participant List (Second batch)

Division	Township	Participants				Remark
		Township	District	Division	Total	
Mandalay	Tada-U	1		1	**5**	
	Ngazun	2	1			Myingyan District
Magway	Chauk	2	1	1	**15**	Magway District
	Pwintbyu	3				
	Saline	3				
	Minbu	4	1			Minbu District
Total		**15**	**3**	**2**	**20**	

3.2) Characteristics of the training participants

Figure 5.5.1 indicates years of service as staff of the Government. Through the two batches of training consisting of the first batch and the second batch, it is observed that half of the participants in the training have less than 15 years of official service. In this case, average years of service in the first batch are 15.5 years, while that of the second batch is 12.7 years, and the weighted mean including all the participants comes to 14 years. The shortest years of government service is 8 months, while the longest service period is 31 years.

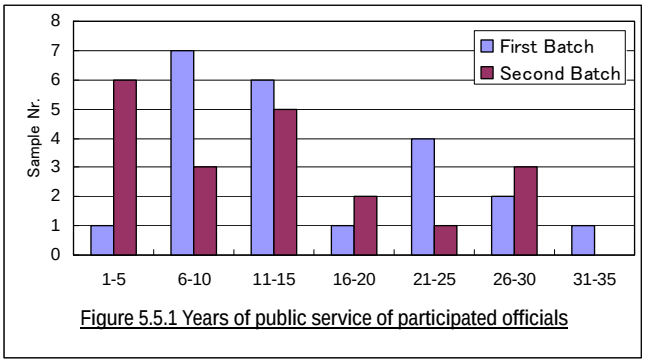


Figure 5.5.1 Years of public service of participated officials

Figure 5.5.2 shows whether the participants in the training have experienced participation in any project other than routine public services or not. In the first batch, 6 participants out of 24 have experienced participation in projects sponsored by UNDP, FAO and JICA, while in the second batch 5 out of 20 have similar experiences, showing similar rate for both two batches. In many

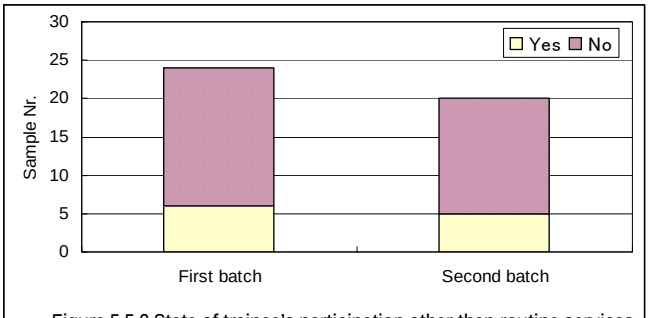


Figure 5.5.2 State of trainee's participation other than routine services

cases MAS serves as counterpart of FAO, most participants have participated in the projects by FAO who give the answer "Yes" to this question.

Table 5.5.3 summarizes problems and solutions on their services the participants in the training have experienced in the past. Many of the issues the participants experienced fall in the category "farmers cannot put their advices into farming practices" and "farmers don't accept what is advised by them". They made efforts for solution by means of such easy, understandable measures as providing their own model farms so that farmers can realize and accept their advices.

Meanwhile, examples are shown in which they solved issues by almost reinforced way through the collaboration with local authorities. Furthermore, a reality of farmer's dependence on chemical fertilizers can be disclosed from the issues they confronted. It is made clear that in order to let farmers realize importance of organic fertilizers, they are practicing extension activities relating their diffusion.

Table 5.5.3 Problems encountered by the participants and their solutions

Number	Encountered problem	How to solve it
8	Farmers cannot practice what extension staff teach them	Established "Model Farm" Arranged so that they put it into practice (invested his resources)
5	Farmers don't accept what extension staff advised	Oriented them to practice what he adviced Resorted to Local Authority's cooperation
5	Many rely on chemicals but few use organic manure	Taught them importance of organic fertilizers
5	Water for paddy cultivation lacks	Coordinated with WRUD (Water Resource Utilization Department) and ID（Irrigation Department）
3	Plant pests and diseases cannot be prevented	Approach made with farmers reflecting superiors' opinions Consulted with companies dealing with agricultural chemicals
2	Access to target farmers is difficult	Messages were sent through mediators Access was tried using his own motorbike
Others	Extension services from the staff hardly permeate into farmers due to low level of their education or living Declining capacity of MAS staff, Lack of liaison among extension offices	Services were practiced taking account of farmer's levels. Held workshosp and seminars Resorted to Local Authority's cooperation

Table 5.5.4 summarizes the result of the questionnaire to the participants for inquiring best moment as the government staff. Their replies indicate that their best moment is felt when they can extend their services related to paddy cultivation that is the top-priority crop in Myanmar. Also, ways of their expression is different depending on respondents, some replied that they felt their best moment when they succeeded in offering extension services to their farmers, when they established familiar relations with their target farmers or when crop yields were improved in their service areas, implying that extension staff working at the sites account their farmers important patrons.

Table 5.5.4 Best moment as government staff

cases	Best moment as government staff
21	When relevant extension services in paddy cropping are realized (use of good paddy seed, cropping based on official norm etc)
7	When organic fertilizers are put into practice (mixed use of organic fertilizers with chemical fertilizers)
5	Successful application of new technology (use of concentrated EM solution, of improvrd seed etc)
4	When crop yields in their service area /jurisdiction are favorable
4	When extension services can be offered to farmers
4	When such a favorable relation is created with the target farmers as real family members
Others	When livelihood level of farmers in their service gets improved, when engaging in their services at farm field

3.3) Participant's expectation of the training

At the commencement of the training course, the trainers pose questions to the participants asking what they expect from the training itself. They were asked to answer two subjects they were

expecting covering both the first and the second batches. Table 5.5.5 and Table 5.5.6 give the summarized results for each of the batches, respectively.

Table 5.5.5 What the participants in the training expect for the training (First batch)

No. of reply	What the participants in the training expect for the training
14	Acquiring new technology (preparation of EM manure and improved paddy cropping techniques)
11	To be able to extend / transfer technology/ skills they learn in the training to their farmers
10	To become capable of disseminate of EM fertilizer in the CDZ
3	Improvement in farmers livelihood in the CDZ by realizing low input~ high yielding cropping
3	Maintenance of favorable natural environment through organic fertilizers
2	Amelioration of agricultural production
2	Improvement of paddy cropping techniques
2	To become capable of extend land-use conversion techniques from upland to paddy

Table 5.5.6 What the participants in the training expect for the training (Second batch)

No. of reply	What the participants in the training expect for the training
8	Provision of organic fertilizers and their application techniques
8	Augmentation of crop production
5	Improvement of organic fertilizers
4	To become capable of offering extension services to farmers
4	Acquiring paddy cropping techniques
4	Experiencing new technology and acquiring knowledge on organic farming
2	Acquiring low cost farming technology
1	To become capable of contributing to poverty reduction

The most frequently answered reply in the first batch constitutes acquiring new technology (preparation of EM fertilizer and technology for improving paddy cultivation (number of reply: 14), followed by enabling to disseminate what is learned in the training towards farmers (number of reply: 11). First ranked reply in the second batch comprises “provision of organic fertilizers and their methods of application to crops” (number of reply: 8) and “increase of crop production” (number of reply: 8).

As a whole, replies from the participants in the first batch contained more referring to extension services than those of the participants in the second batch. Here, a good many replies were related to the matters on agricultural techniques such as preparation and improvement of organic fertilizers and technology for ameliorating paddy cropping. In this training course, the Study Team explained to the trainees about the clarification of modules, i.e., what the participants can concretely learn in this training, including the time schedule of modules in which what subject is dealt in which session scheduled on what date/ hour etc.

4) Excerpts from the Training

4.1) Practice on IMO Culture

All the participants joined a field practice for the preparation of IMP compost in groups of 5 members holding shovels. IMO compost is prepared from material including 200 kg of cow-dung, 84 kg of rice bran, 500 g of fermenting bacterial seed, 33 kg of residual oilcake of sesame 34 kg of plant ash, 100 kg of clay-dominant soil and 2 baskets of charcoal and these components of material are thoroughly pulverized and mixed with shovels etc. The participants had preliminarily been told to join wearing gardening costume, but most of participated women wore what was not suitable for field works.

Participants are turning up Bokashi compost as a part of practices on IMO Bokashi making

Nevertheless, no matter what costume they wear, their attitude to participate in the training was really serious and absorbed in their training work of mixing material of manure.

After the material of IMO compost is homogeneously mixed, water (40 liters) was uniformly sprinkled over the mixture with watering tins etc, here it is essential to add water until the rate of water reaches 40% or so of the weight of the material. After mixing and moisture adjustment, the mixture was divided into appropriate volume for easy handling and placed on the ground for a day with such cover as straw of empty gunny bags for preventing moisture evaporation from the mixture. On the next day of its preparation, the participants never fail to measure the temperature of the fermenting material and if the temperature is raised too much, reversing mixing should be practiced.

4.2) Practice on how to Extract IMO (collection of soil indigenous microorganism)

Assuming indigenous microorganism species that are readily available to villagers, soil samples were collected in small buckets from bamboo shrubs, bottom of water channels, surface of farm plots and hillside. If hills are not located near the village, indigenous microorganisms are collected around pigsty because they are often found in the soil covered by straw located near piggery booths. The participants in the training collected soils from the bottom of water channels, bamboo thickets and upland plots, thus extracted indigenous soil microorganisms from the material found in their surrounding. Participant's ever smiling posture of being engaged in training practices was really impressive.

The participants brought sampled soil back to their training facility and worked for thoroughly mixing it with rice bran to store and incubate indigenous microorganisms (at a rate around a half of bran to a portion of soil). What the participants take caution was, before closing the containers with covers, to put such cover as hand towel over the container buckets to prevent moisture condensation at the back of the cover that takes place as temperature inside the containers rises. White colored matter appears on the surface of stored soil and this is so-called fermenting microorganisms or bacteria.


In the left photo, participants are collecting IMO from virgin soils under a big tree, and in the right photo they are now mixing up all the soils collected for the preparation of extracting IMO.

4.3) Practice on how to make Paddy Husk Charcoal

Preliminarily prepared smoky ignition apparatus with a chimney (made of a drum, half of the drum is processed into a cylindrical pipe for chimney, and the rest half is processed into a footing of the chimney) was used for this preparation. This apparatus was placed uprightly on the ground over which such readily combustible material as sawdust is fed and then rice husk was heaped over it. The participants practiced charring of rice husk for about 3 hours in this way. The drum containers may be difficult to obtain in some villages, but in such a case a handy substitute can be prepared, namely, stone pebbles are heaped to build a cone, the diameter of which is made around 1m and a

bamboo cane inserted into heap of pebbles can be used as a substitute of chimney only if all its nodes are hollowed out.

Husk charcoal vinegar similar to pyroligneous acid, co-product of charcoal production, was produced as a by-product of charring rice husk. This vinegar cannot directly be made use of, but it can be utilized as a concentrate liquid of organic chemicals for pest control if it is purified separating impurities by precipitation for a certain time.

They are now making rice husk charcoal, which can be utilized as a material of low-cost input agriculture.

The participants heaped rice husk around a chimney and light a fire on it with such combustibles as sawdust and identified the state of charring rice husk listening to cracking sound of husk exposed into burning heat. Rice husk was whirled at times for homogenous heat transmission for uniform charring, and well-charred husk changes color into black. Identifying the entire color change into black after 3 hours of charring the participants sprinkled water with watering tins etc so that burning husk was extinguished. In spite of training practice under the scorching sun, they were really absorbed in the preparation of rice husk charcoal.

4.4) Nursery Preparation with Dapog Method, and Early and Sparse Transplanting

Vinyl sheets (substitutable with newspaper etc) are laid over the seeding floor of a nursery mat, on which soil about 1 cm thick is placed. The participants covered the vinyl sheets with soil and rice husk charcoal on which they sowed paddy seed (the optimum rate of sowing at 4 nohzibu / an area of 1m × 1m. Then, they covered the sown seed with rice husk charcoal to just an extent that seed was not visible by the covered charcoal. It is the best to water the seed immediately after sowing seed. Adding rice husk charcoal to Dapog technique aiming at preparing as light seedlings as possible, production of furthermore lighter seedlings is possible and highly porous rice husk charcoal can usefully contribute to retain plant nutrients and water. Although the Study Team didn't notice during this practice of Dapog (portable) nursery, comments were issued from some participants belonging to the second batch desiring to discuss more on Dapog practice.

They are now practicing sparse and early trans-panting, one of good agricultural practices applied in good leveled and water controlled paddy field.

They are making typical dapog nursery where we can see leveled paddy husk charcoal.

Making use of preliminarily prepared Dapog seedlings for transplanting into paddy field, the participants challenged to single-hill planting. It was necessary for them to forget about their own way of paddy transplanting to dare to practice single-hill planting. At first, they hesitated to transplant only one seedling per hill until one of the lecturers advised them to leave everything concerning traditional paddy cultivation and they finally started to transplant with single-hill planting. The participants in the training course completed transplanting of

Dapog seedlings over around 0.25acre of paddy field in about one hour where they transplanted seedlings at an interval of about 16 cm along lines drawn with an interval of around 16cm at a depth of 2.5 cm, taking field ventilation into consideration.

5) Knowledge Enhanced (Pre- and Post Training Test Result)

5.1) Image of the participants for organic farming

Prior to the training, a few questions were made to the participants therein in the course of Pre-training knowledge test, one of the programs of the 1st day of the training course on the definition of organic farming they were thinking or sketched in their image, on organic farming they taught to others in the past, or on any practice of organic farming that was observed in their jurisdictions. The reason of asking their image on organic farming at the beginning of the training course was to know how their concept on organic farming changes through this training course. Table 5.5.7 and Table 5.5.8 summarize the participants' images on organic farming.

Table 5.5.7 Participants' images on organic farming, First batch (prior to training)

No. of reply	Definition of Organic Farming (OF)	OF instructed in the past	OF observed in their service area
13	Farming no using chemical fertilizers but using organic ones, Farming free from detrimental side reaction to the soils but creating favorable soil environment	Applying farmyard manure and crop residues to crop	Using farmyard manure and ureaat the rate 3 : 1. Using EM
3	Farming that raises crop production without negatively affecting soils	Applying farmyard manure and crop residues to crop	Using farmyard manure and ureaat the rate 3 : 1. Using EM
2	Farming in which soils can be improved (soil water retention etc) at cheap cost	Applying farmyard manure and crop residues to crop	Using Farmyaed manure
Other	Farming making use of EM manure, farmyard manure, useful microorganisms	Applying EM fertilizer and EM manure	Mixed use of chemical fertilizers with organic manure

Table 5.5.8 Participants' images on organic farming, Second batch (prior to training)

No. of reply	Definition of Organic Farming (OF)	OF instructed in the past	OF observed in their service area
9	Farming not using any chemical fertilizers but using organic ones	Using EM manure and cow-dung	Currently utilizing EM manure and cow-dung
4	Farming that enables soil improvement	Using cow-dung, green manure, using EM	Using rice husk charcoal, mixedapplication of cow-dung with urea
3	Use of organic fertilizers makes farming cheap and safe for health	Mixing organic fertilizers well with soil, using green manure	Using EM manure, green manure and cow-dung, mixed use of cow-dung with rice husk charcoal
その他	Farming without using chemical fertilizers, Use of chemical fertilizers make farmland poor/ futile, prevention of environmental contamination	Using farmyard manure	Currently using green manure, farmyard manure and mycorrhyza

Most frequently found image on organic farming that the participants of First batch bore was "Farming not using any chemical fertilizers but using organic ones, free from detrimental side effect to the soils but creating favorable soil environment". On the other hand, image of organic farming that the participants of Second batch imagined is farming without using chemical fertilizers which make them believe possibility of enabling to improve current soil environment, and this can be imaged in other replies than that to this question. In this context, reply to the organic farming that the participants taught in their past extension services or that can often observed in their service areas most frequently includes farming utilizing EM, and this would have originated from their extension activities in which MAS distributed EM to the farmers.

5.2) Image of the participants on excellent paddy production techniques

In parallel with the question on organic farming, another question on advanced techniques for paddy cropping, that is one of the programs of this training, was also asked to the participants through pre-training knowledge test. The contents of this question asked them whether the participants diffused any excellent techniques for paddy cropping in the past in their jurisdiction areas or not (Yes/ No), and whether there found any examples of what the farmers practiced as excellent paddy cropping techniques in their service area.

One of the paddy cropping techniques the participants are learning in this training includes the methods of nursery preparation making use of rice husk charcoal and sparse transplanting of young and dwarf seedlings grown in this nursery. Since paddy cultivation often observed in the CDZ mostly employs denser transplanting, the method of paddy cropping the participants are to learn in this training course is most probably different from what they experienced in the past. Table 5.5.9 and Table 5.5.10 recapitulate what they replied.

Table 5.5.9 Excellent paddy cropping techniques diffused by the participants

No.	First batch（Yes:15 No:9）	No.	Second batch（Yes:11 No:9）
8	Proposal on the use of improved seed	6	Proposal on the use of improved seed
6	Proposal on the mixed use of chemical and organic (farmyard manure) fertilizers	3	Proposed mixed the use of chemical and organic (farmyard manure) fertilizers
4	Proposal on seed selection (water soaking)	2	Proposal on seed selection (water soaking)
4	Proposal on optimum transplanting density (planting on 6 rows and 1 row kept vacant)	2	Proposal on optimum transplanting density (planting on 6 rows and 1 row kept vacant)
3	Proposal of early transplanting (transplanting seedlings to permanent field within 1 month after sowing)	2	Proposal on the use of EM Bokashi manure, farmyard manure and manure prepared from crop residue
		others	Proposal on seedlings at the age of 30 days, on the use of organic fertilizers etc.

Table 5.5.10 Cases of excellent paddy cropping techniqies found in the participants extension area

No.	First batch	No.	Second batch
12	Applying improved seed	7	Applying improved seed
7	Using chemical and organic (farmyard manure) fertilizers	5	Using chemical and organic (farmyard manure) fertilizers
1	Suitable transplanting density (planting on continuous 6 rows and 1 row kept vacant)	4	Suitable transplanting density (planting on continuous 6 rows and 1 row kept vacant)
		2	Transplanting seedlings aged at 25 ~ 30 days
		Others	Applying seed selection, Using farmyard manure at the period of land preparation

As to the response to the question asking excellent paddy cropping techniques the participants extended in the past, the most frequent reply from both the first and the second batch participants was the recommendation of utilizing improved seed. The next frequent reply from both batches of the trainees was a recommendation of mixed use of chemical and organic (farmyard manure) fertilizers. It follows that the diffusion activities on these two methods constitute major extension activities they have been engaged. In this regard, the participants experienced to extend good techniques counted at 15 in the first batch against those who haven't experienced counted at 9, while in the second batch 11 participants affirmatively replied versus 9 of them negatively replied. Hence, it was found that more than half of the participants have experience of diffusing good techniques.

Furthermore, cases of excellent paddy cropping techniques found in their servicing areas, the largest number of the respondents belonging to both the first and the second batches gave the answer mentioning use of improved seed. The second-ranked frequent reply was on the mixed use of chemical and organic (farmyard manure) fertilizers, while the third-ranked one was the application of suitable planting density (transplanting on 6 parallel rows and the seventh row is kept vacant). That is to say, these three cropping methods as observed in the participants servicing area may constitute

representative techniques for paddy cultivation considered excellent by participants.

5.3) Organic farming learned by the participants

After the completion of the training, a question was again posed to the participants as to their concept on organic farming, by asking what the key point of organic farming that they have learned throughout the training. Table 5.5.11 and Table 5.5.12 summarize their replies dealing with the first batch and the second one, respectively. In the pre-training test, many of the participants mentioned that chemical fertilizers were not applied in organic farming but organic fertilizers like manure were applied, and that organic farming was useful for improving arable soils.

From these points of view, similar replies were obtained in the post-training test, but in the pre-training test, nothing mentioned about the reasons why organic farming was worthwhile to improve arable soils, and contents of the former reply had been abstractive. On the other hand, in the post-training test conducted after the completion of the training, more replies mentioned why organic farming was useful in their field even though contents of the reply were similar between these two tests.

For example, the reply referring to the mitigation of drought damages by retaining moisture in soils was more observed in the post-training test of both the first and the second batches. From such concrete way of replay, the participants seem to have realized that the application of organic farming has allowed to improve soil physical property, eventually leading to possibility of running more robust farming against risk of drought etc. Likewise, comparing description in the pre-training stage with that in post-training stage, way of expression in the reply was diversified in the latter, implying that participant's concept /image on organic farming has been developed not only deeper but also wider in their spectrum of concept.

The most frequently observed reply in the first batch was "accelerated soil fertility (through low-cost farming)", while that in the second batch included "human health- friendly (by preventing physical damages affected by the application of chemical fertilizers" and "alleviation of environmental pollution dispensing ingredients of chemical fertilizers ". Although number of the reply with these descriptions are different between the first and the second batches, concept / image on organic farming by the participants belonging to both groups is considered common in terms of soil improvement, natural environment consideration and human health.

Table 5.5.11 View of organic farming acquired through the training, (Post-training) First batch

No. of reply	What organic farming means
10	Enrich soil fertility（with low-cost farming）
8	Alleviate damaging effect of drought through increased retention of soil water
7	Lessen environmrnt pollution by dispensing doze of chemical fertilizers
7	Enable sustainable soil conservation
7	Enable to ease the damages of pests/ crop diseases
7	Allow soil improvement on a larger time span owing to application of microorganisms and organic matter
6	Prevent bio-hazards of chemical fertilizers affecting human health
5	Enable to improve quality of harvests
5	Enable to control soil erosion
4	Enable to economize cost of chemical fertilizers by substituting them with organic ones
Others	Allow farmers to utilize not only major nutrients (NPK) but simultaneously effect of microorganisms. Allow them to make use of what are available around them

Table 5.5.12 View of organic farming acquired through the training, (Post-training) Second batch

No. of reply	What organic farming means
7	Good for health（Prevent bio-hazards of chemical fertilizers affecting human health）
7	Lessen environmrnt pollution by dispensing doze of chemical fertilizers
6	Enable to improve soil physical and chemical characteristics
6	Allow farmers to improve crop yields/ production
5	Alleviate damaging effect of drought through increased retention of soil water

5	Enrich soil fertility（with low-cost farming）
5	Enable to economize cost of chemical fertilizers by substituting them with organic ones
4	Enable to control soil erosion
3	Enable to improve quality of harvests
3	Enable sustainable soil conservation
3	Allow farmers to produce tasty vegetables and rice
Others	Allow farmers to utilize not only major nutrients (NPK) but simultaneously effect of microorganisms. Effective use of manure.Provide optimum ambient conditions for crop growth

5.4) Excellent paddy cropping techniques

In the post-training test, the participants were asked about advantages of paddy cropping techniques they learned in the training. Their replies are summarized in Table 5.5.13 and Table 5.5.14. The number of replies was fewer in the case of the second batch as compared with that of the first batch because many respondents in the latter gave almost the same replies to this question as those given to that about organic farming and these similar replies were omitted from the summary. Many participants in both the first and the second batches appreciated the nursery techniques applying Dapog, accounting it as an excellent paddy cropping technique. The reasons given in preponderant replies included that it allowed saving of time for transplanting and also effective use of space for nursery in the replies from the first batch, it allowed to economize amount of seed from the second one.

Characteristics of excellent techniques for paddy cultivation the participants had in mind at the stage of pre-training test included mixed application of chemical fertilizers with organic ones, adequate spacing of transplanting (planting on continuous 6 rows and then keeping 1 row vacant). After the training, their image of excellent paddy cultivation was greatly widened with their increased option of extension repertory including economized seed sowing and cost saving for seedling culture in nurseries, technique of Dapog nursery that enabled to efficiently use space of nursery for raising seedlings as well as preparations and utilization of rice husk charcoal and rice husk vinegar.

Also, they accepted sparse transplanting practiced in the training as an excellent technique for paddy cultivation, commenting that this low-density transplanting should be diffused because it can foster vigorous tillering of transplanted seedlings, as seen in some of their replies to the questions. Thus, the training is considered worthwhile equipping them with new concept that they haven't experienced before.

Table 5.5.13 Paddy cultivation techniques learned in the training (post-training) First batch

No. of reply	What are excellent cultivation techniques of paddy cultivation
15	Time for transplanting can be saved through Dapog, space for nursing seedlings can efficiently utilized
7	By Dapog method, the amount of seed for sowing can be reduced
5	OISCA practices sparse planting (single seedling per hill) for which tiny & young seedlings are used
5	Cost incurred by preparation of seedlings can be economized through Dapog
4	Rice Husk Charcoal
4	Rice Husk Vinegar
4	Organic farming by means of IMO
4	Good paddy yield (100bsk/ac) can be expected without applying chemical fertilizers, only with organic fertilizers
Others	Planting lines are drawn at the interval of 12 inches, on which seedlings are planted at every 8 inches. Such sparse transplanting should be diffused

Table 5.5.14 Paddy cultivation techniques learned in the training (post-training) Second batch

No. of reply	What are excellent cultivation techniques of paddy cultivation
4	By Dapog method, the amount of seed for sowing can be reduced
4	Application of Dapog enables to systematically raise seedlings
3	Rice Husk Charcoal
3	Organic farming by means of IMO
3	Good paddy yield (100bsk/ac) can be expected without applying chemical fertilizers, only with organic fertilizers
3	Early and sparse transplanting allows vigorous tillering (fostered by early and sparse transplanting to permanent field)

3	Water management is essential (water consumption per area is less than that required for ordinary paddy cultivation)
Others	Rice husk vinegar can multi-purposely used. Planting lines are drawn at the interval of 12 inches, on which seedlings are planted at every 8 inches.. Sparse transplanting is really effective for small scale farmers

6) Achievement of the Training Objectives

An inquiry was applied to the participants on the last day of the training on the extent of fulfillment of training objectives. The extent of fulfillment was numerically expressed with the lowest evaluation ranked at Level 1 and the highest ranked at Level 5. Figures 5.5.3 and 5.5.4 give graphs showing the extent of fulfillment of training objectives of the participants. Both for the first batch and the second batch, more than 80% of the participants fulfilled each of them with their self-evaluation by Level 4 or higher.

1) Discuss the MAS's objectives, bases and development direction to improve the CDZ agriculture,
2) Discuss constraints and opportunities on agriculture development in the CDZ,
3) Acquire necessary skills and knowledge of promoting the technologies taught during the training,
4) Understand the TS MAS officers' roles and responsibilities in disseminating the technologies learned during the training,
5) Familiarize with the Pilot Projects now being carried out under the Study in the following areas of;
   5.1 Organizing of farmer beneficiaries for demonstration of new technologies learned,
   5.2 Training of farmer beneficiaries to acquire necessary knowledge through the demonstration and in cases lecture-style-teaching,
   5.3 Facilitate of farmer beneficiaries to put the knowledge on the practice on their own,
   5.4 Monitor the activities of farmer beneficiaries and report to the Project Office, and when needs arise give necessary advices, and
6) Discuss way forward for agricultural development focusing on organic farming.

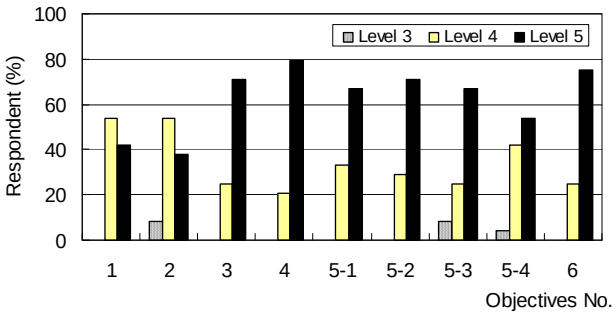


Figure 5.5.3 Achievement of training objectives (First batch)

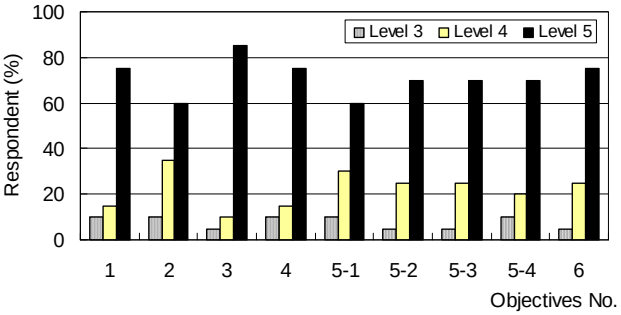


Figure 5.5.4 Achievement of training objectives (Second batch)

In the first batch, the participants gave their self-evaluation on the fulfillment of training objectives with Level 3 only for the objectives 2, 5-3 and 5-4, while in the second batch around 10% (equiv. to 2 persons) of the participants on average marked Level 3 for all the objectives. The participants in the training course are to bring back technology and knowledge that they have learned in the training to their service areas and to disseminate them to the farmers through their on-the-field extension activities. However, problems would also arise and they would be requested to solve them by their own capacity. In other words, few participants self-evaluated themselves with Level 3 anticipating such limitations of their capacity as meeting the requirement of promptly coping with arising problems on their sites for techniques for which they do not have ample experiences.

7) Number of target villages of Agriculture Pilot Project in FY 2008/09

The participants formulated an action plan for extending techniques they had acquired in the training to beneficiary farmers during the latter half of the training course. It consisted of 1) contents of extension activities, 2) key responsible staff for extension activities, 3) number of target villages where extension activities (demonstration and extension) are planned, 4) period of developing extension activities, 5) expected fruit/ effect, 6) inputs required for the planned activities, 7) supporters of the planned activities etc.

Table 5.5.15 summarizes the numbers of target villages for deploying extension activities based on the

action plan formulated by the participants. In this action plan, 12 TS are planned as the target of extending organic farming in which demonstration activity is scheduled at 124 (out of 291) villages, while extension activity is to be done at 291 villages.

Table 5.5.15 Number of Villages Planned for Extension Activities

First Batch														
Typology	Type III		Type III		Type IV		Type V		Type V		Type V		Total	
TS	Monywa TS		Myinmu TS		Ayadaw TS		Wetlet TS		Kyaukse TS		Myittha			
Demonstration & Extension	Demo	Ext'n	Demo	Ext'n	Demo	Ext'n	Demo	Ext'n	Demo	Ext'n	Demo	Ext'n	Demo	Ext'n
IMO Bokashi Making	6	10	4	20	5	20	6	20	2	20	7	45	30	135
IMO Seed Extraction	6	10	7	20	20	20	8	15	10	20	10	50	61	135
Rice Husk Charcoal Making	10	20	7	20	10	20	12	20	5	10	15	50	59	140
Rice Husk Vinegar Making	0	10	1	3	3	10	1	20	2	10	3	20	10	73
Seedling by Dapog Method	2	10	1	8	5	10	5	15	5	10	10	30	28	83
Early and Sparse Transplanting	2	10	1	8	5	10	6	20	2	10	10	30	26	88
Training of Trainers	15		5		3		9		6		27		65	
Accumulated Village Number	26	70	21	79	48	90	38	110	26	80	55	225	214	654
Number of Villages by TS (Extension)	20		20		20		20		20		50		150	
Number of Villages by TS (+ demo)	10		7		20		12		10		15		74	
Second Batch														
Typology	Type I		Type II		Type III		Type IV		Type IV		Type V		Total	
TS	Chauk TS		Ngazun TS		Tada-U TS		Minbu TS		Salin TS		Pwintbyu TS			
Demonstration & Extension	Demo	Ext'n	Demo	Ext'n	Demo	Ext'n	Demo	Ext'n	Demo	Ext'n	Demo	Ext'n	Demo	Ext'n
IMO Bokashi Making	4	15	3	25	4	18	5	21	3	25	3	25	22	129
IMO Seed Extraction	5	15	10	25	12	18	12	21	6	25	5	25	50	129
Rice Husk Charcoal Making	2	7	10	25	5	25	9	21	3	25	5	20	34	123
Rice Husk Vinegar Making	2	7	3	20	5	25	2	17	2	25	2	20	16	114
Seedling by Dapog Method	2	5	3	25	10	30	3	21	2	25	3	25	23	131
Early and Sparse Transplanting	2	5	2	25	4	30	3	21	2	25	3	25	16	131
Establishment of Organic Farm	2	15	2	25	2	30	3	21	3	25	3	25	15	141
Foliar Fertilizer Making by using Local Products	2	4	2	25	4	30	2	5	3	6	0	0	13	70
Selection of Quality Seed	3	5	2	25	2	25	5	21	3	25	5	25	20	126
Training of Trainers	15		9		3		13		24		22		86	
Accumulated Village Number	24	78	37	220	48	231	44	169	27	206	29	190	209	1094
Number of Villages by TS (Extension)	15		25		30		21		25		25		141	
Number of Villages by TS (+ demo)	5		10		12		12		6		5		50	
Number of Villages by TS (Extension)	**35**		**45**		**50**		**41**		**45**		**75**		**291**	
Number of Villages by TS (+ demo)	**15**		**17**		**32**		**24**		**16**		**20**		**124**	

Number of extension activities planned in the action plan amounts to 7 including "TOT (Training of Trainers)" in the first batch, while that in the second batch counts more. For the participants in the first batch decided their extension activities according to the contents of the training, but those in the second batch planned not only the extension activities in line with the contents of the training but also their own idea born during the discussions and Q & A such as establishing a model farm for organic agriculture, thus diversifying their activities.

8) Participants Satisfaction by Module

The participants were requested to record their extent of satisfaction every time at the completion of each module on the contents of what they learned every day. Figure 5.5.5 and Figure 5.5.6 show the degree of their satisfaction by module. In these figures, level 1 indicates the lowest extent of satisfaction whereas level 5 gives the highest one. No participants, belonging to both batches, marked with level 1 and level 2, and about 40% of

Module 1: Program Orientation
Module 2: Organic Manure Making with IMO
Module 3: Organic Manure Making with Paddy Husk Charcoal
Module 4: Nursery Preparation including Dapog Method
Module 5: Good Practice with Early and Sparse Transplanting Technology
Module 6: Action Plan Formulation
Module 7: Study Tour / Self-learning Practice

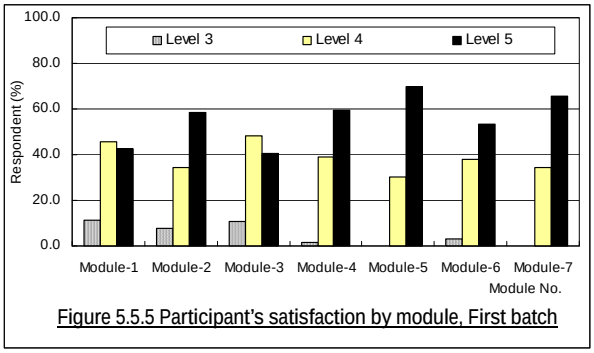


Figure 5.5.5 Participant's satisfaction by module, First batch

them marked all the modules with level 5.

More than 60% of the participants in both of two batches satisfied with excellent paddy cultivation techniques including module 4 that presented raising of nursery seedling by Dapog method and module 5 that introduced early stage transplanting and sparse spacing by marking with level 5. The reason why these modules gave them such high degree of satisfaction probably lies in that these techniqiues were accepted as worthwhile paddy cultivation techniques to stimulate very many tillerings from a planted seedling, quite fifferent from what they had previously experienced.

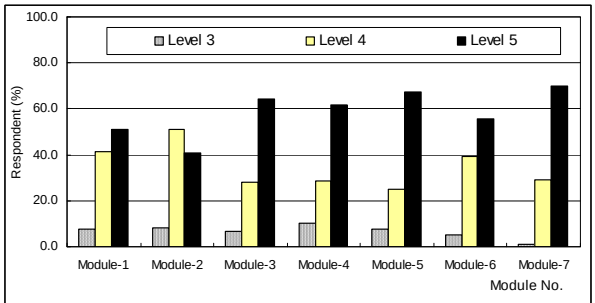


Figure 5.5.6 Participant's satisfaction by module, Second batch

Likewise, more than 60% of the participants also in both batches gave module 7 high evaluation with level 5. By the way, for other modules except for module 1 for orientation, they consist of lectures and field practices. Regardless of the sessions in a module, there observed a tendency that higher satisfaction was brought from field practices rather than from lectures.

9) Satisfaction by as a Whole, Logistics, Theory, and Own Participants

The participants were asked about degree of their satisfaction with training as a whole, logistics, theory, practice and their own participation. Figure 5.5.7 and Figure 5.5.8 show the degree of their satisfaction with a scale from level 1 to level 5 by batch. Out of participants belonging to the first batch, 5 - 10 % (or 1 - 2 persons) of the participants marked level 3 except for the self-evaluation of their own degree of participation. While in the batch, 5 % (or 1 person) marked level 3 except for the evaluation of logistics and practice. According to the comments by the participants, there intervened some difficulty in translation from Japanese to Myanmar language (for Japanese trainer was included in the trainer's group dispatched from OISCA). Other comments desired to preliminarily distribute printed references prior to the training. These two were considered as the causes of receiving the mark of level 3 from a part of the participants.

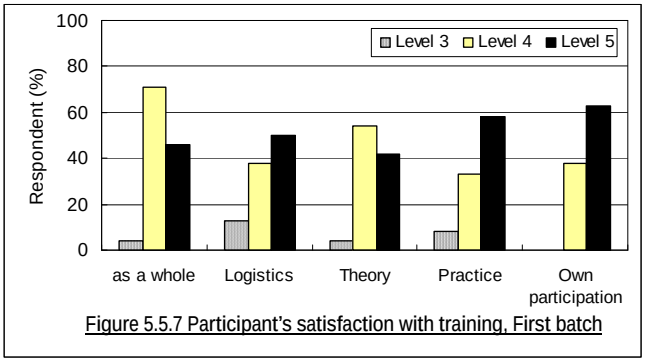


Figure 5.5.7 Participant's satisfaction with training, First batch

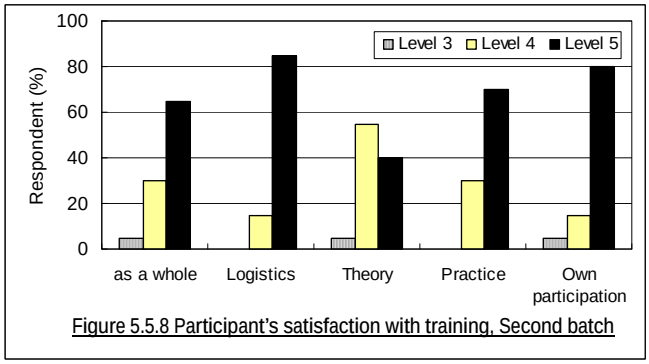


Figure 5.5.8 Participant's satisfaction with training, Second batch

10) Participants' Comments to Improve

In parallel with evaluating degree of trainee's satisfaction, they were requested to give comments on the training as a whole, logistics, theory and practice as well as their participation for providing better training course for the next training. Following are the summary of their comments.

1) Many comments appreciated field practices by the reason that they were useful for the participants' easy understandings. The net duration of the training course was 5 days, and some participants requested to extend the duration to one week or longer.

2） Many participants commented that high quality logistics were provided. The training course provided lodging facility in the training center, and there were some participants who were not accustomed to live in a group staying in a lodge. They were a bit of confused with collective movements within a given schedule, and some participants requested to adjust dining hours. Also, some of them made detailed requests concerning provision of accommodation facility (for instance appealing need of strings to hang cloths etc).

3） Many comments referred to the lectures that were better than those they expected before the training because they could learn flexible techniques applicable according to natural and soil conditions in the field. On the other hand, various requests were made including improvement of quality of translation, prior provision and distribution of manual and other references. In this connection, it is not necessarily desirable to distribute references prior to the lecture because some of trainees receive them and actually do not pay attention to the lecture. This was the reason why the Study Team avoided distributing references before the training.

4） There were some comments mentioning that knowledge and techniques acquired in the training is beneficial for farmers, and they would like to provide a similar training course consisting of theory and practice. This suggests that the participant's superior willingness of not only receiving a training service but also diffusing the fruit of the training among beneficiary farmers. In this regard, some comments requested that all the contents of the training should have comprised of the explanation based on experimental data, and this assertion could be made use of hereafter provision of references.

5） Some comments emphasized that what can give better hopes to the generations to come is organic farming. A participant mentioned that he has acquired confidence to diffuse soil improvement among farmers. A good many comments mentioned the usefulness of the training since it was the first experience for the participants for theory accompanied by field practices. Also, some commented that the problems faced by farmers could be solved through their demonstrative verifications.

6） Some comments referred to a merit that the participants gathered from different places, then exchange of topics was realized through practices in a group and collective staying, thus they could share farming intelligence in each of their service areas. Some others mentioned that the participants debated advantages and shortcomings of their farming found in their fields of extension services, thereby they could share concept and knowledge on individual farming practices. In short, the participants' comments appreciate that their mutual understanding deepened through their mutual communications has created a benefit in the training.

5.5.2 Second Training Course (Follow up and Refresher)

This second training was carried out as a refresher course of 08A2 Pilot Project on organic farming promotion. In the first training held in July 2008, ways of approach to the pilot project were clarified, various techniques concerning agricultural development were transferred and action plans to diffuse these techniques among villagers were formulated. This training course was therefore a follow up action of the first training course, aiming at the review of the action plans based on the outcome of extension activities in the participants' service areas. At the same time, since the participants themselves share experiences so far made, the training can foster generating individual learning through exchanging their experiences.

1) Rationale and Objectives of the Training

This training envisages mutual discussion of the participants themselves on the performances by activity shown in the action plans formulated in July 2008, experiences, issues of their extension

activities and lessons learnt through the process of solving these issues and also review of their targets (number of villages) by activity. The participated staff are expected to achieve the following items through this training:

1) Sum up experiences of the participants on the improvement of agriculture in CDZ,
2) Share the skills and attitude to solve the problems encountered during the extension,
3) Gain collective insights on what needs to be further improved for agriculture development,
4) Review, and modify if needed, the action plans prepared during the first training,
5) Prepare extension materials which fit in the context of the beneficiaries of CDZ, and
6) Discuss way-forward for agriculture development in the CDZ.

2) Training Schedule and the Participants

Similar to the first training, this training was conducted also in cooperation with OISCA International Myanmar (hereinafter referred to as OISCA). Taking account of the capacity of accommodation in the facility held by OISCA, the participants were divided into 2 groups, and the training was conducted for net 3 days for each of these groups. 44 participants were basically the same as those attended in the first training, but some participants were different as a result of personnel transfer in both two groups.

Table 5.5.16 Training Schedule for the Refresher Course of 08A2 PP

Date	Time	Activities	Remarks
Day-1	07:45 – 08:15	Registration, Pre-training questionnaire	
	08:15 – 08:30	Opening and Overview of the Training	
	08:30 – 10:30	Field work on the paddy planted during the 1st training	
	10:30 – 12:00	Top-up lecture on minerals for rice field, discussion	
	13:00 – 14:00	Top-up lecture on water management by making ridge	
	14:00 – 16:00	Interactive discussion on the harvested paddy	
	15:00 – 17:00	Preparation of the progress, problems, lessons, etc.	Group work
Day-2	08:00 – 08:30	Recapitulation	
	08:30 – 11:00	Presentation of the group work	by TS
	11:00 – 12:00	Identification of common problems	Interactive discussion
	13:00 – 15:00	Measures to tackle the common problems Measures to further improve the MAS extension Interactive top-up lecture on issues identified	Interactive discussion
	15:00 – 17:00	Review/ modification of action plan	
Day-3	08:00 – 08:30	Recapitulation	
	08:30 – 11:00	Presentation of the revised action plan	
	11:00 – 12:00	Preparation of extension materials	by TS
	13:00 – 14:00	Preparation of extension materials, continued	by TS
	14:00 – 16:00	Presentation of the extension materials	by TS
	16:00 -	Post training evaluation, and Closing	

In this training, the participants shared experience of paddy harvesting that had been planted by early and single hill planting using Dapog seedlings practiced in the previous training, state of extension on the organic farming promoting activities based on the action plans, clarification of their outcome, progress of the implemented activities, issues/ problems and their solutions etc. The participants were separated into TS in charge, providing tables in each session, thus presented their results. The above table shows the contents/schedule of the session.

The participants in the training consisted of 3 provincial staff from 3 provinces, 5 district staff from 5 districts and 36 TS extension staff in total from 12 TSs, or 44 staff of MAS officers in total. Figure 5.5.9 shows the participant's educational

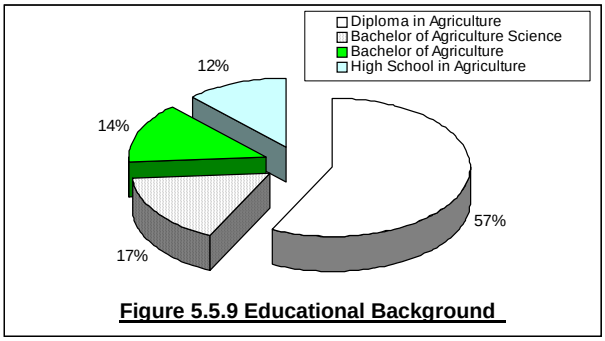


Figure 5.5.9 Educational Background

background. Out of 36 agent-participants 24 completed Diploma of ^Agriculture (57% of the total participants), 7 are bachelor of agricutlure science (17%), 6 are bachelors of agricutlure (14%) and 5 are graduates of high school in agriculture (12%). Also, their vocational background consists of 6 participants with less than 5-year of staff experience, 11 with 6 - 10-year, 12 with 11 - 19-year and 11 with more than 20 years of staff experience (some didn't reply). From this distribution it seems that the participants composition were well-balanced.

Concerning their transport means to their extension sites, 27 out of 31 respondents use their owned motorbikes, while others who do not own bikes utilize public buses or bicycles. Also, as to number of villages they cover in their routine services, it is averaged at 21 villages, with the maximum 63 and the minimum 5, implying considerable differences in the scale of service area by TS. In TS belonging to Sagaing division, for example in Monywa TS and in Myinmu TS, staff in charge of these areas render their services in more villages, in particular in Shwebo TS, an advanced TS in paddy production, a staff member covers 63 villages under him.

3) Experiences of the participants in their extension activities

A preliminary questionnaire survey was applied prior to the start of the training. The items surveyed in the questionnaire are given in the right frame. In this questionnaire, the questions are focused on the extension activities for the pilot project in FY 2008/09, asking issues and their solutions faced in the process of the extension activities, the most proud performance amongst activity experiences, manual used for extension activities and contents and reason why the inhabitants are most interested in.

1) issues in extension/ demonstration activities
2) methods of solving issues
3) the most proud experience in one's activities
4) with/ without provision of extension manual
5) what kind of manual provided
6) activity inhabitants pleased/ interested in
7) why inhabitants pleased/ interested in the above listed activity

As the most frequently confronted issue, the participants experienced that farmers were not interested in what they tried to diffuse, such as provision of Bokashi manure by IMO and that of paddy husk charcoal, they never directly accept any new technique etc. What was tried at the sites to cope with such difficulty was to ask them for trying the proposed techniques in a small scale. Also, opinions were heard about difficulty of obtaining required material to provide Bokashi manure, and there was staff's record in which the staff considered together with the farmers, as a device of solving this difficulty, on what can be used as a substitute of material.

Response to the question asking the most proud performance among their extension activities included that a staff utilized Bokashi manure for raising *Dapog* seedlings, a staff made use of material resembling to paddy husk charcoal that had been wasted from a milk plant (where husk was used as fuel) instead of providing paddy husk charcoal. Also, as a substitute of paddy husk vinegar, a liquid resembling to paddy husk vinegar produced in the same milk plant was substituted with the vinegar. All of these activities are result of applying what had been learned in the training to their extension sites.

As regards the extension materials the extension staff themselves provided, it was reported that pamphlets were provided in 12 TSs and were distributed through their extension activities to their target farmers. In this regard, a staff in Ngazun TS provided small paper model in extending paddy husk charcoal as a device to facilitate farmers to imagine the apparatus of providing paddy husk charcoal. Similarly, a staff of Ayadaw TS provided seed for Bokashi manure. What they intended is to avoid laborious effort of farmers themselves for providing germ seed.

The activity villagers were most interested in was to raise paddy seedlings with *Dapog* because they

can reduce the quantity of seed used for the nursery. Likewise, many villagers had interest in the preparation as well as application of Bokashi manure with IMO. Concerning the preparation of Bokashi manure, issue of procuring its material was posed in some areas, however extension staff tried to solve it with the beneficiary farmers, for example to use sesame cake (residue of sesame seed after extracting oil) as a substitute of rice bran. Such a device shows us result of efforts made by extension staff and farmers to overcome confronted issues.

4) State of progress in extension activities

Table 5.5.17 gives the number of target villages and that of actually realized the planned extension services and demonstration as of November 2008, in which progress in each TS were presented as a total by item. In the training, the participants were subdivided into groups by TS to identify number of targeted villages for extension and that of achieved ones, later the representatives of each TS presented their progress individually. In their presentations, how to identify the number of achievement was also explained to the attendants.

Table 5.5.17 Number of Villages where Extension/ Demonstration are deployed as of November 2008

Activity		Target (Nr. of Villages)		Accomplishment (Nr. of Villages)		Accomplishment (%)	
		Ext.	Demo.	Ext.	Demo.	**Ext.**	**Demo.**
1	Making IMO Bokashi compost	264	67	243	85	**92**	**127**
2	IMO seed preparation	264	96	253	98	**96**	**102**
3	Paddy husk charcoal	263	93	216	87	**82**	**94**
4	Paddy husk vinegar	187	26	165	12	**88**	**46**
5	*Dapog* method	214	51	189	59	**88**	**116**
6	Early & sparse transplanting	219	42	178	36	**81**	**86**
7	Organic Farm establishment	141	15	108	21	**77**	**140**
8	Foliar fertilizer by local products	70	13	75	9	**107**	**69**
9	Seed selection	126	20	92	29	**73**	**145**

As to the state of progress during the period since July 2008 until mid-October, Making IMO Bokashi compost, IMO seed preparation, raising of paddy seedlings with *Dapog* nursery, development of demonstration parcel for organic farming and paddy seed selection were over-fulfilled the plan beyond 100% in terms of demonstration. Whereas, the progress of demonstrations related to such activities as the preparation of paddy husk charcoal and paddy husk vinegar, transplanting of *Dapog* seedlings by early and sparse planting did not exceed 100%. Nevertheless, the extension service dealt with even such low-interest activities at the recorded rate of 80% or higher. So, it can be said that frequencies of extending as well as demonstrating these subjects were recorded at high rates as of November 2008.

5) Extension performances (Actual Practice)

Table 5.5.18 shows the number of villages and their villagers as the targets of extension / demonstration activities where the extended techniques were actually put into trials. The number of villagers who actually put the learned techniques into practices of trials in paddy seed selection prior to sowing shows an outstanding number as compared to that of other activities. This is related to the fact that farmers voluntarily practiced elimination of panicles of mixed different varieties from their parcels at heading stage. Although the number of villagers who actually practiced as trials on the preparation of paddy husk vinegar and transplanting of paddy seedlings with early and sparse planting, these techniques will be practiced in the following summer paddy (starting on next March 2009), according to the report of the extension staff.

Table 5.5.18 Number of Villages & Villagers Tried against Target of Extension / Demonstration

Activity		Accomplishment to Date No. of Villages		Of which how many villagers actually tried (After Demo)	
		Ext.	Demo.	No. of Villages	No. of Villagers
1	Making IMO Bokashi compost	243	85	37	69
2	IMO seed preparation	253	98	23	50
3	Paddy husk charcoal	216	87	19	25
4	Paddy husk vinegar	165	12	1	2
5	Dapog method	189	59	11	12
6	Early & sparse transplanting	178	36	3	3
7	Organic Farm establishment	108	21	9	38
8	Foliar fertilizer by local products	75	9	7	13
9	Seed selection	92	29	22	505
Total		**1,519**	**436**	**132**	**717**

The participants in the training categorized problems faced individually and altogether discussed nature of these problems and how to solve them. As concern the preparation of Bokashi manure utilizing IMO, the participants again identified that substances like rice bran as proposed in the training are not essential and if some other, locally available substitutes are found, it can be used in place of bran upon analyzing C/N ratio of the substitutes.

Also, the participants once again have shared technique of raising paddy seedlings with *Dapog* nursery, in a way that it is not always relevant to use seedlings aged 15 days after germination, but farmers can use seedlings of different heights depending on the water depth over paddy fields. Thus, it is desirable to use seedlings with various growth stages that are suitable to the ambient state of permanent parcels.

Apart from such technical arguments as cited above, bitter experiences felt by extension staff were also debated in the training. In Kyaukse TS, Monywa TS and Wetlet TS, according to some farmers rumor, (coercive way of) agricultural extension has reputedly made farmers impoverished. Not merely in these 3 TSs, but also in other TSs similar gossips may more or less prevail among the sites of extension services. On the other hand, some extension staff heard voice of farmers saying that they do not trust a technique itself called “agricultural extension” that has been enforced as a “must” by the side of a political pressure, but they do confide agricultural extension staff personally. They seem to encourage one another by sharing such topics of their experiences.

6) Outputs

Not merely sharing lessons learnt in their extension sites etc, actual harvesting of paddy that was cultivated with early and sparse planting exercised in the previous training was also practiced in this training. According to the application of the yield estimating method adopted by the MAS (result of test reaping at 5 sampling sites), this planting method could realize a yield of 112 basket/acre. Taking account of the yield performance by OISCA, obtaining 100 basket/acre from similar parcel by sparse planting (2-3 seedlings per hill), it has been proved that high paddy yield is expectable by adopting an improved paddy cultivation technique tried this occasion of training. The following show the fruit of extension activities obtained as of November 2008.

1) Methodology of extension varies by TS. However, it is considered that extension activities are performed standing on the farmers side/ vision in such a way that technical transfer/ explanation is visualized with preparation of model tools, photos etc or with the distribution of pamphlets containing figures and tables though the activities do not accompany with demonstration. Also, there is TS that provided Bokashi manure and delivered to farmers free of charge.

2) Techniques are not necessarily omnipotent adaptable to all conceivable conditions. Extension staff are requested to choose or adapt techniques to ambient conditions such as water and soil

conditions, and its typical example is flexible choice of seedling age used for transplanting to main fields depending on the field conditions. Similarly, as available material for preparing Bokashi manure etc varies from area to area, it is required to select suitable material to meet site conditions considering its ingredients. Also, such TSs have been found.

3) In developing extension activities, extension staffs consider it most important to dialogue with their farmers. The participants account that extension activities including demonstrations are easiest tool for their target farmers to realize contents of techniques. Though farmers do not necessarily accept what extension staff intend, staffs believe that as far as they confidently continue their extension activities in such a manner that they themselves are convinced of, the farmers come to listen to what they want to extend.

7) Provision of extension material

The participants provided extension material as a final task of the training. While agricultural extension staff had already prepared such extension material of their original ideas in their extension sites as pamphlets provided by folding sheets of the size A4 in thirds, the participants challenged the provision referring to what they experienced so far in their extension activities. In this regard, material as termed here is nothing but conventional extension memos finishing up with illustration figures sketched on sheets of draft paper.

An Extension Material made at Kyaukse TS on a plastic paper, which shows how to make paddy husk charcoal.

The photo shown right is an example of the extension material that Kyaukse TS actually uses in its extension sites. A method of providing paddy husk charcoal with kinds of material and their required quantities is described on a large vinyl sheet with oil colored pens. The reason why they used large vinyl sheets lies in its various advantage, as it is visible to a multitude of farmers, it is usable even when it gets wet and it is easily portable by folding.

Representatives of each TS presented their extension material provided by themselves, and the Study Team also joined to identify/ evaluate the material on whether suficient contents were included and presented or not. Other participants commented to what was presented standing on the side of village inhabitants and then further improvement on the provision of extension material was sought altogether. The check points pointed out by the Study Team included; 1) the provided material should be visually effective, 2) brief explanation should be attached to, 3) necessary figures are desirably inscribed, 4) quantity of materials, rate of ingredient etc are explicitly marked and 5) description of the process/ schedule should be included etc.

Besides, extension material cuurently used for their services on the sites was simultaneously exhibited. In this connection, all the TSs schedule to keep photos taking snap scenaries of their extension services in VCD, and distribute it among the beneficiary farmers. This also serves as an extension material.

8) Achievement of the Training Objectives

Figure 5.5.10 shows the degrees of the fulfillment by each participant in contrast with the training objectives. Covering from the objective 1 to the objective 6, each of the participant evaluate his achievement by 5-level ranking. The participants marked high ranked evaluation for all the objectives ranging 4 - 5, above all for the objective 2 on the provision of coping techniques and measures to solve issues they faced in their extension services as well as for the objective 2 on the provision of extension material for beneficiary, the greatest number of them gave Level 5.

Among the opinions expressed by the participants in questionnaires and others, the most frequently observed one was the achievement in sharing of views and exchanging opinions with other extension staff joined from different service areas. Likewise, a woman participant expressed her opinion in a way that in the former training she had always been in a position of learning techniques, but in this training she could play both student's role and teacher's role since she could present her own experiences to all other participants. The participants were of the opinion that to put what they had learnt in the training into practice at their service sites and for example to share among all the staff their experiences of confronting problems at their sites and of taking measures for their solution would make themselves confident.

1. Sum up experiences of the participants on the improvement of agriculture in CDZ,
2. Share the skills and attitude to solve the problems encountered during the extension,
3. Gain collective insights on what needs to be further improved for agriculture development,
4. Review, and modify if needed, the action plans prepared during the first training,
5. Prepare extension materials which fit in the context of the beneficiaries of CDZ, and
6. Discuss way-forward for agriculture development in the CDZ.

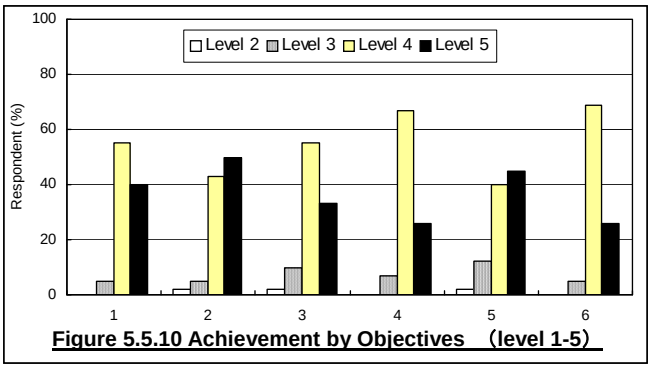


Figure 5.5.10 Achievement by Objectives （level 1-5）

5.5.3 Achievement as of January 2009

The participants took another agriculture related training course, which 08A1 "Improved Paddy Cultivation Promotion Pilot Project". This training was carried out in January 2009, during which the participants reported what and how much they extended their services according to the action plan they formulated at previous training. Since agriculture extension activities are to be carried out to the ones undertaken under the 08A1 pilot project, reported hereunder can be taken as final outputs under the 08A2 pilot project of "Organic farming promotion.

1) Nursery Improvement by Dapog

Figure 5.5.11 shows cost incurred by Dapog nursery as compared to conventional nursery preparation. Average cost arrives at 25,043 Kyats/acre by Dapog method, and at 35,000 Kyats/acre by conventional method. This indicates Dapog can reduce the nursery preparation cost by about 10,000 Kyats/ac. Figure 4.1.1 shows necessary cost incurred in main paddy field as well. Including this cost for main field, the average cost arrives at 124,618 Kyats/acre for Dapog and 150,725 Kyats/acre for conventional method, former of which is reduced by about 26,000 Kyats/acre. However, the costs in Tada-U TS and Kyaukse TS are not the case, in that cost required for improved ones was higher especially in the main field. This is because harrowing costing the farmer as much as 30,000 Kyats/acre took place in the case of Kyaukse TS as early transplanting need more evenly leveled field. For Tada-U, compound fertilizer of 240,000 Kyats was applied to the improved one but no fertilizer to the conventional field.

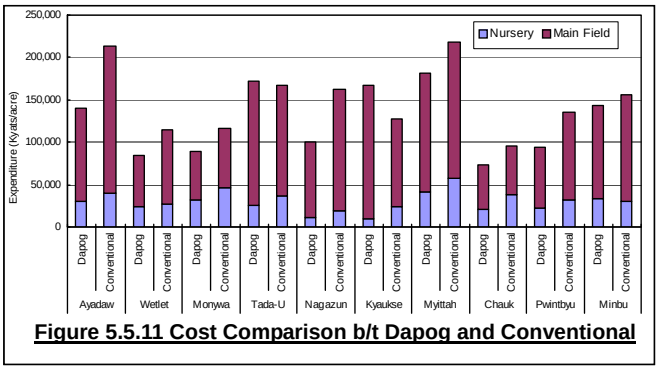


Figure 5.5.11 Cost Comparison b/t Dapog and Conventional

Dapog enables lightening of nursery and also make it very simple and compact, thereby reducing seed amount required. In conventional nursery, farmers usually use 2 baskets of seeds per acre while only 0.68 baskets are required under Dapog method. This reduction of seeds led to a reduction of nursery cost by about 10,000 Kyats per acre. Reduction including the ones in main field reached as much as 26,000 Kyats per acre as average. Roots can hardly be damaged under Dapog

method, and therefore growing right after the transplanting in the main field must be better than that of conventional method. This practice may realize 2 advantages as 1) reduction of necessary cost, and 2) increasing harvest.

2) Comparison between Early & Transplanting and Conventional One

Table 5.5.19 shows a comparison between improved one and conventional one. Here, improved one include Dapog, early and sparse transplanting while conventional ones are what nearby farmers have tried in the vicinity. Note is that since this trial was not carried out in any research farms but in farmers' actual field, no condition in terms of, e.g., fertilizer application, is same. The participants picked up one typical example from each division (total 3 divisions). Technologies tried are Dapog, early transplanting and sparse transplanting, of which actually tried ones in those particular fields are marked with 'Yes'. Items compared are; Life Period, Seed applied per Acre, Seedling Period, Spacing, Plant per Hill, Plant Height, Length of Panicle, Nr. of Tillers with Panicle, Matured Seeds per Panicle, 1,000 Seeds Weight, etc. though some were not recorded.

In case early transplanting tried, 18 days seedling period is the longest and others are 15 and 16 days. On the other hand, conventional method used seedlings of about 1 month age. Spacing applied under sparse transplanting is 10" x 6" or 12" x 8" while conventional ones employed 6" x 6" or 8" x 6", showing big difference.

Most noticeable difference between the 2 methods was on number of tillers with panicles. For example the one under improved practice in Ayadaw TS was 16 while the other under conventional method was only 7, about half only. Matured seed per panicle was also different in number between the 2 methods. About 10 matured seeds more have shown up per panicle, as 85 against 75 in Kyaukse TS, 105 against 89 in Ayadaw TS, and 85 against 78 in Minbu TS. All these led to higher yield, e.g. about 100 baskets per acre under improved practices while 60, 101, and 85 baskets under conventional ones.

Table 5.5.19 Comparison between Improved Ones and Conventional Ones

Particular	Kyaukse TS (Mandalay) Variety: Yesin Lone Thwe		Ayadaw TS (Sagaing) Variety: Sin Nwe Yin		Minbu TS (Magway) Variety: Mawnawthukha	
Dapog	Yes	No	Yes	No	Yes	No
Early Transplanting	Yes	No	Yes	No	Yes	No
Sparse Transplanting	No	No	Yes	No	Yes	No
Life Period	140 days	138 days	115 days	115 days	135 days	135 days
Seed per Acre	10 pyi	48 pyi	16 pyi	32 pyi	12 pyi	2 baskets
Transplanting Date	Aug. 24, 2008	Aug. 20, 2008	Aug. 3, 2008	Jul. 25, 2008	Aug. 15, 2008	Aug. 30, 2008
Seedling Period	18 days	31 days	16 days	35 days	15 days	30 days
Spacing	10" X 6"	8" X 6"	12" X 8"	6" X 6"	12" X 8"	6" X 6"
Plant per Hill	2-3 plants	9-10 plants	2-3 plants	6-7 plants	2 plants	3-4 plants
Plant Height	3'6"	2'6" - 3'	2'6" - 3'	3'	3'8"	3'6"
Length of Panicle	9" - 10"	7" - 8"	8" - 10"	8" - 10"	10"	10"
Nr. of Tillers with Panicle	15-22	10-12	16	7	18	8
Matured Seeds per Panicle	85	75	105	89	85	78
1,000 Seeds Weight	26.9g	26.9g	23g	23g	19g	19g
Harvested Date	Dec. 16, 2008	Apr. 12, 2008	Nov. 26, 2008	Nov. 9, 2008	Dec. 15, 2008	Dec. 15, 2008
Input						
Cow dung	2.5 carts		8 carts	5 carts	5 carts	5 carts
Chicken dung	20 baskets		3 baskets			
Compost (Bokashi)	5 bags		5 carts			
Urea	26 pyi	2 bags		2 bags	1.5 bags	1.5 bags
P205 (T-super)	0.5 bag			1 bag		
Compound	Armo 0.5 bag			2 bags		
Foliar Fertilizer						
Pesticide						
Yield per Acre	98 baskets (dry)	60 baskets (dry)	109 baskets (dry)	101 baskets (dry)	94 baskets (dry)	85 baskets (dry)

3) Extension Achievement for Organic Farming Promotion

Table 5.5.20 summarizes the targets as compared to what have been actually achieved as of January

2009. The targets were set in June/July 2008 during the first training of 08A2 Organic farming promotion pilot project, and they are set in terms of village numbers by extension and by demonstration. The accomplishment in the table shows how many villages have been covered till January 2008 by extension and demonstration. In fact, demonstration is a part of extension, so that the villages under demonstration are automatically included in the villages under extension.

As we can see, total 340 villages were covered by extension activities, out of which there were demonstrations in 160 villages, which account at 117 % accomplishment and 136 % accomplishment against the targets respectively. Though overall accomplishment surpassed the target by far, there are activities which accomplishment were less than 100%. Those activities are; paddy husk vinegar in demonstration, early & sparse transplanting in demonstration, organic farming establishment in extension, seed selection in extension.

For those activities, the targets may have been too ambitious. However there are reasons why these activities could not accomplish the target; e.g., paddy transplanter resisted the early & sparse transplanting because it needs much care than conventional nursery. The paddy plant is usually transplanted as early as 2 weeks after seedling to the main field. The plant is still small, so that the transplanter who is used to using 30 – 45 days nursery could not well manage the transplanting.

Table 5.5.20 Accomplishment against Target by Extension and by Demonstration

Activity		Target (Nr. of Villages)		Accomplishment (Nr. of Villages)		Accomplishment (%)	
		Ext.	+Demo.	Ext.	+Demo.	Ext.	+Demo.
1	Making IMO Bokashi compost	264	67	314	121	119	181
2	IMO seed preparation	264	96	318	135	120	141
3	Paddy husk charcoal	263	93	290	112	110	120
4	Paddy husk vinegar	187	26	231	25	124	96
5	Dapog method	214	51	244	56	114	110
6	Early & sparse transplanting	219	42	239	34	109	81
7	Organic Farm establishment	141	15	101	28	72	187
8	Foliar fertilizer by local products	70	13	93	31	133	238
9	Seed selection	126	20	100	49	79	245
Nr. of Villages (Net)		291	124	340	169	117	136

Extension and demonstration do not automatically entail actual practices by the farmers on the ground. The participants carried out follow up how many villages and villagers have actually tried what was extended or demonstrated. Table 5.5.21 shows the actually tried ones. Extension was carried out in 340 villages, out of which 83 villages have tried at least some activities. In terms of villager number, there were 610 villagers who had tried at least some activities. Amongst the activities villagers actually tried, seed selection surpasses by far, showing as many as 425 villagers had actually tried the technology. Aside from the seed selection, we can know there were many villagers in such activities as IMO Bokashi making and IMO seed preparation. This may be because those technologies do not need expensive materials.

Table 5.5.21 Villages and Villagers who actually tried Some Technologies

Activity		Accomplishment to Date No. of Villages		Of which how many villagers actually tried (After Demo)	
		Ext.	Demo.	No. of Villages	No. of Villagers
1	Making IMO Bokashi compost	314	121	52	194
2	IMO seed preparation	318	135	43	144
3	Paddy husk charcoal	290	112	26	49
4	Paddy husk vinegar	231	25	4	4
5	Dapog method	244	56	10	36
6	Early & sparse transplanting	239	34	9	35
7	Organic Farm establishment	101	28	5	6
8	Foliar fertilizer by local products	93	31	11	27
9	Seed selection	100	49	34	425
Nr. of Villages / Villagers		340	169	83	610

5.6 Trainings on 08L1, 08L2, and 08L3 Livestock Sector Pilot Projects

There are 3 pilot projects in livestock development sector in FY 2008/09; namely, "08L1 Pro-poor oriented goat/ sheep revolving programme", "08L2. Pro-poor oriented piggery revolving programme" and "08L3. Livestock feeding improvement programme (molasses block, silo, Ipil Ipil, etc)". Specifically related to the third pilot project are 2 sets of training courses inviting LBVD staff, though the trainings undertook the first and the second pilot projects as well.

2 sets of training courses were administered; one in mid July and the other in mid October 2008. The first one consisted of the training main part and the latter was for follow-up and refresher. In these training courses, 33 LBVD staffs were trained. Through these training courses, various techniques related to livestock development in the CDZ were transferred to the trainees. The contents and the results of the trainings are outlined in the following; sub-chapter 5.6.1 is for the training proper and sub-chapter 5.6.2 briefs the follow-up and refresher course:

5.6.1 First Training Course (Training Proper)

1) Rationale and Objectives of the Training (the first training)

From the evaluation of the pilot projects done in February 2008, we have realized that goat and pig revolving projects contributed to improvement of the livelihood especially for the poor. As poorer people in the CDZ can be found in the social strata of landless people and small-scale farmers, we have well understood such projects could really improve their income status. Therefore there is a need of further extending the projects for the sake of poor people such as landless people, who are suffering from bigger magnitude of poverty, and also small-scale farmers.

To expand the projects further, the best way lies on the full involvement of concerned LBVD officers. In implementing livestock related pilot projects in FY 2008/09, staff of LBVD (Livestock Breeding and Veterinary Department) in the target 6 TSs should therefore play a pivotal role. As a starting point of the projects, a training course was provided targeting staff of the said Department. The objectives of this training were to acquire required techniques and knowledge as well as attitude toward extension services for promoting good livestock husbandry. What are expected after the training to the participants included the capacity development of discussing and understanding the following items; namely the objectives of the training:

1) Discuss the LBVD's objectives, bases, and development direction,
2) Discuss the TS LBVD office's roles to support livestock raisers in the CDZ,
3) Discuss constraints/opportunities to livestock development for the poor in the CDZ,
4) Facilitate beneficiaries of livestock sector in solving their problems encountered, and
5) Discuss livestock development now being promoted to improve living standard of the poor in the CDZ, in relation to which;
    5.1) Organize beneficiaries covering landless people and small-scale farm households for the Pilot Project (dealing with goat & pig raising including feeding improvement, etc),
    5.2) Train the beneficiaries to acquire necessary knowledge to raise goat/ pig to be provided by the Pilot Project,
    5.3) Facilitate the beneficiaries to conduct their parts under the Pilot Project, e.g. establishment of Revolving Committee (for kids), erection of improved animal house, etc.,
    5.4) Monitor the activities of the beneficiaries and report to the Project Office, and when needs arise give necessary advice, and
6) Discuss way-forward for livestock raising focusing on the poor.

2) Training Mechanics and Topic Tackled

The training was carried out for net 5 days in Mandalay Divisional Office of LBVD. It consisted of lecture, exchange of opinions, study tour to Ma Gyi Sauk village, one of the Project target villages in 2007, practice to make UMMB (Urea Molasses and Mineral Block), etc. In addition, on the last day, action plans on the Pilot Project activities in FY 2008/09 were prepared together with the number of target villages for extension and demonstration. Having considered that all the participants were not necessarily veterinarians, techniques and knowledge on animal husbandry in general were included in the topics of the training, and also briefings of the Pilot Project related with livestock implemented in FY 2007/08 were included.

Above all, improved animal house for goats and sheep and revolving system of offspring were included in the contents of lecture because it served as key points for the responsibility of beneficiary farmers and extension officers. Textbook used in the training was a reference written in Myanmar on livestock techniques for livestock in general and goat specific raising techniques. Many of the participants were "veterinarians" who were already equipped with certain knowledge on livestock pests and diseases, but they did not necessarily have enough knowledge and experiences on livestock management, feeding, livestock nutrition, useful leguminous fodders etc. To cope with this situation, the training was provided for clearing many sessions to enrich knowledge of these aspects. Following are the modules provided:

Module 1	Program orientation
	Pre-training knowledge/experience inventory, and pre-training test on animal husbandry
	Overview of the training program
	Introduction of the pilot project in livestock sector implemented in 2007/09
Module 2	Goat raising
	Concept of goat raising pilot project
	Revolving system applied in the pilot project
	Duties and responsibilities of the beneficiary
	Proper goat management covering feeding, breeding, housing, health and disease control etc.
Module 3	Cattle/draft cattle raising
	Concept of the cattle improvement pilot project
	Duties and responsibilities of the beneficiary
	Proper cattle management covering feeding, breeding, housing, health and disease control
Module 4	Swine Raising
	Concept of pig fattening pilot project
	Revolving system applied in the pilot project
	Duties and responsibilities of the beneficiary
	Proper piglet management covering feeding, breeding, housing, sanitary management, health and disease control etc.
Module 5	UMMB and silage making
	What are UMMBs?
	Livestock that can be fed UMMBs
	Raw materials and formula of UMMBs
	Nutrient value of UMMBs
	How to feed UMMBs for ruminants
	Practical UMMB making by trainees
	Silage and its effective use

	Silo types applicable in village
Module 6	Study Tour to Ma Gyi Sauk Village, one of pilot villages in Ayadaw TS, Sagaing division
	Concept of the goat/sheep raising
	How to select and organize beneficiaries
	Impact on household economy of the poor by goat/sheep raising
	Collective management of sheep/goat
	How to save construction cost of improved goat housing
	Discussion with beneficiaries by the participants
Module 7	Action Plan Formulation for 2008/09
	Post-training test, satisfaction by topics, and evaluation of the training
	Plan of activities
	Decision of target villages

Module 1 and module 2 were administered on the 1st day of the training course. In module 1, registration and pre-training knowledge/experience inventory were done by asking each participant prior to the opening program and overview of the training program. And taking into consideration various experiences of the participants who are ranging from bachelor of veterinary science, veterinary assistant (diploma), and auxiliary staff, pre-test was also asked to the participants to know their knowledge on livestock. This test was also done on the final day of the training course as the post-test in order to compare the effect of this training. In order to share information about the pilot project implemented under FY 2007/08, various pilot projects in the selected 6 villages were introduced involving picture and concept of each project. The pilot projects which are going to be implemented mainly by LBVD TS officers were introduced.

Module 2 on goat raising was given in the afternoon of the 1st day. Not only goat management but also revolving system established for the pilot project was informed to make them understood because goat raising was one of the important pilot projects to extend in CDZ to improve living standard of the poor. At the same time, some case examples were also introduced to share lessons from 2007/08 projects.

Module 3 on cattle raising was given on the 2nd day of the course. Regarding cattle, cattle improvement pilot project implementing in Legaing and Ar La Ka Pa Villages were introduced about its concept and duty of the beneficiaries as well as general technologies on cattle management. As to forage production, intercropping of sorghum and rice bean was introduced as an effective technology to increase sorghum production and to improve the soil texture.

In module 4 on swine raising, fattening technologies including advantageous marketing method, disease control etc were given referring to the case example of piggery pilot project in Legaing Village, including revolving system and lessons learned from FY 2007/08 project in the village. Since six piglets were lost in Legaing village, importance of heating for piglets especially at early growing stage during winter season was taught in parallel with teaching effective heating method.

Module 5 in the day-3 was conducted to provide participants with practical training on how to make UMMB (Urea Molasses Mineral Block), and effectiveness of it as a supplementary concentrate for ruminants. After teaching general knowledge about UMMB, all the participants made it by themselves using provided materials of rice bran, cement, lime, molasses and salt. Finally more than 30 UMMBs were made by the participants. In the afternoon of the day-3, technology on silage making and silo were taught because it will be effective to feed during dry season when fresh grasses and forage are difficult to feed.

Study tour was carried out in the day-4. All the participants visited one of villages where goat raising

pilot project has been implanted. Ma Gyi Sauk village in Ayadaw TS was selected to visit and see a case example of group-based collective management not only in grazing but also in goat housing. Ma Gyi Sauk village is the first case that applied collective goat raising in the 4 villages. Participants and the representative of beneficiaries could exchange views and discussed each other mainly about advantageous point of group management from economic point of views. Participants also visited several goat housings with raised floor built up by beneficiaries with cost sharing method.

Day-5, the final day of the training course, was started from post training test using the same questionnaire used in the first day in order to compare the participant's knowledge about livestock management taught in the training. Then the participants formulated action plans by themselves, which will be implemented by each TS officer of LBVD. And also they decided number of target villages to be extended pilot projects under FY 2008/09 project. The monthly reporting system was explained by counterpart of LBVD, which will record all the activities of TS officers of LBVD to monitor their accomplishment. Before closing, post-evaluation of the training were asked to the participants to check their achievement and overall evaluation of the training course.

3) Participants to the Training

3.1) Number of participant trainees

Each 11 LBVD extension staff were participated from the related 3 divisions in the training. Namely, the total participants counted 33, while 4 trainers (or lecturers) participated. Breakdown of these 33 participants were: 6 district LBVD staff, 3 divisional LBVD staff and 25 TS LBVD staff. Also, they consisted of 25 BVS (bachelor of veterinary science), 2 extension staff graduated from veterinary college, 4 VA (veterinary assistant) and 2 Extension sub-staff (though they experienced training on first-aid treatments, they are not veterinarians).

Table 5.6.1 Participant List for the Livestock Training

Division	TS	Village Nr. for Goat	Village Nr. for Pig	TS Officers	District Officers	Division Officers	Total
Sagaing	Ayadaw	1	1	4	1	1	**11**
	Myinmu	2	1	4	1		
Mandalay	Tada U	2	-	4	1	1	**11**
	Ngazun	2	1	4	1		
Magway	Chauk	4	-	4	1	1	**11**
	Pwintbyu	1	1	4	1		
Total		**12**	**4**	**24**	**6**	**3**	**33**

3.2) Characters of the training participants

Figure 5.6.1 indicates age distribution of the participants. Those aged 30 - 40 years old predominate with the oldest age of 60 and the youngest 26, averaged at 44.7 years old. Figure 5.6.2 shows number of years under government service. Mean duration of service is 18.2 years with the longest service of 40 years and the shortest 1 year.

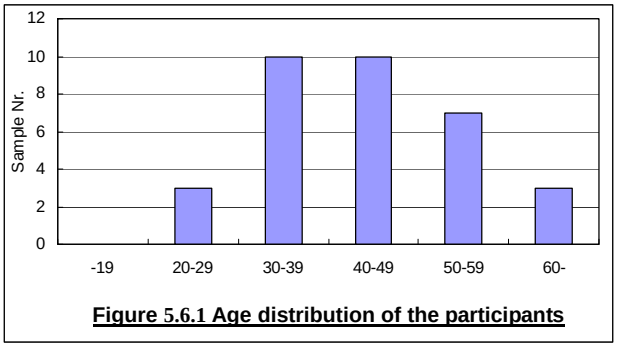


Figure 5.6.1 Age distribution of the participants

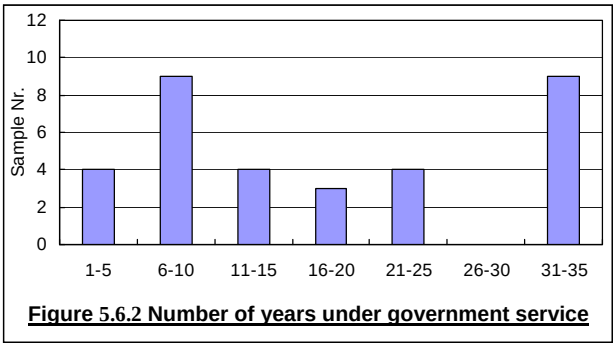


Figure 5.6.2 Number of years under government service

3.3) Participants' past experiences

To the question asking past experience of involvement in the projects related to livestock development, 10 out of 33 participants gave affirmative reply. However, 5 out of 10 respondents have their experiences in this Project sponsored by JICA that has been carried out since 2007. This fact implies that, so far, the projects for livestock development – those that are run by special budgetary account to attain specific goals with definite duration and sites – have seldom been implemented in the CDZ, apart from routine extension activities such as vaccination service at an outbreak of contagious animal diseases.

3.4) Their important role

The largest number of the respondents, 13 out of the total 33 participants, replied that their important services included vaccination, medical treatments and preventive measures against contagious diseases to the question of asking their important role as the staff of LBVD. This reply suggests that weight is placed on veterinarian services in their routine works, while technical extension service on livestock (feeding) management for keeping health and productivity of livestock normal is placed at the second position.

3.5) Confronted issues and solutions applied

During this training course, a question was asked to the participants asking the problems they have faced so far in their extension activities and the solutions they found to deal with these problems. The following table shows the result of reply to this question, where the participants accounted frequently confronted examples of the inhabitants at large who cope /deal with the problems only by conventional or traditional methods just because they haven't acquired correct knowledge on how to deal with them as their most seriously felt problem. In addition, the respondents gave shortage of necessary inputs (including veterinarian medicines) as the secondly serious problem.

Table 5.6.2 Problems so far faced by extension staff and the methods of solving them

Frequency	Problem	Solution
12	Deeply penetrated mistaken concept on animal husbandry	Preclusion of erroneous concept thereon
5	Shortage of vocationally required inputs	Medicines for use of human were appropriated
4	Shortage of castrating tool (Burdizzo)	Castrated by traditional method

3.6) Participant's expectation of the training

At the beginning of the training course, the participants were asked what they expect from the training course. They were asked to give two items they expect in the training, while the most frequent reply (22 respondents gave the answer of this category) included acquisition of new techniques and knowledge, that of experiences and lessons through colleagues, JICA etc.

The Study Team confirmed more concretely what kinds of techniques or knowledge they need, and then explained the training schedule indicating that what they want to know are dealt in which session on what day. In this context, it is quite natural that the participants expect new techniques or modern technology, but in this training course the sessions had been designed for intentionally dealing with basic knowledge for all the scheduled subjects on animal husbandry, taking account of knowledge level of the villagers in CDZ.

Besides, what the participants expected in the course following acquisition of knowledge was an assistance for skills/ equipment. Responding to their expectation, the Study Team clarified, prior to the starting of the course, what can be provided from this pilot project (for example, castrating tool) and what cannot be supplied (for example, motorbike).

Table 5.6.3 What the participants expected in the training

Nr.	Expectations
22	Acquisition of new technology/ knowledge, Obtaining experiences and opportunities
7	Required assistance for skills/ equipment
7	- Learning methodology of poverty reduction or rural development - Broadening their own knowledge on livestock - Building capacity so that they can deploy their extension services in villages

4) Excerpts from the Training

4.1) Practice on how to make UMMB (Urea Molasses Mineral Block)

UMMB making is the only one practical training conducted in this training course. Despite its effectiveness is to improve nourishment of ruminants, UMMB is not popularly used, though some LBVD Officers know about it. JICA Study Team has implemented UMMB making in the selected villages in parallel with goat/sheep raising pilot project. However participants were not so willing to make it continuously for the reasons that goat/sheep don't prefer licking UMMB, villagers cannot afford to make UMMB due to lack of money, and UMMB making bothers for them etc. JICA Study Team considers that UMMB is worthy to be expanded in CDZ to improve nutritious status of ruminants because CDZ is the center of raising ruminant in Myanmar.

Training participants are making UMMB as a part of improved feeding components.

All the participants joined a practical training of making UMMB by weighing raw materials, mixing, mashing, and molding. Finally more than 30 UMMBs were made and kept for drying for about one week to make it harder enough to hang up in shed for licking.

4.2) Study tour

In the day-4, participants visited Ma Gyi Sauk village in Ayadaw TS where goat and sheep raising pilot project has been implementing. Ma Gyi Sauk village was selected because of their unique management system established by the beneficiaries themselves. Since all the beneficiaries are the poor, they decided to build up goat house collectively as well as daily grazing. Participants could understand deeply the concept of the goat and sheep pilot project for the poor by visiting, looking at the site, which will bring them good information and experience for promoting pilot project under FY 2008/09 in villages in charge.

Moreover it is considered that the participants could recognize that goat and sheep raising is one of the effective means to create income source for the poor who have no property before the pilot project. In the study tour, participants and several beneficiaries discussed each other on how to organize beneficiaries, impact on household economy of the poor, advantage of the collective management, and how to save cost for goat housing etc. In this case, beneficiaries played as teachers and the participants of LBVD TS officers as students.

One day of the training was spent on a study tour to Ma Gyi Sauk village, one of successful villages for FY 2007/08 pilot projects for goat raising.

4.3) Support for TS officer for FY 008/09 pilot project

One of the major issues arisen at the workshop to conduct extension work and demonstration was lack of budget for transportation and training materials for TS LBVD officers. TS officers expressed strongly that they need financial support by JICA by explaining present status. In response to the request, JICA Study Team explained them that financial support is available though it is within the prescribed budget. The participants proceeded to formulate action plans and to set up target number of villages, which are to be implemented within the projected period.

For LBVD TS officers who have worked mainly for providing veterinary services so far, this kind of pilot projects implementing as package project of provision of ruminants and pigs along with extension work and demonstration to help the poor in CDZ is considered to be the first experience. Therefore it is expected that this workshop may be a trigger to promote livestock development as the economic activities of the poor to alleviate poverty by TS LBVD officers themselves.

5) Pre- and post-training tests

With a view to grasping change of knowledge levels on animal husbandry before and after the training, tests on the basic items concerning livestock were conducted. The following table indicates the rate of correct answers for each question. The total rate of right answer was improved from the state of prior training; 40% to that of post training; 74%. Their improved intelligence was assumed to originate from such subjects as feeds, animal nutrition, general livestock management guideline, marketing etc because most of the participants were veterinarians.

Table 5.6.4 Result of knowledge identification tests at pre-training and post-training stages

Question No.		Ratio of Correct Answers, %		
		Pre	Post	Impr't
1	**Cattle**			
1.1	Puberty age of male and female	3	46	43
1.2	Weaning period of calf	18	46	27
1.3	Lactation period, calving interval	33	79	46
1.4	Fresh fodder in % of live body weight	3	52	49
1.5	Gestation period	94	97	3
1.6	Advantage of AI	82	94	12
2	**Goat**			
2.1	Puberty age of buck	15	61	45
2.2	Age to serve for doe	33	55	21
2.3	Weaning period for kid	39	58	18
2.4	Twins rate on average	30	67	36
2.5	Fresh grasses per day	21	52	30
2.6	Gestation period	67	94	27
2.7	Age in month for marketing	55	97	43
3	**Swine**			
3.1	Average nr. Of piglets per bearing	76	94	18
3.2	Fattening period to marketable size	85	97	12
3.3	Average marketable size of pig	24	64	39
4	**Forage**			
4.1	Leguminous crops with higher protein	12	88	76
4.2	Fodder trees for animal feed	21	76	55
5	Livestock advantageous for CDZ landless	54	91	36
Average		**40**	**74**	**33**

6) Achievement of the Training Objectives

At the end of the training course, the participants were requested to mark their result of self-evaluation, by checking with 1 - 5 levels showing what extent they fulfilled their own objectives of the training to. Namely, level 1 indicated the lowest degree of fulfillment, while level 5 did the highest. As illustrated in Figure 5.6.3, no participant evaluated his/her result by level 1 and level 2 (low levels of

fulfillment).

78% of the participants replied that they reached level 4 or higher toward all the training objectives. For instance, to the objective No.1, "discuss the LBVD's objectives, base, and development direction" all of the participants replied that they reached level 4 or higher. In other examples, to the objective No.5.1 "organize beneficiaries covering landless people and small-scale farm households for the pilot project", 79% of them replied reaching also level 4 or higher, while 76% of them replied to have fulfilled the same level toward No.5.2 "train the beneficiaries to acquire necessary knowledge to raise goat/pig to be provided by the pilot project" that seems to be the most important key-point in implementing pilot project in FY 2008/09.

On the other hand, as to the objective No.5.3" facilitate the beneficiaries to conduct their part under the pilot project, e.g. establishment of revolving committee, erection of improved animal house etc", the degree of fulfillment was replied at somewhat lower than those replied to other objectives. This might be attributable to some anxiety on the problems that LBVD extension staff would confront in their service area who are acquainted with rural situations through their extension activities.

1) Discuss the LBVD's objectives, bases, and development direction,
2) Discuss the TS LBVD office's roles to support livestock raisers in the CDZ,
3) Discuss constraints/opportunities to livestock development for the poor in the CDZ,
4) Facilitate beneficiaries of livestock sector in solving their problems encountered, and
5) Discuss livestock development now being promoted to improve living standard of the poor in the CDZ, in relation to which;
   - 5.1 Organize beneficiaries covering landless people and small-scale farm households for the Pilot Project (dealing with goat & pig raising including feeding improvement, etc),
   - 5.2 Train the beneficiaries to acquire necessary knowledge to raise goat/ pig to be provided by the Pilot Project,
   - 5.3 Facilitate the beneficiaries to conduct their parts under the Pilot Project, e.g. establishment of Revolving Committee (for kids), erection of improved animal house, etc.,
   - 5.4 Monitor the activities of the beneficiaries and report to the Project Office, and when needs arise give necessary advices, and
6) Discuss way-forward for livestock raising focusing on the poor.

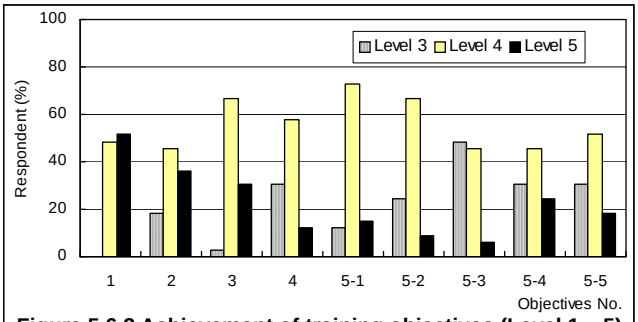


Figure 5.6.3 Achievement of training objectives (Level 1 – 5)

7) Number of target villages of Livestock Sector Pilot Project in FY 2008/09

After completing a series of training sessions, the participants formulated an action plan on Livestock Sector Pilot Project in FY 2008/09. It consisted of 1) the activities required for implementing PP, 2) appointment of responsible staff by activity, 3) number of targets on demonstration and extension activities, 4) period of implementation by activity, 5) outputs expected from the activities, 6) required inputs, 8) related supporters etc.

Table 5.6.5 Number of villages selected for extension activities

Typology	Type I		Type II		Type III		Type III		Type IV		Type V		Total	
TS	Chauk TS		Ngazun TS		Tada-U TS		Myinmu TS		Ayadaw TS		Pwintbyu TS			
Goat Raising	4		2		2		2		1		1		12	
Pig Fattening	0		1		0		1		1		1		4	
Demonstration & Extension	Ext'n	+Demo	Ext'n	+Demo	Ext'n	+Demo	Ext'n	+Demo	Ext'n	+Demo	Ext'n	+Demo	Ext'n	+Demo
UMMB Making	24	4	33	3	40	2	12	2	20	3	17	2	146	16
Livestock Housing	14	4	8	3	10	2	7	2	7	2	7	2	53	15
Urea-treated Straw Making	14	4	33	3	40	2	6	1	20	3	15	5	128	18
Castration		25		30		20		15		20		15		125
Disease Control	25	5	83	3	40	2	0	35	0	20	0	15	148	80
Pasture Improvement	14	4	23	3	70	2	6	1	8	3	15	2	136	15
Disinfection	14	4	25	10	22	2	7	2	8	3	20	5	96	26
General Training	25		30		40		35		20		15		165	
Silage / Silo	0	4	0	3	40	2	7	2	20	3	17	2	84	16
Accumulated Village Number	105	54	235	58	302	34	80	60	103	57	106	48		
Net Number of Villages by TS (Extension)	**25**		**83**		**70**		**35**		**20**		**20**		**253**	
Net Number of Villages by TS (+ Demo)	**25**		**30**		**20**		**35**		**20**		**15**		**145**	

Table 5.6.5 indicates the number of target villages for each activity divided in TS concerned. As shown in the table, the pilot project provides certain types of extension services on improvement of animal husbandry in 253 villages in total, out of which demonstration is scheduled in 145 villages in parallel with ordinary extension activities. Out of 145 villages, activities of goat rearing and pig fattening accompanied by revolving of offspring is targeted at 12 for the former activity and 4 for the latter activity, respectively.

8) Participants' Satisfaction by Module

The participants were requested to record their degree of satisfaction with each of the module every day after the scheduled training. Level 1 represents the lowest degree, while level 5 indicates the highest. Figure 5.6.4 shows the degrees of satisfaction by module in which no participants gave the degree of level 1 and level 2. Almost the same degree of satisfaction was given with module 2 on goat raising, module 3 on cattle /draft cattle raising, module 4 on swine raising. Higher degree of satisfaction was shown to module 1 on orientation and module 5 on the practice of UMMB making. UMMB making would be one of the major activities in livestock sector pilot project in FY 2008/09.

Module 1: Program Orientation
Module 2: Goat Raising
Module 3: Cattle/ Draft Cattle
Module 4: Swine Raising
Module 5: UMMB and Silage
Module 6: Study Tour
Module 7: Action Plan Formulation

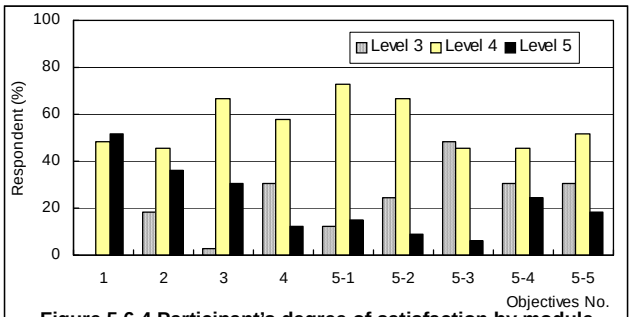


Figure 5.6.4 Participant's degree of satisfaction by module

As concern the degree of satisfaction with each session within modules, it seems that the participants tend to give as a whole lower degree of satisfaction to revolving system, well-balanced feeding of ration, culling, forage crops, hygienic management in and around animal houses. Such a preferential tendency presumably may have originated from their predominant vocation as "veterinarian". That is to say, because they have keen interest on preventive measures against prevalence of contagious diseases, they feel higher degree of satisfaction with these subjects, while they have rather low interest in feeding itself, leading to lower degree of satisfaction.

9) Satisfaction by as a Whole, Logistics, Theory, and Own Participants

Apart from the degree of satisfaction on the contents of the training, questions were also asked to the participants on the degree of satisfaction with the training course as a whole, logistics, theoretical lectures, field practices and their own participation. Similar to other cases, level 1 represents the lowest extent of satisfaction while level 5 stands for the highest. Figure 5.6.5 shows the synopsis of the resulted satisfaction on the questioned 5 items.

From this figure, it is indicated that the participants have felt high degree of satisfaction with all the questioned items. Above all, all the participants appreciated the training as a whole with level 4 or higher satisfaction. On the other hand, there observed some participants who were satisfied with logistics, theory and practice by level 3, implying somewhat lower satisfaction as compared to that with modules.

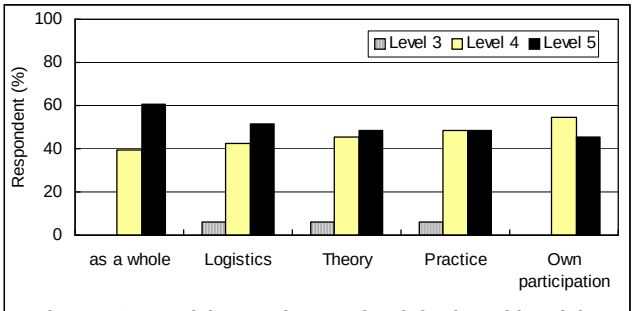


Figure 5.6.5 Participant's degree of satisfaction with training

Out of logistics, lodging accommodation may have been an issue. As all the participants could not be accommodated in the attached dormitory to the training facility, half of the participants had to commute from somewhat remote lodgings. Because traffic means were not well streamlined, every day commutation was cumbersome for the commuting participants. Besides, some participants commented that more practices should have been incorporated in the training course such as UMMB making rather than mere lectures.

10) Participants' Comments to Improve

In addition to the above-mentioned evaluation, the participants were asked to comment on what should be improved for the training course as a whole, logistics, theory and practice and their own participation. The following listed up the participants' comments that can be referred to as points to be improved in future provision of training.

1) The participants have proposed improved lodging and practices, extended duration of training course and regular provision of training as their desirable points of improvement. More concretely, many participants wanted to realize 1) more field practices should be provided in the course, 2) currently available, the most up-dated technology and knowledge should be adopted and 3) provision of regular training per 6 months or per year.

2) Though many participants were satisfied with the provided logistics by level 4 and level 5, comments were given on the lodging as a task to be improved. They hoped to stay together in the same/ single facility, however, due to limited accommodating capacity in the lodge of LBVD they had to stay separately. It entailed to necessity of commuting every day to the training facility. Thus, many of the participants commented that it's desirable to accommodate the trainees in a single lodge as far as possible. As to why they desired to stay altogether in a single lodge, the reason lies in impossibility of completing review/ home study among roommates, also of exchange of views and opinions among them.

3) As concern theory, some participants commented that 1) need of lecturing with wider vision / broader coverage in a module, 2) more effective training is based on a combination between theory and practice, 3) too much complicated lecture on livestock nutrition, 4) the training will be much improved if the brand-new livestock technology and up-dated knowledge are distributed in the lecture through internet communication, etc.

4) As regards field practices, several participants commented preferring further provision of practices rather than theoretic lectures. Indeed, this point is important all right, but some special measures would be necessary to deal with trainees of various background including participants who are not veterinarians within limited period of only 5 days, covering as many techniques/ knowledge on lectures and practices, and this will have to be examined with the extension of training period.

5.6.2 Second Training Course (Follow up and Refresher)

In the training course held in July 2008, ways of approach to the Pilot Project was elucidated, various techniques concerning livestock development were transferred and action plans to diffuse these techniques among villagers were formulated. This second training follows the previous training, aiming at the review of action plans based on the outcome of extension activities in the participants' service areas. At the same time, since the participants themselves share experiences so far made, the training can foster generating individual learning through exchanging their experiences.

1) Objectives of the training

This training aims at mutual discussion of the participants themselves on the performances by activity

shown in the action plans formulated in July 2008, experiences, issues of their extension activities and lessons learnt through the process of solving these issues and also at review of their targets (number of villages) by activity. The participated livestock staff are expected to achieve the following items through this training:

1) Sum up experiences of the participants on the improvement of livestock in CDZ,
2) Share the skills and attitude to solve the problems encountered during the extension,
3) Gain collective insights on what needs to be further improved for livestock development,
4) Review, and modify if needed, the action plans prepared during the first training,
5) Prepare extension materials which fit in the context of the beneficiaries of CDZ, and
6) Discuss way-forward for livestock development in the CDZ.
7) Capability building so that participant can discuss the direction of livestock development in the CDZ.

2) Contents of the training and composition of the participants

The training was carried out for net 3 days at the Divisional office of Mandalay of LBVD. 33 participants were basically the same as those attended in the first training, but 6 participants out of 33 were new members. They are extension staff newly positioned to the TS by personnel transfer who experience for the first time contact with on-going pilot project.

Table 5.6.6 Training Schedule for the Refresher Course of 08L1,2,3 PPs

Date	Time	Activities	Remarks
Day-1 (Oct.16)	08:00-09:00	Registration, pre-training questionnaire	
	09:00-09:30	Opening and overview of the training	
	09:30-11:30	Preparation of the progress, problems, lessons	Group work
	12:30-14:30	Presentation of the group work	
	14:30-15:00	Identification of common problems	Interactive discussion
	15:00-17:00	Measures to tackle the common problems Measures to further improve the LBVD extension	Interactive discussion
Day-2 (Oct.17)	08:00-08:30	Recapitulation	
	08:30-10:30	Interactive top-up lecture on issues identified	by trainers
	10:30-12:30	Review/modification of action plan	by TS
	13:30-17:00	Presentation of the revised action plan	by TS
Day-3 (Oct.18)	08:00-08:30	Recapitulation	
	08:30-12:00	Preparation of extension materials	by TS
	13:00-14:00	Preparation of extension materials, continued	by TS
	14:00-16:00	Presentation of the extension materials	by TS
	16:00-	Post training evaluation, and Closing	

Source：JICA Study Team

The above table shows the schedule of the session. The participants share the state of extension related to the livestock development activities based on the action plans, grasping of the results of extension activities, the state of progress in the project implementation, problems encountered and ways of their solutions etc in this training. Participants were divided into each TS in charge, drawing tables in each session and presented the results of the sessions in front of the attendants.

At the opening of the training, a questionnaire was conducted on the project extension activities in 2008/09. In this questionnaire extension/teaching material they use at their individual extension sites, confronted problems and their ways of solution, what villagers have been pleased etc were asked. Also, means of transport to their extension sites, background of veterinary experiences, number of villages they are taking charge were also asked.

The participants in the training consisted of 3 divisional staff from 6TS, 6 district staff, 24 TS extension staff, totalled to 33 staff of livestock. Figure 5.6.7 shows the participant's background of mastering veterinarian subjects. Out of 33 participants 24 were bachelor of veterinary science accounting for 78% of the participants, 5 were veterinary assistants accounting for 16% thereof, and the rest 2 were auxiliary staff accounting for 2% who are not veterinarians but capable of servicing first-aid treatments. In this concern, 18 of the participants, or 54% thereof had less than 10 years service in LBVD, seeming that mainly extensin staff of relatively younger generation render the extension activities.

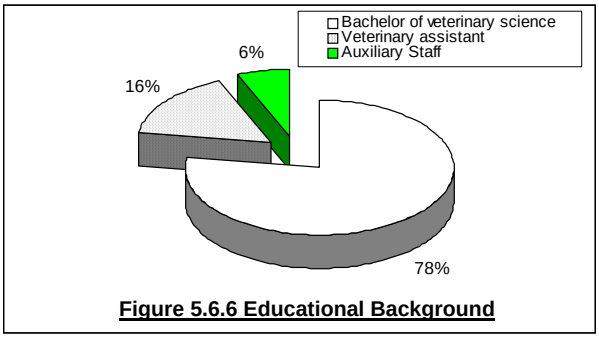


Figure 5.6.6 Educational Background

As to the transport means to their extension sites, 22 (68%) out of 33 participants use their owned motorbikes, 6 staff (19%) utilize public buses and the rest 4 staff (13%) use both public buses and bicycles. As regards the number of villages they cover for their routine services, a staff covers 45 villages on average, with a range at maximum 160 to the minimum 10 where the varies from a TS to another. It is known from the result of other questionnaire survey that too many villages for a staff has to cover is one of the reasons why thorough extension activity can hardly be provided for the entire service area allocated to a staff. 6 out of 22 respondents have their service areas of more than 61 villages, implying difficulty in continuing extension services amidst escalated fuel price and limited financing provision.

3) Experiences of the participants in their extension activities

A preliminary questionnaire survey was applied prior to the start of the training. The items surveyed in the questionnaire are given in the right frame. In this questionnaire, the questions are focused on the extension activities for the project in 2008/09, asking issues and their solutions faced in the process of the extension activities for the Project, the most proud performance amongst activity experiences, manual used for extension activities and contents and reason why the inhabitants are most interested in.

1) issues in extension/ demonstration activities
2) methods of solving issues
3) the most proud experience in one's activities
4) with/ without provision of extension manual
5) what kind of manual provided
6) activity inhabitants pleased/ interested in
7) why inhabitants pleased/interested in the above listed activity

The most frequently posed issue in extension/ demonstration activities was "difficulty of mobilizing villagers (12 out of 27 respondents answered)", followed by "dull interest in vaccination and UMMB (6 respondents replied)" and "low knowledge on livestock (5 respondents replied)". For example, the landless and small-scale farmers as target class of goat revolving extension are always busy with farm labor services or their own farm practices, so the staff think it difficult to ask them to spare time for discussion. Also, their low interest on vaccination etc seems to imply their lack of consciousness on livestock quarantine / hygiene.

On the other hand, as the way of solution towards the most frequently posed issue, difficulty in mobilizing villagers, included cooperation with VPDC they could obtain for the solution. As to how to solve the low interest on vaccination was coped with free of charge distribution of UMMB provided by their own expenses after the former training, also with the explanation of the effect of quarantine by vaccination etc.

Response to the question asking the most proud performance among their extension activities included "provision of animal husbandry training for livestock held by inhabitants" and also "actual

demonstration of UMMB they acquired in livestock training" (these two are the most frequently found reply from 8 respondents out of 27. In addition, other reply included "procuring stock goats with representatives of the inhabitants ", "provision of huts equipped with lifted floor", "performance of door-to door extension service" etc. These replies suggest that they are taking off from hitherto activities as veterinarian to the extension activities for promoting animal husbandry motivated by the project.

As to the extension manual that TS extension staff of LBVD prepared themselves, it was identified that it was done in 2 out of 6 TSs. As to its contents, a manual made in Pwintbyu TS provided pamphlet on piggery and goat rearing while in Ayadaw TS the explanatory note was provided on how to prepare UMMB. However, judging from the fact that manual has so far been provided in only 2 out of 6 TS from where staff participated in the first training, provision of manual for training/ demonstration by extension staff is most likely not sufficiently progressed at current stage.

The activity villagers were most interested in was "preparation of UMMB (9 respondents replied)", followed by "vaccination / treatment (7 respondents replied)". High interest on vaccination and treatment might be an after-math effect of the free-of-charge service performed by using medicines distributed to each TS in the first training. As to other matters villagers were interested in, 4 respondents referred to "the occasion of providing goat housing with lifted floor" in which villager's interest was focused on lifted floor style that was different from traditional style livestock huts, coupled with delivery of stock goats.

As the reasons why villagers were interested in the activities of LBVD TS extension staff, 4 respondents replied "landless inhabitants could become owners of goats/ pigs" and 4 others replied "they found UMMB effective in the period of feed shortage". Also, 3 respondents replied "they found that improved goat housing allowed goats to soundly grow and odors were less in improved ones." Adding these, a respondent accounted the reason of villager's interest as "they received timely treatment from their extension staff".

4) State of progress in extension activities

Table 5.6.7 gives the number of target villages and that of actually realized as of October 2008 as to the planned extension services and demonstration, in which progress in 6 related TS were presented as a total by item. In the training, the participants were subdivided into TS to identify number of targeted villages for extension and that of achieved ones, later the representatives of each TS presented their progress individually. In their presentations, how to identify the number of achievement was also explained to the attendants.

As concern the state of achievement during the period from July 2008 to mid-October, demonstration livestock housing was over-fulfilled above 100%. This is because building goat house is a precondition to deliver livestock in 08L1 Goat revolving Pilot Project and 08L2 Piggery revolving P.P. In all TSs, extension activities were deployed in every occasion of meetings in the target villages held by TS at the frequency of once or twice per month, according to the report of the staff. Many people including participants from the related Ministries participated in these meetings for the purpose of disseminating government's policies.

Table 5.6.7 Number of Villages where Extension/ Demonstration are Deployed as of October 2008

Activity		Target (Nr. of Villages)		Accomplishment (Nr. of Villages)		Accomplishment (%)	
		Ext.	Demo.	Ext.	Demo.	**Ext.**	**Demo.**
1	UMMB making	146	16	33	9	**22.6**	**56.3**
2	Livestock housing	53	15	29	16	**54.7**	**106.7**
3	Urea treated straw	128	18	18	3	**14.1**	**16.7**

4	Castration	0	125	0	15	**-**	**12.0**
5	Disease control	148	80	69	61	**46.6**	**76.3**
6	Pasture development	136	15	57	13	**41.9**	**86.7**
7	Sanitation	96	26	56	16	**58.3**	**61.5**
8	General training on livestock	165	0	102	0	**61.8**	**-**
9	Silage /silo	84	16	0	0	**-**	**-**

5) Extension performances (Actual Practice)

Table 5.6.8 shows the number of villages and their villagers targeted to deploy extension / demonstration where the extended techniques were actually put into trials. As of October 2008 demonstrations were conducted in 133 out of 364 villages as targets of extension activities. As to preventive measures against livestock diseases villagers actually tried the preventive techniques in 82 villages. As to silage and silo construction, their number remained blank since they are to be implemented after November 2008.

Table 5.6.8 Number of Villages & Villagers Tried against Target of Extension / Demonstration

Activity		Accomplishment to Date No. of Villages		Of which how many villagers actually tried	
		Ext.	Demo.	No. of Villages	No. of Villagers
1	UMMB making	33	9	13	55
2	Livestock housing	29	16	17	166
3	Urea treated straw	18	3	3	NA
4	Castration	0	15	3	4
5	Disease control	69	61	82	865
6	Pasture development	57	13	8	50
7	Sanitation	56	16	26	199
8	General training on livestock	102	0	34	456
9	Silage /silo	0	0	0	0
Nr. of Villages / Villagers (Net)		**133**	**62**	**89**	**981**

With regard to the problems encountered by the participants of the training and their methods of solution, it was already mentioned at individual level, but if the issues at group level are added here, it should be stressed that villagers are not affordable to build goats housing. As to the means of solving this issue, extension staff advised villagers to build jointly used house or to build them with only locally available material. Similarly, despite too many burdensome financial problems for villagers, goats can hardly lick UMMB. To cope with this problem, technical device by the extension staff to try to change materials and the mixing rate of ingredients to increase palatability has been proposed.

6) Outputs

Some of the achieved fruits are briefed below. A few lessons learnt in the projects in FY 2007/08 have been reflected into what has achieved here. In fact, until the first training was provided in July 2007, the involvement of veterinarian extension staff in FY 2007/08 were not necessarily profound. Since then, they have realized what the project aims at and now we can identify their subjective involvement in a wide range from purchasing stocks to extension works in the villages and quarantine activities as well.

1) Both beneficiaries and extension staff of LBVD were involved in purchase of stock and as a result, better quality stock goats than initially expected could be procured. Also, the fact that inhabitants in a village adjacent to the target one built an imitated model goat housing with lifted floor supports the pride of TS extension staff of LBVD in performing their extension services. Likewise, such diffusion of copied goat housing strengthens their confidence of enabling to make revolving system well function

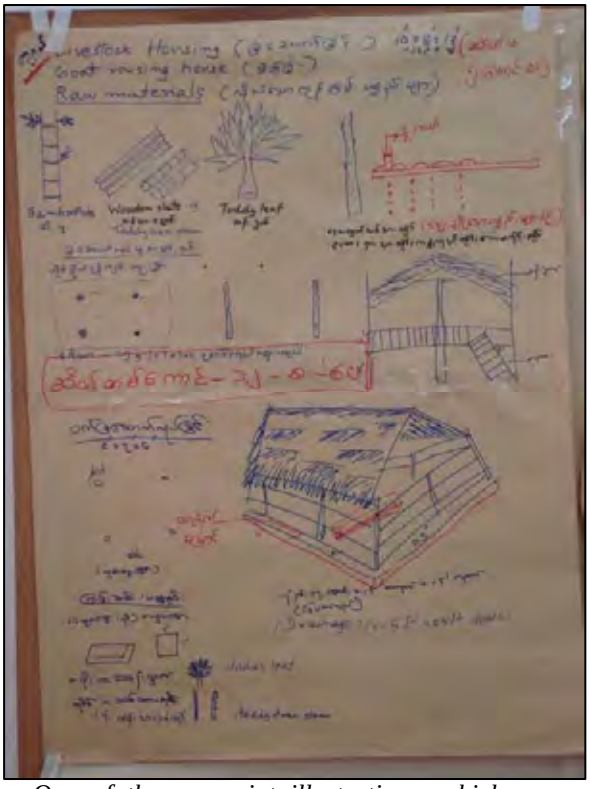
2) Following can be counted as the fruits achieved by TS extension staff of LBVD, e.g, 1) they could purchase and deliver more heads of stock goats within the budgetary appropriation through preliminary market survey and negotiations prior to purchase of stock goats and piglets, 2) they could deliver goats and piglets for improving their livelihood, and 3) in Ma Gyi Sauk village offspring from 1st generation goats provided in FY 2007/08 could further be delivered to the second-generation beneficiaries.

3) Similarly, TS extension staff of LBVD consider it advantageous for the poor to apply semi-intensive rearing of goats. In this context, what they reported includes that villagers built their housing making use of readily available material within their villages and that villagers made device to adjust the ingredients of UMMB that made sterilization around stock yard and animal huts to improve to an extent that goats can lick it.

7) Provision of extension material

As a final task of the training, provision of extension material by the participants was challenged. The Study Team initially anticipated that it took too long time to perform this work, but actual time consumed was shorter than initially expected. Conceivable reasons why they could finish it so smoothly may reside in that the participants already have their image with the Technical Manual (draft) shown in the first training held in July 2008, also may be influenced by available technical references provided by an international agency in late 1990s. Each TS prepared extension material on selected subjects by themselves. Material as termed here indicates really simple and conventional notes completed with illustration figures sketched on sheets of draft paper.

An example is shown in the right, provided by Chauk TS on livestock hut building. Other than Chauk TS, Pwintbyu TS provided a material on disinfection (sanitation), while Tada-U TS did on silage/silo, Ngazun TS provided one on the preparation of urea treated straw, also Ayadaw TS did a material on castration and Myinmu TS made one on the preparation of UMMB.



One of the one-point illustrations, which were produced during the training course.

Presentation by the representatives of each TS was made on extension material provided by the staff, and the Study Team also joined to identify/ evaluate the material on whether suficient contents were included and presented or not. Other participants took a role of village inhabitants or the extended targets to state their opinions and comments so that further improvement was sought altogether. The check points pointed out by the Study Team included; 1) the provided material should be visually effective, 2) brief explanation should be attached to, 3) necessary figures are listed, 4) quantity of materials, rate of ingredient etc are explicitly marked and 5) description of the process/ schedule should be included etc.

8) Achievement of the Training Objectives

Figure 5.6.8 gives the degree of achievement versus training objectives. Here, 5-level ranking is applied to self-evaluate the degree of the achievement on each of the objectives 1-6. The participants gave as a whole higher ranked marks, level 4 or 5 to all the objectives. Above all, to the objective 3, i.e., to have common consciousness on what is required for future livestock development, more than half of the participants gave the highest degree of achievement, or level 5, implying that participants agreed in possessing mutual awareness on the vision. The training provided this time seems to have arranged a good opportunity not only for identifying current state of progress, but also for learning pertinent techniques in sustaining extension activities as well as methods of coping with problems to the participants.

1. Round-up of experiences related to improve livestock industry in the CDZ
2. Supply of techniques and coping measures for solving issues faced by the extension activities
3. Having common consciousness on the key points for further improvement in livestock development
4. Review of action plans formulated in the first training as need arises
5. Provision of extension material for the beneficiaries
6. Discussion on the future direction of livestock development in the CDZ.

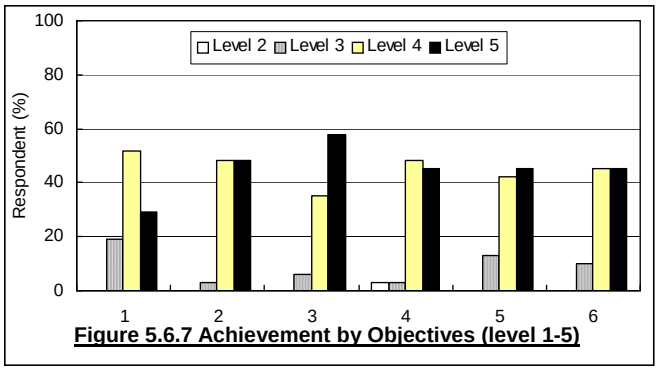


Figure 5.6.7 Achievement by Objectives (level 1-5)

5.6.3 Accomplishment of the Activities in Livestock Sector as of July 2009

On almost one year after the training was carried out in July 2008, final results of the extension activities were reported by relevant LBVD officers in comparison with the targets they had set during the training. They have reported as against the targets how many villages were covered, how many villagers participated in relevant trainings, how many villages actually tried what was taught and how many villagers actually practiced.

1) Target Village by Activity

The targeted number of villages is summarized in Table 5.6.9, which was in fact set during the first training held in July 2008. As seen in the table, TS LBVD officers gave higher priority on General Training on Livestock, followed by Disease Control and UMMB making in Extension Service. For Demonstration, they gave also high priority on castration followed by disease control. Then all of them started their activities to attain the targets set.

Table 5.6.9 Targeted Villages

Activity		Target (Nr. of Villages)	
		Ext.	Demo.
1	UMMB making	146	16
2	Livestock housing	53	15
3	Urea treated straw	128	18
4	Castration	0	125
5	Disease control	148	80
6	Pasture development	136	15
7	Sanitation	96	26
8	General training on livestock	165	0
9	Silage /silo	84	16
	Nr. of Villages (Net)	253	145

2) Accomplishment about Villages Covered

Figure 5.6.8 shows the comparison on target and accomplishment for Extension as of July 2009. As the figure shows, they made effort to attain target that they had set. In total, they have covered as many as 401 villages against the target of 253 villages for extension (overall achievement ratio is 158%). The activities which have not yet reached the targets are UMMB making, urea treated straw making, pasture development, and silage/ silo making, while activities which surpassed the targets are disease control by far, followed by general training, sanitation, improved livestock housing.

Figure 5.6.9 shows the comparison of target and results of 9 activities for Demonstration. Different

form the Extension, all the activities, but silage/ silo, exceeded the target number of villages as seen in the figure. Like Extension, Disease Control shows the highest number of villages covered. After the training held in July 2008, TS LBVD officers had visited many villages many times.

According to interview to officers, visiting villages to extend technologies taught in the training course concentrated during July to October 2008. In fact, one officer had visited his responsible villages 96 times, and also they had visited villages from October 2008 to September 2009 to extend technologies more. Then, as they went into 2009, the activities become not as busy as they used to be so far.

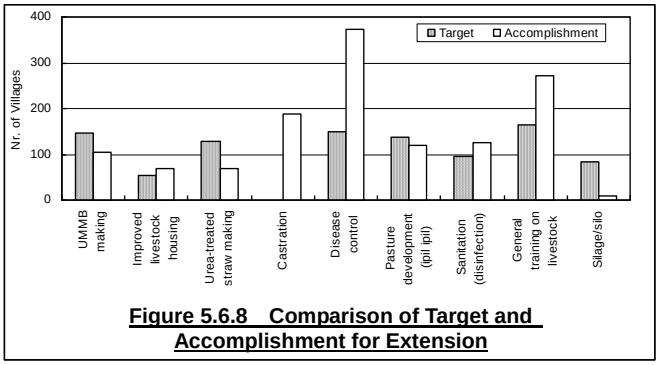


Figure 5.6.8 Comparison of Target and Accomplishment for Extension

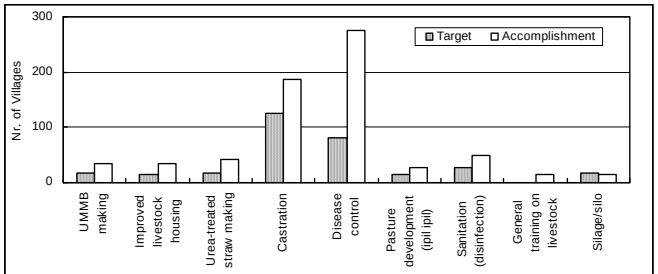


Figure 5.6.9 Comparison of Target and Accomplishment for Demonstration

3) Number of Participants

The accumulated number of participants by Extension and Demonstration and by Activity from July 2008 to July 2010 is shown in Table 5.6.10. The number of participants is much bigger than what JICA Study Team had expected. In fact, many villagers participated when TS LBVD officers visited their villages though it was sometimes reported that there was a difficulty of getting people on time. Among the 9 activities, Silage/silo programme shows smallest participants in number probably because they are not familiar with storing fodder crops for the season with scarce fresh grasses including TS LBVD officers.

Table 5.6.10 Number of Participants as of July 2009

Activity		Extension			+ Demonstration		
		Target	Accomplishment		Target	Accomplishment	
		Villages	Nr. of Villages	Nr. of Participants	Villages	Nr. of Villages	Nr. of Participants
1	UMMB making	146	104	3,501	16	34	896
2	Livestock housing	53	70	2,489	15	35	533
3	Urea treated straw	128	68	2,239	18	43	541
4	Castration	0	189	1,208	125	188	1,034
5	Disease control	148	373	8,761	80	275	7,789
6	Pasture development	136	120	1,815	15	28	525
7	Sanitation	96	126	2,932	26	48	1,637
8	General training on livestock	165	273	4,369	0	15	348
9	Silage /silo	84	10	218	16	14	246
Nr. of Villages / Villagers (Net)		253	401	10,038	145	294	7,789

Source: Data recorded by LBVD TS Offices

4) Number of Participants Tried Technologies

It is important to know the number of participants who actually tried the taught technologies, which will be important indicators to evaluate each technology. Till June 2009, many people participated in Demonstration and Extension done by TS LBVD officers, which exceeded Study Team's expectation before starting the pilot project. However, when we examine the number of villagers and villages actually tried the technologies after Demonstration and Extension, we notice that both are not so many as compared with the accomplishments as seen in UMMB making, Urea Treated Straw and silage/silo.

This may imply how extension is difficult and some of the technologies may not fit in the context of CDZ at moment.

Table 5.6.11 Number of Participants and Those Who Actually Tried the Technologies

Activity		Accomplishment from Jul' 08 to July 09				Of which, how many villagers actually tried (After Demo)	
		Extension		+Demonstration			
		Nr. of Villages	Nr. of Participant	Nr. of Villages	Nr. of Participants	Nr. of Villages	Nr. of Participants
1	UMMB making	104	3,501	34	896	16	80
2	Livestock housing	70	2,489	35	533	19	218
3	Urea treated straw	86	2,239	43	541	8	20
4	Castration	189	1,208	188	1,034	108	413
5	Disease control	373	8,761	275	7,789	242	1,585
6	Pasture development	120	1,815	28	525	8	50
7	Sanitation	126	2,932	48	1,637	135	407
8	General training on livestock	273	4,369	15	348	44	556
9	Silage /silo	32	218	14	246	0	0
Nr. of Villages / Villagers (Net)		401	10,038	294	7,789	256	1,690

Source: Data recorded by LBVD TS Offices

5.7 Pilot Project Implementation for Agriculture Sector other than Trainings

This sub-chapter discusses the current status, outputs, issues arisen for the agriculture pilot projects commenced in FY 2008/09, excluding 08A1 and 08A2 which were reported in the previous sub-chapters. Table 5.7.1 summarizes the agriculture pilot components together with the objectives of the projects. Following discussion centers on outputs level and also issues arisen through the process of the implementation:

Table 5.7.1 Summary of the Agricultural Pilot Projects with those Objectives

Sector	Component	Village	Pilot Objectives
Agriculture	08A3. Improved Seeds Regeneration (with the introduction of seeder)	Nga Zin Yine Ar La Ka Pa Htee Saung Ma Gyi Sauk	· To increase the yield of pulses (chick pea, paddy) by introducing an improved seeder together with improved seed. · To regenerate degraded seed (chick pea, paddy) by introducing improved seed.
	08A4. Pro-poor Oriented Mushroom Culture Promotion	Za Yit Zee Bwa	· To increase incomes for small scale farmers and especially landless villagers by introducing mushroom cultivation, which can be done in their household compound (no need of farm lands).
	08A5. Small-scale Irrigation Promotion	Zee Pin Gwe Kan Ma	· To promote dry season vegetable cultivation thereby increasing the villagers' income.
	08A6. Crop Storage Depots Promotion	Ma Gyi Sauk Legaing	· To store agricultural produces such as pulses, paddy, for a certain period, contributing to hike of the farm gate price.
	08A7. Minimum tillage Promotion	Kan Ma Htee Saung	· To conserve and enrich soils by introducing leguminous plants under minimum tillage cultivation.
	08A8. New Varieties Adaptability Trial	22plots for rainy 35plots for winter 16plots for cotton	· To find suitable and adaptable varieties in the CDZ.

5.7.1 Outputs from the Pilot Implementation

Outputs are summarized in the following Table 5.7.2.

Table 5.7.2 Summary of the Agricultural Pilot Projects with those Objectives

Sector	Component	Village	Major Outputs from the Pilot Implementation
Agriculture	08A3. Improved Seeds Regeneration (with the introduction of seeder)	Nga Zin Yine Ar La Ka Pa Htee Saung Ma Gyi Sauk	· In Nga Zin Yine village, 100 baskets of chick pea seeds were provided to 96 farmers, and they have revolved to the 2nd generation beneficiaries. · In Ar La Ka Pa village and Htee Saung village, each 27 baskets of chick pea seeds were provided to 19 beneficiaries and 6 beneficiaries respectively. · In Ma Gyi Sauk, 31 farmers were provided with total 74 baskets of improved paddy seeds (26 baskets were for demonstration), and regenerated the new variety to the 2nd generation beneficiaries.
	08A4. Pro-poor Oriented Mushroom Culture Promotion	Za Yit Zee Bwa	· In Za Yit village, 20 beneficiaries learned the mushroom cultivation. · In Zee Bwa village, same 20 beneficiaries learned the mushroom cultivation.
	08A5. Small-scale Irrigation Promotion	Zee Pin Gwe Kan Ma	· In Zee Pin Gwe village, 20 beneficiaries were provided with treadle pumps of 3 pressure type and 5 simple type, and now growing onion and some green leaves. · In Kan Ma village, same arrangement, 3 pressure type and 5 simple treadle pumps were provided to 22 beneficiaries, and they have cultivated onion.
	08A6. Crop Storage Depots Promotion	Ma Gyi Sauk Legaing	· one crop depot each was constructed in the target villages (15 feet x 45 feet for the floor area and divided into 3 cells, storable of 4,500 baskets for paddy)
	08A7. Minimum tillage Promotion	Kan Ma Htee Saung	· In each of the villages, 0.2 plot of minimum tillage was established with Rhizonia as intercrop with main crop and Glyricidia as hedge row.

	08A8. New Varieties Adaptability Trial	22plots for rainy 35plots for winter 16plots for cotton	· Such rainy season crops as pigeon pea, peanut, green gram and sunflower were tested in 22 plots, and suitable varieties were found. · Winter crops such as sesame, maize, chickpea, green gram, groundnut, sunflower were tested in 35 plots and suitable varieties were found. In addition, 2 cotton varieties were tested in 16 plots.

5.7.2 Issues Arisen through the Implementation of Agriculture Pilot Projects

This section summarizes the issues arisen during the implementation of the agriculture pilot projects in FY 2008/09. Major issues that could be more generalized toward CDZ development planning and implementation disciplines are described in the Main Report. Hence in this section, rather specific issues in each particular pilot project are summarized:

1) 08A3 Improved seed regeneration pilot project

Seed regeneration training was conducted during 1st week of October 2008 in all the target 4 villages. The training had enhanced the beneficiaries' awareness on; 1) importance of seeds for crop production, 2) seed regeneration process by farmers, 3) importance of post harvest crop handling process, and 4) storage of seeds at farmers' level.

All 97 chickpea farmers in Nga Zin Yine village actively participated in the training. The beneficiaries were provided with improved seeders, chickpea seeds and fertilizer. Land preparation (all Yar land) was completed and most beneficiaries had completed seeding by end of October 2008. Total 11 chickpea beneficiaries in Htee Saung village and 25 beneficiaries in Ar La Ka Pa village participated in the training program. Seed, fertilizer and improved seeders were supported to the farmers. All the beneficiary farmers had completed land preparation & seeding on their Yar land by the end of October 2008. Total 27 paddy & chickpea farmers participated in the seed regeneration training program in Ma Gyi Sauk village. 25 beneficiaries cultivated 50 acres of paddy.

1.1) Nga Zin Yine Village

For Nga Zin Yine village, the Project provided 20 baskets of chickpea new variety, 10 bags of compound fertilizers and ten seeders. Altogether 20 farmers were selected as the first generation beneficiaries and each beneficiary was provided with 1 basket of chickpea and half a bag of compound fertilizer. For seeders all beneficiaries used them alternately, and there was no problem for using seeders in turns because Nga Zin Yine villagers have been using their village-made seeders for years.

Beneficiaries cultivated Yezin (6) new variety intercropping with sunflower (In this village, villagers are in the habit of intercropping chickpea with sunflower). The best yield per acre of chickpea in that village was, when compared with yield per acre of other villages, just at fair level. All beneficiaries cultivated chickpea of old and new varieties on their Ya-lands (uplands) which were used for chickpea cultivation every year.

According to beneficiaries, although new variety Yezin (6) has a longer life period than an old one (ICCV2), it is more resistant to pests/insects and diseases than the old one. Not only that, the yields were better either. For these reasons, after handing over the same amount of seeds as they received to the second generation group, they have cultivated this Yezin (6) new variety in FY2009/10 as well, it was learnt.

Another reason of why beneficiaries want to cultivate this new variety is that it earns higher price than the old one at market. When the Team made a field trip to Nga Zin Yine village after chickpea had been harvested, beneficiaries said that the market price of new variety was 36,000 Kyats per bag and that of old variety was 33,000 Kyats per bag (1 bag = 3 baskets).

Yield per acre of beneficiaries (except for some beneficiaries whose some chickpea plants were ruined

by unwanted rain) in Nga Zin Yine village were 2.5 - 5 baskets more than those of old variety. According to a study of difference between new variety and old one, it is learnt that average yield per acre of new variety was 11.6 baskets and that of old variety was 8.2 baskets.

Table 5.7.3 Comparative Study on Yields of Lowest and Highest

Sr.	Activity	Seed (basket)	Chemical Fertilizer(kg)	Yield (basket)	Remark
Lower side	Yezin (6)	1.0	26.00	7.5	Sample no. 3
	Old variety	1.3	0.00	5.0	
	Average year	1.3	0.00	5.0	
Higher side	Yezin (6)	1.0	26.35	20	Sample no. 3
	Old variety	1.0	0.30	15	
	Average year	1.0	0.00	15	

Source: JICA Study Team

According to the above-mentioned table, although farmers applied chemical fertilizer for new Yezin (6), they still could earn more profit due to the better yield. The price of fertilizer varies from 8,000 Kyats to 40,000 Kyats per 50kg bag depending on 'brand name'.

Beneficiaries of second generation group, although there was no provision of chemical fertilizer in 2009/10, willingly asked for new variety seeds and they have been provided with the revolved seeds. And beneficiaries of first generation group have already cultivated the new variety as well in 2009/10 season. It can be seen by these facts that farmers are interested in regeneration of chickpea and revolving farmer-to-farmer to implement the objective of the project.

1.2) Ar La Ka Pa Village

For Ar La Ka Pa village, 28 baskets of chickpea new-variety were provided by the Project and then 19 beneficiaries of the first generation group were provided with chickpea seed through the management of Village Committee Members. Not only that, the Project also provided 13 bags of compound chemical fertilizer to Ar La Ka Pa village. One basket of chickpea seed was delivered together with 0.5 bag of compound chemical fertilizer among beneficiaries. In connection with which beneficiaries should be provided with how much seed, the Committee made the decision based on such conditions as a beneficiary's request, his owned-acreage, and his capacity to take responsibility.

Most of Ya lands (upland) in the village are of sandy soil and most farmers used seeders. It was learnt that all farmers cultivated the new variety with great care because it was the first time or experience for them in connection with Yezin 6 variety. According to beneficiaries, it was also learnt that the new variety had a longer life period than the old variety, it was more drought-resistant, and the yield was more, either. The name of the old variety which farmers used to grow is Yezin 3 (ICVV 2).

Table 5.7.4 Comparative Yields of Beneficiaries in Ar La Ka Pa Village in FY 2008-09

No	Category	Seed Usage (bsk)	Type of land	Fertilizer (kg)	Yield
1	Under Project	1	Ya	50.275	11
	Outside Project	1.25	Ya	0.275	15
	Average Year	1.25	Ya	0.275	10
2	Under Project	1	Ya	37.500	11
	Outside Project	0.75	Ya	12.500	5
	Average Year	1.25	Ya	31.290	10
3	Under Project	1	Ya	0.325	8
	Outside Project	1.25	Ya	17.825	12
	Average Year	1.25	Ya	17.825	15
4	Under Project	1	Ya	25.225	18
	Outside Project	1.25	Ya	0.225	9
	Average Year	1.3	Ya	Almost Nil	13
5	Under Project	1	Kain	25.300	15
	Outside Project	1.5	Kain	0.300	12
	Average Year	1.5	Kain	Almost Nil	12
6	Under Project	1.3	Ya	0.600	14

	Outside Project	2	Ya	0.240	8
	Average Year	2	Ya	0.240	10
	Under Project	Average			12.8
	Outside Project	Average			10.2
	Average Year	Average			11.7

Note; For Nos. (1) and (3) of the table mentioned above, Yezin 6 variety was cultivated on lands which are situated at lower parts and so some young plants were destroyed by water.

Above table was extracted from the data collected by the Project at the time of cultivation and after chickpea had been harvested. According to the table, it can be seen that No.4 is the best yield for the new variety provided by the Project and No.1 is the best yield for the old variety. On the contrary, No.3 is the lowest yield for the new variety and No.2 is the lowest yield for the old variety. It can also be seen that there are different rates of seed-use.

However, it is clear that the best and the lowest yields of new variety are 3 baskets each higher than those of old variety. It can be assumed that one of the causes of why the old variety is lower than the new variety, Yezin 6, in yield is due to plant degeneration caused by disease and unfavorable weather and since they are not as weather and disease - resistant as the new variety.

One of chickpea fields (Yezin-6) variety provided by Project in (2008-2009) FY

Considerably-higher yield of new variety, Yezin 6, than that of old variety, Yezin 3, can clearly be seen at No.4. According to No.4 of the table, it can be learnt that using the same variety for long without any regeneration caused lower yield per acre from 13 baskets of yield per acre (average) to 9 baskets of yield per acre last year (2007). Although there was almost no application of chemical fertilizer previously, farmer began to apply it for the old variety, it can also be learnt from No.4 of the table. By adding a little more chemical fertilizer, better yield was obtained from Yezin 6 variety than the old variety Yezin 3 - the former's yield was 18 baskets while the latter's yield was 9 baskets. This means that the quality of Yezin 6 variety plays an important role to get high yield.

One of the beneficiaries said, "It's no good using one variety of seed for more than 3-4 years. But I don't know exactly why. All I know is the yield gradually gets lower and lower. Now the new variety provided by the Project gets better yield because it's been carefully researched by Myanma Agriculture Service', expressing his opinion on the new variety.

In Ar La Ka Pa village and its surrounding area, Yezin 6 variety provided is well-known as ‘Japan chickpea’ and there are many farmers who want to get seeds and so it is on brisk-sales. Due to good yield of last year, the first generation beneficiaries are sure to grow Yezin 6 variety this year either after they have handed over the same amount of seeds they received to the second generation beneficiaries, it is learnt.

According to the yields of above table, average yield per acre for Yezin 6 variety is 12.8 baskets and that for Yezin 3 variety (old variety) is 10.2 baskets respectively. If rough calculation is made based on the price of chickpea (average) from March to July in 2009 and yield per acre (average), the net profits per acre of the two varieties can be learnt as follow.

Gross profit (Yezin-6)	179,200 Kyats per acre
Gross profit (Old variety)	127,500 Kyats per acre
Expenditure for input (Yezin -6)	3,159 Kyats

Expenditure for input (Old variety)	676 Kyats
Net Profit (Yezin -6)	176,041 Kyats
Net Profit (Old variety)	126,824 Kyats
Difference between Yezin-6 & Old	49,217 Kyats per acre

In calculating cost per acre for chickpea cultivation, one farmer's cost is different from another farmer's because they apply different amount of chemical fertilizer, herbicide, pesticide, etc. So, the calculation was made based on their actual expense. Farm-labour charges which are almost the same for every farmer, was not included in the calculation. For the above-mentioned calculation, farm-labour charges have been extracted from the profit for both varieties and the net profit of new variety was about 50,000 Kyats more than that of old variety.

Although there has been an arrangement for revolving system for Ar La Ka Pa village made by the Project, the Village Committee is making efforts to be able to carry out an improved revolving system. According to an improved revolving system the first generation beneficiaries are, since they were provided with not only seeds but also compound chemical fertilizer, to hand over the Village Committee not only original amount of seeds but also seeds of original amount as 'interest" for compound chemical fertilizer.

Table 5.7.5 An improved revolving system

FY	Beneficiary Group	Received (A) and hand over to (B)	
		(A)	(B)
2008-09	1st	28	50
2009-10	1st	25	25
	2nd	25	25
20010-11	3rd	50	50

Note; When the first generation beneficiaries hand over the seeds to the second generation beneficiaries, 3 baskets of chickpea seed destroyed by rain and 3 baskets of interest - total in 6 baskets - will be exempted.

However, a few beneficiaries got low yield and when they hand over the seeds to the Village Committee with interest, there were not enough seeds for them. To avoid this, the Village Committee will, in FY 2009/10 fiscal year, provide seeds to the first generation beneficiaries. By so doing, beginning from the third generation beneficiaries 50 baskets of chickpea seed will be provided to the next, next generation beneficiaries year after year. As per the number of the 2nd generation beneficiaries, 19 farmers participated, same number to the 1st generation beneficiaries. This means as of end January 2010, a total of 38 farmers have been covered with this chickpea seed regeneration programme (about 6 % of whole farmer households).

1.3) Htee Saung Village

In carrying out regeneration of chickpea in Htee Saung Village, there were some difficulties. Most farmers did not dare to cultivate a new variety on one hand, and they just wanted to cultivate onion on the other hand. As a result, there was difficulty to select the first generation beneficiaries for chickpea new variety provided by the Project.

According to the Village PDC chairman who is carrying out the activity in cooperation with the project, there were only 2 farmers who willingly asked for the new variety. Therefore, he asked for help from 3 farmers who own many acres. At last, 20 baskets of chickpea new variety provided by the project were cultivated by 6 beneficiaries including the Village PDC chairman.

Trouble upon trouble, yield of new variety Yezin (6) in Htee Saung village was markedly low in comparison with that of old variety. Only yields of two beneficiaries who willingly asked for the new variety could compete with the yield of old variety. It is learnt that those two beneficiaries started crop cultivation only last year, that is to say, they started crop cultivation by chickpea new variety provided by the project.

Based on a study through a field trip to Htee Saung village, it can be assumed that those 3 farmers, whom Village PDC chairman asked for help, seemed to have cultivated old variety chickpea on their

regular Ya-lands and new variety chickpea on other lands, unfertile or almost abandoned lands. Since the first generation beneficiaries did not get good yield it was difficult for them to hand over seeds to the second generation group.

Beneficiaries in Htee Saung village were explained about the good results of other villages such as good yields, better price than old variety and about farmers who were successful in new variety cultivation and discussions were made. In a nutshell, farmers in Htee Saung village came to take interest in the new variety Yezin (6). Harvested seeds were handed over to the same number of 6 second-generation beneficiaries, and they have planted in the season 2009/10. The prices of chickpea in Htee Saung Village were the same as those of other villages: 12,000 Kyats per basket of old variety and 13,000 Kyats per basket of new variety.

1.4) Ma Gyi Sauk Village

Paddy seed regeneration was tried in Ma Gyi Sauk village in FY 2008/09. Following table shows the paddy yield by each beneficiary of Ma Gyi Sauk village, under the pilot project. Data were collected and organized by the extension officer in charge of township MAS. The yield ranges from 23 to as much as 105 baskets per acre, showing big fluctuation due mainly to availability of water. The average yield was 70.4 baskets per acre while average yield in normal year is only 52 baskets according to a baseline survey carried out in 2007.

Table 5.7.6 Yield of Paddy Seed Regeneration under 08A3 Pilot Project

Sr	Beneficiary name	Sown acre	Harvest (basket)	Yield per acre	Variety	Village track	Remark
1	U Nyi Tun	2	47	23.5	Sin Nwe Yin	Magyi Sauk	
2	U Aye Win	3	Nil	-	"	"	Damaged due to drought
3	U Khin Tun	3	270	90	"	"	
4	U Nyo	2	Nil	-	"	"	Damaged due to drought
5	U Myint	2	Nil	-	"	"	Damaged due to drought
6	U Thaung Win	1	93	93	"	"	
7	U Tin Aung	2	167	83.5	"	"	
8	U Zaw Win Gyi	2	160	80	"	"	
9	U Sein Myint	3	278	92.6	"	"	
10	U Aung Maung	1	95	95	"	"	
11	U Maung Tin	1	80	80	"	"	
12	U Aye Kyaw	3	270	90	"	"	
13	U Win U	1	90	90	"	"	
14	U Nyan Than	1	45	45	"	"	
15	U Kalar	1	85	85	"	"	
16	U Cho	1	77	77	"	"	
17	U Kyi Thaung	1	95	95	"	"	
18	U Tin Maw	1	75	75	Yezin Yar-9	"	
19	U Thaung Win	1	73	73	"	"	
20	U Kyaw Aung	2	145	72.5	"	"	
21	U Kan Bo	3	300	100	Sin Thwe Latt	"	
22	U Po Pyar	1	85	85	Sin Nwe Yin	"	
23	U Moe	1.5	75	50	"	"	
24	U Pwar	1	88	88	"	"	
25	U Ba Maw	2	160	80	"	"	
26	U Win Lwin	1	83	83	"	"	
27	U Myint Swe	1	92	92	"	"	
28	U Win Naing	1	105	105	"	Zayit	
29	U Thein Win	2	162	81	"	Magyi Sauk	
30	U Ye Myint	1.5	135	90	"	"	
31	U Htay Aung	1	90	90	"	"	
	Total	**50**	**3,520**	**70.4**			

Source: Compiled from the records by the township MAS extension officer in charge

To the village, 74 baskets of paddy seeds were provided. At harvest time when paddy was re-collected on January 2009, 67 baskets could be re-collected because 3 farmers failed in their

cultivation. As second time, at summer paddy cultivation time (April, 2009), only 22 out of 67 baskets could be distributed to 4 beneficiaries with an interest rate of 4 pyi per basket. Why only 22 baskets could be distributed was that Sin Nwe Yin variety was not liked by many villagers in Ma Gyi Sauk village. It was because Ma Gyi Sauk farmers had no habit of cultivation and eating such local variety and there is no market for Sinn Nwe Yin variety. The rest 45 baskets were kept in Crop Storage until August 2009 by Main Committee. There was no farmer who wanted to cultivate that variety. Therefore, to prevent from loss and waste caused by rats, squirrels, etc. those 45 baskets were milled and sold. And then, 13,500 Kyats out of 93,500 Kyats (sales income) were lent to village weaving committee.

With the rest money 80,000 Kyats, 23 baskets of IR 747 paddy variety which is popular in the village were bought. Then on September 2009, only 12 baskets could be re-collected from summer paddy cultivation and paddy variety was not Sinn Nwe Yinn but IR747 variety. The main reason of why it was like this was that those 4 farmers consumed Sinn Nwe Yin variety without cultivating them due to their financial difficulty, it was learnt. When the Committee asked them to repay paddy, they repaid IR 747 paddy variety which is easily available in the village.

During the month of September 2009, for monsoon paddy cultivation the Committee distributed 35 baskets of IR 747 variety to 4 farmers as third time with an interest rate of 4 pyi per basket. At present (up to mid December 2009), the Committee has only 25 baskets which were recollected. In reality, total amount for first, second and third times it must be 37.5 baskets. Since this paddy distribution activity was not liked by many farmers, the Committee is planning to do another activity (e.g. agricultural loan with low interest) when they have re-collected all paddy baskets out of 2009/10 season harvest and by selling them.

2) 08A4 Pro-poor Oriented Mushroom Culture Promotion

2.1) Za Yit Village

Mushroom cultivation training-1st time was conducted during August 2008 with 20 participants each in both villages. In Za Yit village 1st batch cultivation produced mushroom, min 0.7 to max 7.1 viss, with average yield of 3.5 viss. In Za Yit, 2nd batch cultivation started during 1st week of October 2008, and has been harvested during the month and continued to November. One beneficiary who failed on 1st batch training experienced some yield during the second trial.

In Za Yit village, though 1st and 2nd batches of the training did not yield good harvest, the third batch mushroom growing tried in December 2008 resulted in much better yield with an average of 6.8 viss. Each and every beneficiary harvests good yield, and there is not much significance between different raw materials (paper board & paddy straw). The major reason may be the seed freshness procured from Mandalay, and not from Ayadaw town which provided the 2nd seeds. Following table shows the yield of individual beneficiaries through 3 times of mushroom cultivation.

Table 5.7.7 Yield of Mushroom Training in Za Yit Village

Sr	Name of beneficiary	Sex	1st batch (August- Sept'08)		2nd batch (October)		3rd batch (December)	
			Yield (viss)	Raw material	Yield, (viss)	Raw material	Yield, (viss)	Raw material
1	U Kyaw Shein	M	7.0	Paper board	0.5	Paper board	7.25	Paper board
2	U Win Naing	M	7.0	"	3.0	"	7.55	Paddy straw
3	U Chit Win Lay	M	4.25	"	8.5	"	6.75	Paper board
4	U Myo Hlaing	M	4.55	"	3.0	"	6.5	"
5	U Tun Wai	M	1.5	"	0.5	"	7.15	"
6	U Toe	M	3.75	"	1.0	"	6.85	"
7	U Nyo Win	M	7.1	"	1.5	"	7.75	"
8	U Win Khine	M	4.55	"	3.0	"	6.85	"
9	U Sun Htoo	M	0.70	"	1.0	"	7.00	Paddy straw
10	Daw Yi Hnin	F	1.00	"	5.0	"	6.5	Paper board

11	Daw Mya Win	F	6.90	"	Nil	"	7.5	"
12	U Tin Kyaing	M	6.95	"	5.0	"	6.25	"
13	U Maung	M	2.85	"	3.0	"	6.25	"
14	U Win U	M	2.75	"	5.0	"	7.0	"
15	U Kyaw Min	M	5.10	"	1.5	"	6.75	"
16	U Tun Shwe	M	Nil	Sesame stalk	8.5	"	6.5	"
17	Daw Nu	F	Nil	Water hyacinth	1.5	"	6.0	"
18	Daw Shan	F	0.25	"	0.5	"	6.75	"
19	UMyint Than(Rice mill)	M	4.10	Paddy straw	8.0	"	6.35	Paddy straw
20	U Myint Than	M	1.55	"	1.5	Paddy straw	6.5	"
	Total		**71.85**		**61.5**		**136.0**	
	Average		**3.59**		**3.1**		**6.80**	

Source: JICA Study Team, field survey

In Za Yit village, after the training was carried out, there were only 2 - 3 beneficiaries who carried on mushroom cultivation intermittently. For the beneficiaries, it was difficult to buy mushroom seeds (to buy seeds they have to go to Monywa town). In addition, natural mushroom is available in the rainy season. So, cultured mushroom was not preferred by the villagers although they requested the mushroom culture when contacted by relevant agricultural officer.

2) Zee Bwa Village

In Zee Bwa village, total 2 times of cultivation had been completed by end of September 2008 and yielded with average 8.0 viss in 1st time and 6.86 viss in the 2nd time cultivation, which is much better than that of Za Yit village. In Zee Bwa, 3rd batch cultivation started and harvesting was done during October 2008 and continued to November 2008. But the results were not good with an average of 4.48 viss only as shown in the table below.

Mushroom cultivation of the 3rd batch had resulted with comparatively low yield to former two times, due mainly to; 1) some beneficiaries substitute saw dust as raw material (others used paper boards), 2) water (moisture) requirement during heavy sun shine in early October at some beneficiaries' place, and 3) heavy & continuous rain during last week of October had wiped out nearly all the mushroom heaps of some beneficiaries.

Table 5.7.8 Yield of Mushroom Training in Zee Bwa Village

Sr	Name of beneficiary	Sex	Mushroom Yield (Viss)		
			1st batch (August)	2nd batch (September)	3rd batch (October)
1	U Thein Paing	M	12.95	8.6	1.00
2	U Nyein Maung	M	10.90	5.00	5.57
3	U Nay Lin	M	12.45	12.5	8.75
4	U Kyaw Htoo	M	7.45	5.60	1.80
5	U Pho Hlwar	M	10.35	4.35	Nil
6	Daw Aye Aye	F	11.5	10.8	10.2
7	Daw Mu Mu Thin	F	6.40	8.10	5.85
8	Daw Aye Aye Than	F	11.1	8.3	3.2
9	U Win Zaw U	M	9.1	9.2	3.8
10	U Ohn Maung	M	8.0	5.3	Nil
11	U Nyunt Win	M	5.2	6.4	1.75
12	Daw Nwe	F	8.5	5.0	4.5
13	U Zar Ni	M	4.8	7.55	2.6
14	U Aye Lin	M	6.85	3.4	5.5
15	U Kyaw Sann	F	7.00	1.5	3.0
16	Daw Khin Toe Hlaing	F	8.35	8.1	5.75
17	U Yan Naing Aung	M	8.0	5.0	4.3
18	U Phyo Ko Ko	M	7.85	4.3	3.0
19	Daw Pan Ei Phyu	F	12.85	10.85	11.2
20	Daw Wathan Moe	F	7.1	7.4	7.65
	Total		176.70	137.25	89.6
	Average		**8.84**	**6.86**	**4.48**

Source: JICA Study Team, field survey

On September 7, 2008, about 40 persons including responsible persons from World Vision studied

mushroom cultivation in Zee Bwa (at that time 'vegetable cultivation training' was being conducted at 'Koe Su' village which is situated 6 miles away from Zee Bwa under the arrangement of World Vision). At the invitation of Koe Su village, some beneficiaries from Zee Bwa went to Koe Su to give necessary instruction for 5 beds of mushroom cultured by Koe Su villagers. Here, village to village technical transfer took place.

In Zee Bwa village, for about 2 - 5 months after the mushroom cultivation training had been conducted there was a good demand for mushroom on the market. Since underground crude-oil course was found at Gway Pin village near Zee Bwa, there were comers from many parts of the country to that village to tap crude-oil. Vendors went to that village to sell mushroom and they got good price for it.

However, the yield of crude-oil became less and less, and there were almost no crude-oil tappers. The market of mushroom dwindled away in this way towards September 2009. According to beneficiaries, they are ready to culture mushroom again if there is a good demand for it. For them, there was no difficulty to get seeds. Seeds could be bought from Maha Nanda seeds farm, Paleik with the help of highway-buses. Some beneficiaries went to Kyaukpadaung town to enquire mushroom market but restaurants have already had an arrangement with other mushroom cultivators to get mushroom by paying advanced money to them.

3) 08A5 Small-scale Irrigation Promotion

Treadle pumps had been delivered to Zee Pin Gwe village and Kan Ma village in October 2008, 3 pressure type and 5 simple type pumps per village. There are 20 beneficiaries and 22 beneficiaries in each of the villages respectively. In Zee Pin Gwe village, farmers efficiently utilized the treadle pumps for onion crop as well as other winter crops such as vegetables e.g. cauliflower, mustard, egg plant, water crest, and seasonal flowers. All 20 onion beneficiaries had made the IMO Bokashi for their crop. The training on “Water saving irrigation & water management” was conducted in the village on 5th December 2008.

In season 2009 in Zee Pin Gwe village, about 15 members still used the treadle pumps to irrigate mostly onion nursery. In fact, there are farmers who have engine pump and sometimes use it to not only nursery but also main field. However, if they apply engine pumped irrigation to onion nursery, the nursery could easily be damaged due to the water pressure. Therefore even if a farmer can afford to operate engine pump, he prefers to irrigate nursery with treadle pump. In this way, about 15 members are using the treadle pump.

Treadle pump provided to Kan Ma village, irrigating onion field.

In Kan Ma village, beneficiary group managed to collect rental charge of 300 Kyats per day for utilizing treadle pumps provided by the project. The collected fund, 3,800 Kyats as of end January 2009, is to be used for repairing and maintenance of the pumps. The farmers can manage to irrigate 0.5 acre in 2 days, with 3 people, which they can save about 8 gallons of diesel (to irrigate 1 acre, they used to spend 16 gallons). In addition, the quality of onion crop is much better in standing crop condition than conventional ones, due probably to the application of IMO Bokashi compost. The beneficiaries shared using the treadle pumps for irrigating onion crop as well as other seasonal crops. Simple pumps are used for irrigation and pressure pumps are used for watering directly on the raised beds.

In the season of 2009 in Kan Ma village, about 14-15 members alternately use the treadle pumps not

only for nursery but also for onion main field. By using treadle pump, they irrigate vegetables such as tomato, cabbage, coriander, etc. In this season 2009, they stopped to collect the rental charge, and instead introduced an arrangement of whom he/she has got broken should repair it. This is because the amount collected was not much and they thought it was cumbersome to collect every time. Instead, they introduced this simple way.

4) 08A6 Crop Storage Depots Promotion

In Ma Gyi Sauk Village, construction of the crop storage depot was done from November 11 to 20, 2008. They did not use cow dung for wall inner coat, as they intended to store the crops with individual bags. By the end of December 2008, the depot started utilized for storage of paddy crop. Training on crop storage systems & storage pest control was conducted in December 2008 at the village with 31 participants. About 80 -100 baskets of paddy under seed regeneration program have been collected in the crop storage depot as of January 2009, organized by the main committee. The committee also collected and stored about 40 baskets of chickpea from the previous year, seed regeneration program, for the distribution to next generation beneficiaries.

In Legaing village, the location was approved by the township PDC, and then the construction permission was applied to the divisional authorities at the end of October 2008. Crop Storage Depot in Legaing village started its construction in mid January 2009 and completed by the end of the month. The location is behind the Road Station near the paddy dryer. One water pump for the prevention of fire hazard was handed over to the village, together with the crop storage depot. Training on crop storage and post harvest technology was conducted in early February 2009.

Crop depot established in Ma Gyi Sauk village which can store as many as 800 bags (1,200 baskets) of paddy.

The depot in Legaing village was originally meant to store dried paddy prepared by paddy-dryer established under one of pilot projects in FY 2007/08. However, since the onset of rainy season of year 2009 was very much delayed due to drought, farmers just dried their pre-monsoon paddy under sunshine. Hence, they all stored their paddy in their houses and in their compounds. Therefore no paddy came to the storage depot in Legaing village in year 2009. Instead, they stored a bulk of fertilizer.

As of August 2009, there were about 16,00 bags of urea fertilizer which were provided to villagers in 5 village-tracts including Legaing village-tract. This was for FY 2009/10 rainy season paddy cultivation. All the Urea fertilizer bags were stored in the storage depot at a cost of 16,000 Kyats (payment to the village fund) under the joint-arrangement of township PDC and Village PDC. In recent years, bags of fertilizer had to be kept in pagoda compound and at Village PDC office since they did not arrive in bulk. Now, this year 2009, they arrived in bulk and so they had to be kept in different places including the crop storage depot.

5) 08A7 Minimum tillage Promotion

An idea of introducing minimum tillage came in and it was tried in 2 villages, requiring less time of draught cattle and also protecting soils from being eroded by wind and rainfall. In minimum tillage, mulching is usually practiced as a measure against weeds. However, mulching materials such as crop residue are utilized as fuel for cooking in the CDZ. Thus, since crop residues cannot be used as material for mulching, this pilot project inter-cropped with a perennial leguminous plant, a fodder, as a

substitute for mulching. Leguminous crops can fix atmospheric nitrogen which in turn can enrich soils. Since originally planned *desmodium* was not available in DAR research station, the perennial leguminous crop was changed to *Rhizonia* and *Glyricidia*, which are in fact leguminous tree.

In Htee Saung village, 2-days training program had been conducted during 2nd week of October 2008 with 13 interested farmers. Major crop, sunflower, had already been sown at the end of September 2008, and the perennial legume plants had been transplanted by inter-cropping during the end of October 2008. Perennial legumes (*Rhizonia* plants) were grown in 1 ft x 7 ft spacing with 120 number/ row, total 7 rows (720 plants) in 0.2 acre plot mixed with the chickpea. On the other hand, *Glyricidia* plants of 75 number were planted as hedge row (wind break) in single line with 2.5 feet spacing.

In Kan Ma village, same 2-days training programme had been conducted during 2nd week of October 2008 with 28 interested farmers. The perennial legume plants of *Rhizonia* were transplanted into plot on 9th November 2008 and wheat, as an intercropped plant, was grown on 11th November 2008. *Glyricidea* plants were grown as hedge rows for wind break, as of November 25 2008. As of January 2008, the perennial legumes and wheat were performing well, as the beneficiary had irrigated the plot.

The leguminous crops had been growing well during the rainy season, however they could not survive in hot and dry season due to the high temperature and its dryness. In fact, year 2009 was drought prevailing over the CDZ. Till June 2009, all the leguminous crops had died unfortunately. It is therefore necessary to try this kind of practice in fields equipped with irrigation facilities.

6) 08A8 New Varieties Adaptability Trial

There are two kinds of soil. They are (1) red brown savanna soil and (2) compact soil. In the rainy season, rainy sesame, rainy season peanut and pigeon pea are mainly cultivated and places where water is available, rainy season paddy is cultivated. In winter, chickpea is mostly cultivated and other crops such as wheat, onion, winter sesame + dolichos lablab and beans and pulses (true pea, lentil pea, lima bean, butter bean) are also cultivated. For places where irrigated water is available, rainy season paddy, chickpea and summer paddy are cultivated.

Under above condition, new varieties seeds, provided from DAR, were cultivated on trial with an objective of finding out new varieties, which are locally adaptable. According to Steering Committee's advice, MOAI and JICA Study Team cultivated new varieties on trial in target villages in CDZ. The variety test was carried out on rainy season crops (pigeon pea, peanut, green gram and sunflower), winter crops (sesame, maize, chickpea, green gram and peanut), and also on cotton as pre-monsoon crop. Above-mentioned crops were cultivated beginning from 2008 rainy season as follows:

6.1) Rainy Cultivation Test Trial

Under this pilot project of 08A8 New Varieties Adaptability Trial, there are 3 trials by season; namely, rainy crop, winter crop, and pre-monsoon crop (cotton only). In the previous report of ITR3, presented in March 2009, results only for rainy crops were delivered and as of August 2009, all the data including winter crops and pre-monsoon crop (cotton) became available as presented below.

In the rainy season, rainy sesame, rainy season peanut and pigeon pea are mainly cultivated and places where water is available, rainy season paddy is cultivated. In winter, chickpea is mostly cultivated and other crops such as wheat, onion, winter sesame + dolichos lablab and beans and pulses (true pea, lentil pea, lima bean, butter bean) are also cultivated. For places where irrigated water is available, rainy season paddy, chickpea and summer paddy are cultivated.

Following table summarizes the rainy season crops cultivated on trial basis and also the TS and villages where the crops were tried.

Table 5.7.9 Rainy Season Crops Cultivated on Trial and Townships

Sr.	Township	Rainy season crops cultivated on trial (demonstration plot)				Remark
		Pigeon pea	Peanut	Green gram	Sunflower	
1.	Ayadaw	1	1	1	1	
2.	Myinmu	-	-	-	-	
3.	Tada-U	2	-	2	1	
4.	Ngazun	2	1	2	1	
5.	Chauk	1	-	1	1	
6.	Pwintbyu	2	-	2	-	
Total		8	2	8	4	22 plots

Table 5.7.10 The villages tried for Rainy Season Crops

Sr.	Township	Nos. of Village	Demonstration Plots 2008-rainy Crop / village			
			Pigeon pea	Peanut	Green gram	Sunflower
1.	Ayadaw	2	Taw Hla	Ma Gyi Sauk	Ma Gyi Sauk	Ma Gyi Sauk
2.	Myinmu	-	-	-	-	-
3.	Tada U	2	Chaung Khwa Nga Zin Yine	-	Chaung Khwa Nga Zin Yine	Nga Zin Yine
4.	Ngazun	2	-	Ka Lay Wa	Ywa Thit (East)	-
5.	Chauk	2	Sarr Taung (East)	-	Pa Khan Nge	-
6.	Pwintbyu	2	San Pya	-	In Doung Let Pan Nwe	-
	Total	10	5	2	7	2

The area of demonstration plot is 33' x 33' and it is divided into two parts. A new variety is cultivated in one part in comparison with a local variety in other part. New varieties were purchased from Tut Kone (Nay Pyi Taw) Seed Farm and the names of new varieties are shown in the table right.

Table 5.7.11 New Varieties for 2008 Rainy Season

Crop	New Variety Name
Pigeonpea	2043 B
Peanut	Sinn Pa De Tha (8)
Green gram	Agriculture (1) and Yezin (11)
Sunflower	Sinn Shwe Kyar (3)

To be able to find out whether new varieties are locally adaptable or not, systematic data collection was done from the sowing time to harvesting time. The results of new varieties are summarized in the following tables and suggestions are given below:

Pigeon pea new varieties 2043 (B) is produced by Tut Kone Reserach Farm. That new variety is not yet submitted to National Seed Committee (NSC) to get confirmation. When it is cultivated competitively with local variety (late), it is found that 2043 (B) is of medium age and flowerings are the same and there is no difference in yields. It is learnt that trial should be extended to produce grain in CDZ. Especially, it is suitable for Upper Myanmar because it is the variety which is less infested with pests / insects and diseases.

Table 5.7.12 Characteristics of 2043 B

Item	Description
Life Period	155 days
Plant Height	121 cm
Pods per Plant	86 pods
Seeds per Pod	3.2 seeds
100 Seeds Weight	20 gm
Yield per Acre	15 baskets

Peanut new variety Sinn Pa Da Tha (8) cultivated in 2 target townships got promising yield and there were no signs of leaf spot disease. It is found that farmers like new variety than local variety SP 121 because the sizes of pods and grains are bigger than those of SP 121 variety. A suggestion is that if more detailed supervision is given, the yield can be promoted to 'Goal Yield'.

Table 5.7.13 Characteristics of Sin Pa De Tha-8

Item	Description
Life Period	105-110 days
50 % flowering	24 days
Plant Height	40 cm
Pods per Plant	16 pods
Seeds per Pod	1-2 seeds
100 Seeds Weight	46 gm
Seed Color	Pink
Yield per Acre	55 baskets

Two new varieties of green gram (Agriculture - 1 and Yezin - 11) are much more pest/ insect-resistant and disease-resistant than Yezin (4). The yield of Yezin (11) is higher and promising while Agriculture (1) has not performed well in its yield. For Yezin (11), it has an advantage of labor saving because the variety bears seeds in a certain period while the local one has longer time of bearing seeds.

Table 5.7.14 Characteristics of Agriculture (1), Yezin (11)

Item	Description	
	Agriculture (1)	Yezin (11)
Life Period	70-75 days	65 days
50 % flowering	40 days	35 days
Plant Height	38-45 cm	38.1 cm
Pods per Plant	10-15 pods	12 pods
Seeds per Pod	8-9 seeds	10 seeds
100 Seeds Weight	7.5 gm	5.5 gm
Seed Color	Yellowish Green	Black
Yield per Acre	8-10 baskets	15 baskets

In CDZ, Yezin (11) and Yezin (12), currently cultivated ones, should be cultivated on an extended scale, it is learnt. Farmers like these two varieties because the plants are short, more branches appear, there are more mature seeds and they can be harvested earlier. They are free from mosaic disease.

Sunflower new variety Sinn Shwe Kyar (3) produces higher yield than local variety. The size of flower is of medium size and the quantity of grains is good. It should be cultivated on an extended scale in places where sunflower is cultivated. Its age is short and it is suitable for places where water is scarce.

Table 5.7.15 Characteristics of Sinn Shwe Kyar (3)

Item	Description
Life Period	90 days
Plant Height	115 cm
Seeds per Cob	357 seeds
100 Seeds Weight	55 gm
Seed Color	Black
Yield per Acre	27 baskets

Table 5.7.16 Result of the Trial (Pigeon Pea in 2008 rainy season)

Sr.	Township	Local Variety		DAR Variety		Remark
		Local	Yield, basket	2043(B)	Yield, basket	
1.	Ayadaw	local	16.0	2043(B)	15.0	
2.	Tada-U			2043(B)		Not Available
3.	Chauk	Sarr Taung	8.0	2043(B)	10.0	
4.	Pwintbyu	Shwe Din Gar	11.0	2043(B)	12.0	(average)
Average		11.7		12.3		

Table 5.7.17 Result of the Trial (Peanut in 2008 rainy season)

Sr.	Township	Local Variety		DAR Variety		Remark
		Local	Yield, basket	Variety	Yield, basket	
1.	Ayadaw	SP 121	43.0	Sinn Pa De Tha (8)	62.00	
2.	Ngazun	SP 121	55.5	Sinn Pa De Tha (8)	62.59	
Average		49.3		62.3		

Table 5.7.18 Result of the Trial (Green gram-1 in 2008 rainy season)

Sr.	Township	Local Variety		DAR Variety		Remark
		Variety	Yield, basket	Variety	Yield, basket	
1.	Ayadaw	Yazin (4)	13.00	Agriculture (1)	10.00	
2.	Tada-U	Variety from broker	7.50	Agriculture (1)	8.75	
3.	Ngazun	-	-	Agriculture (1)	10.57	
4.	Chauk	local	8.00	-	-	
5.	Pwintbyu	Mya Kyay Mon	12.19	Agriculture (1)	12.64	
Average		10.2		10.5		

Table 5.7.19 Result of the Trial (Green gram-2 in 2008 rainy season)

Sr.	Township	Local Variety		DAR Variety		Remark
		Variety	Yield, basket	Variety	Yield, basket	
1.	Ayadaw	Yezin (12)	14.0	Yezin (11)	14.00	
2.	Tada-U	-	-	Yezin (11)	10.00	
3.	Ngazun	-	-	Yezin (11)	16.51	
4.	Chauk	-	-	Yezin (11)	12.00	
5.	Pwintbyu	-	-	Yezin (11)	15.23	
Average		14.0		13.6		

Table 5.7.20 Result of the Trial (Sunflower in 2008 rainy season)

Sr.	Township	Local Variety		DAR Variety		Remark
		Variety	Yield, basket	Variety	Yield, basket	
1.	Ayadaw	San Pho La	15.00	Sinn Shwe Kyar (3)	27.0	
2.	Tada-U	Ka Di Pa	18.75	Sinn Shwe Kyar (3)	25.0	
Average		16.9		26.0		

Table 5.7.21 Summary of the Result for the New Varieties of Rainy Season Crops

No	Crop	Variety		Period		Plant height		Pods/Plant		Seed/pot		Yield (basket)	
		New	Old	New	Old	New	Old	New	Old	New	Old	Old	New
1	Pigeon pea	2043(B)	Local	155	155	4' 5"	5' 4"	86	93	3.2	3.3	11.7	12.3
2	Groundnut	Simpedathar	SP 121	96	100	18"	18"	11	14	2	1.6	49.3	62.3
3	Greengram	Agri (1)	Local	83	87	20"	25"	12	18	10	9	10.2	10.5
		Yezin (11)	Yezin (12)	79	74	20"	18"	14	14	11	11	14.0	13.6
4	Sunflower	Sinshwekyar	Sanfola	90	95	115	110	-	-	357	287	16.9	26.0

According to the test trial, new varieties such as peanut (Sinn Pa De Tha (8)), green grum (Yezin 11), sunflower (Sinn Shwe Kyar (3)) can probably give better yield as compared to conventionally cultivated local varieties.

6.2) Winter Crops Test Trial

Following table summarizes the rainy season crops cultivated on trial basis in FY 2008/09 and also the TS and villages where the crops were tried.

Table 5.7.22 Winter Season Crops cultivated on Trial and Townships

Sr.	Township	Winter Crops						Remark
		Sesame	Maize	Chickpea	Green gram	Groundnut	Sunflower	
1.	Ayadaw	1	3	-	-	1	-	
2.	Myinmu	-	3	1	1	1	-	
3.	Tada-U	-	3	1	-	1	1	
4.	Ngazun	-	3	1	-	1	1	
5.	Chauk	-	3	1	1	-	1	
6.	Pwintbyu	1	3	-	1	-	1	
Total		2	18	4	3	4	4	35 plots

Table 5.7.23 The villages tried for winter Crops

Sr..	Township	Nos. of Village	Demonstration Plots 2008-Winter Crop / village					
			Sesame	Maize	Chickpea	Green gram	Groundnut	Sunflower
1.	Ayadaw	3	Myay Net	Ku Doe Gine	Ku Doe Gine	-	-	-
2.	Myinmu	5	Wun Pyae	Ma Gyee Kan	Wun Pyae	Wun Pyae	Wun Pyae	-
3.	Tada U	4	-	Chaung Khwa	Chaung Khwa	-	Chaung Khwa	Chaung Khwa
4.	Ngazun	4	-	Sin Phyu Kan	Nyaung Chin	Nyaung Chin	-	Nyaung Chin
5.	Chauk	4	-	Let Pan Kywun	Pa Khan Nge	Let Pan Kywun	-	Ywa Nge Kan
6.	Pwintbyu	4	-	Nyaung Pin Ywa	Kan Tha Gyi	Let Pan Nwe	-	Shwebo
	Total	24	2	6	6	4	2	4

The area of demonstration plot is 33' x 33' same as the trial for rainy season crops, and it is divided into two parts. A new variety is cultivated in one part in comparison with a local variety in other part. New varieties were purchased from Tut Kone (Nay Pyi Taw) Seed Farm and the names of new varieties are shown in the table right.

Table 5.7.24 New Varieties for 2008 Winter Crop

Crop	New Variety Name
Sesame	Sinn (3)
Peanut	Magway (15)
Maize	Yezin (3), Yezin (4), Yezin (5)
Green gram	Yezin (11)
Chickpea	Yezin (6)
Sunflower	Yezin (1)

Yields per acre of local varieties are summarized below in comparison with new varieties derived from Department of Agricultural Research, which were cultivated in (6) target townships in CDZ in winter of FY 2008/09. Suggestions are as follows:

Table 5.7.25 Characteristics of Sinn (3)

Item	Description
Life Period	95-100 days
50 % flowering	35-36 days
Plant Height	91-137 cm
Pods per Plant	120 pods
Seeds per Pod	68 seeds
100 Seeds Weight	3.2 gm
Seed Color	Black
Yield per Acre	10-15 baskets

For winter sesame, it is found that Sinn (3) new variety of DAR (Yezin) is better than local variety in yield, and it is a locally adaptable variety. Its yield

and market situation is balanced and so sesame cultivation and production can become higher than before. If destruction of green sand flies which cause sesame phyllody disease can be protected in advance, the yield will furthermore increase.

Concerning winter peanut (groundnut), Magway (15) marked higher yield than SP 121 local variety but lower than another local variety of Sinn Pa Da Tha (11). It is learnt that farmers like Magway (15), but it is necessary to be able to cultivate in time. In the dry zone, after sesame, peanut is the second important crop and so technologies for increasing yield per acre such as applying of lime/ rock phosphate, preventive measures for disease control and applying of boron and molybdenum of trace elements should be practiced.

Table 5.7.26 Characteristics of Magway (15)

Item	Description
Life Period	115 days
50 % flowering	30 days
Plant Height	45 cm
Pods per Plant	15 pods
Seeds per Pod	1-2 seeds
100 Seeds Weight	40 gm
Seed Color	Pink
Yield per Acre	50 baskets

When yields of new varieties and local varieties on maize are compared, it is found that yields of new varieties (average) are higher than those of local varieties. Farmers from Tada-U township have never seen maize and they have never experienced of cultivating it. So, sowing time was late and land preparation could not be done completely. As a result, it is found that the yield of Tada-U was the lowest. Farmers from Ayardaw township had no experience of maize cultivation either. For Pwintbyu township, there are only a few farmers who so far cultivated maize. Most farmers cultivate yellow maize variety of 'Ya (upland)' region. They also were lack of experience on maize cultivation. For these reasons, maize cultivation in the dry zone should be tried again, though, it is still necessary to arrange extension work and demonstration work for farmers.

Table 5.7.27 Characteristics of Yezin (3), Yezin (4), Yezin (5)

Item	Description		
	Yezin (3)	Yezin (4)	Yezin (5)
Life Period	105-115 days	105-115 day	105-115 day
50 % flowering	Nil	Nil	Nil
Plant Height	205 cm	195 cm	219 cm
Cobs per Plant	1.2 - 1.4	1.2	1.4 - 1.5
Seeds per Pod	Nil	Nil	Nil
100 Seeds Weight	Nil	Nil	Nil
Seed Color	Orange	Orange	Orange
Yield per Acre	100-110 bsk	Nil	100-105 bsk

For green gram, Yezin (11) variety is appreciated by farmers. It is a locally adaptable variety because its yield was good. It has a market and it is labor saving because the variety bears seeds in a shorter period than local variety. Therefore, it should be cultivated on an extended scale in the dry zone. The reason why its yield was low in Chauk TS is that Yezin (11) is not suitable to be cultivated as winter crops, just suitable for monsoon crop, because the yield of green gram in the rainy season was 12 baskets per acre. Table 5.7.21 shows characteristics of green gram.

Table 5.7.28 Characteristics of Yezin (11)

Item	Description
Life Period	65 days
50 % flowering	35 days
Plant Height	38.1 cm
Pods per Plant	12 pods
Seeds per Pod	10 seeds
100 Seeds Weight	5.5 gm
Seed Color	Black
Yield per Acre	15 baskets
Diseases Resistant	Masaic disease resistance

Concerning chickpea, although yield is not much different between local and new variety, the new variety (Yezin 6) was found promising because local varieties are not strong enough to resist fungus disease and stem-boring flies. Most of chickpea plants are easily destroyed by them, it is found. In the condition of bearing peas, Yezin (6) seemed to be better than V2 variety (local variety) at first. But Yezin (6) variety had a longer life period and so its growth stages are slow. It bears peas only when it is high. It is said that some farmers do not like it

Table 5.7.29 Characteristics of Yezin (6)

Item	Description
Life Period	85-90 days
50 % flowering	45 days
Plant Height	30 cm
Pods per Plant	35-42 pods
Seeds per Pod	1-2 seeds
100 Seeds Weight	32 gm
Seed Color	Yellow
Yield per Acre	18 baskets
Diseases Resistant	More resistant than ICCV2

very much. However, yield per acre and price per basket are higher than those of V2 variety. So, requests for Yezin (6) were received. A remarkable point from Ar La Ka Pa village in Myinmu TS was that farmers got high yield of chickpea because they could irrigate the plants at the time of pod-setting.

This sunflower new variety Yezin (1) should be cultivated in the dry zone, it is seen. By cultivating this variety in winter/ monsoon crop-field either as inter-cropping crop or as main crop, it can serve as trap-plant for pests/ insects. Besides, it is a locally adaptable variety. But in Chauk TS, the yield was low because there was a mistake in selecting demonstration plot, e.g. very sandy soils with less moisture holding capacities.

Table 5.7.30 Characteristics of Yezin (1)

Item	Description
Life Period	80-85 days
Seeds per Flower	1114 seeds
100 Seeds Weight	55.6 gm
Seed Color	Black
Yield per Acre	40-60 baskets

Table 5.7.31 Result of the Trial (Sesame in 2008 Winter Crop)

Sr.	Township	Local Variety		DAR Variety		Remark
		Variety	Yield, basket	Variety	Yield, basket	
1.	Ayadaw	Yoe Seinn	10.00	Sinn (3)	16.00	
2.	Chauk	Hnan Ni 25/160	7.00	Sinn (3)	15.00	
Average		8.50		15.50		

Table 5.7.32 Result of the Trial (Groundnut in 2008 Winter Crop)

Sr.	Township	Local Variety		DAR Variety		Remark
		Variety	Yield, basket	Variety	Yield, basket	
1.	Tada-U	SP 121	30.00	Magway 15	37.50	
2.	Myinmu	Sinn Pa De Tha (11)	51.81	Magway 15	45.58	
Average		40.91		41.54		

Table 5.7.33 Result of the Trial (Maize in 2008 Winter Crop)

Sr.	Township	Local Variety		DAR Variety		Remark
		Variety	Yield, basket	Variety	Yield, basket	
1.	Ayadaw	Su Wan	32.00	Yezin 3,4,5	42.60	
2.	Myinmu	CP 888	70.00	Yezin 3,4,5	77.00	
3.	Tada-U	Local variety	4.60	Yezin 3,4,5	6.00	
4.	Ngazun	CP 888	85.00	Yezin 3,4,5	75.00	
5.	Chauk	Hybrid (3)	40.00	Yezin 3,4,5	45.00	
6.	Pwintbyu	Yellow maize (yaw)	41.43	Yezin 3,4,5	55.31	
Average		45.51		50.15		

Table 5.7.34 Result of the Trial (Green gram in 2008 Winter Crop)

Sr.	Township	Local Variety		DAR Variety		Remark
		Variety	Yield, basket	Variety	Yield, basket	
1.	Myinmu	Yezin (4)	10.66	Yezin 11	14.20	
2.	Ngazun	V3 726	15.00	Yezin 11	16.00	
3.	Chauk	Yezin (7)	7.00	Yezin 11	8.00	
4.	Pwintbyu	Mya Kyay Mon	10.87	Yezin 11	13.91	
Average		10.88		13.03		

Table 5.7.35 Result of the Trial (Chickpea in 2008 Winter Crop)

Sr.	Township	Local Variety		DAR Variety		Remark
		Variety	Yield, basket	Variety	Yield, basket	
1.	Ayadaw	ICCV 2	17.50	Yezin 6	19.00	
2.	Myinmu	ICCV 2	17.95	Yezin 6	21.45	
3.	Tada-U	Karachi	15.75	Yezin 6	20.00	
4.	Ngazun	ICCV 2	12.00	Yezin 6	11.50	
5.	Chauk	Karachi	12.00	Yezin 6	15.00	
6.	Pwintbyu	Yezin 4	15.79	Yezin 6	11.92	
Average		15.17		16.48		

Table 5.7.36 Result of the Trial (Sunflower in 2008 Winter Crop)

Sr.	Township	Local Variety		DAR Variety		Remark
		Variety	Yield, basket	Variety	Yield, basket	
1.	Tada-U	Sanfola	18.75	Yezin 1	25.00	
2.	Ngazun	Sanfola	21.00	Yezin 1	20.50	

3.	Chauk	Sinn Shwe Kyar 3	5.00	Yezin 1	6.00	
4.	Pwintbyu	Sinn Shwe Kyar 3	11.74	Yezin 1	18.38	
Average		14.12		17.47		

Table 5.7.37 Summary of the Result for the New Varieties of Rainy Season Crops

No	Crop	Variety		Period		Plant height		Pods/Plant		Seed/pot		Yield (basket)	
		New	Old	New	Old	New	Old	New	Old	New	Old	Old	New
1.	Sesame	Sinn 3	Local	90	63	85cm	80cm	120	90	68	-	8.50	15.50
2.	Groundnut	Magway 15	Local	115	121	40 cm	40 cm	16	15	2-1	1-2	40.91	41.54
3.	Maize	Yezin 3,4,5	Local	86	86	200 cm	200 cm	Nil	Nil	Nil	Nil	45.51	50.15
4.	Green gram	Yezin 11	Local	67	67	38 cm	35 cm	14	14	11	11	10.88	13.03
5.	Chickpea	Yezin 6	Local	94	78	30 cm	30 cm	35	22	1-2	1-2	15.17	16.48
6.	Sunflower	Yezin 1	Local	102	102	115 cm	110 cm	Nil	Nil	350	280	14.12	17.47

6.3) Cotton (pre-monsoon: summer)

Depending on the time, there are (3) seasonal periods of cotton cultivation such as pre-monsoon (summer), mid-monsoon and late-monsoon. In connection with pre-monsoon cotton cultivation, Myanma cotton enterprise has been distributing Ngwe Chi (6) cotton variety to farmers. And there is another cotton variety imported from China by private traders named 'Ka Mar' (hybrid). The pilot project has tried the cultivation of 'Ngwe Chi (6)' cotton variety on trial and the cultivation of 'Ka Mar' (hybrid) cotton variety on trial in comparison with each other. Besides, the project also studied the situation of 'Ma Hlaing (5/6)', local variety, which was previously distributed by Myanma Cotton Enterprise.

Table 5.7.38 Characteristics of Ngwe Chi (6)

Item	Description
Plant Type	Indeterminate (round shape)
Stem color	Reddish Brown
Leaf color	Dark Green
Flower color	White
Plant Height	106 - 120 cm
Cotton Fruit Shape	Round
Branch with Fruit	1 (average)
Fruit per Plant (av)	20 - 50 (average)
Cotton Ball Weight	0.004 - 0.005 viss (5.6 – 8.2 kg)

The cultivation was tried in 2 villages in 2 townships as shown in Table 5.7.39, and according to the recorded data of Myittha township and Sint Kaing township, the situations of Ngwe Chi (6) and Ka Mar varieties could be learnt as in Table 5.7.40:

Table 5.7.39 The villages tried for Pre-monsoon Cotton

Sr.	Township	No. of village	Variety		Area Cultivated, ac	Remarks
			Ngwe Chi (6)	Ka Mar		
1.	Sint Kaing township	1	Moe Koung	Moe Koung	3 acre	
2.	Myittha township	1	Kyaung Pann Kone	Kyaung Pann Kone	4 acre	
	Total	2	2	2	7 acre	

Table 5.7.40 Cultural Practice and Yield of Ngwe Chi (6) and Ka Mar

Sr.	Particular	Ngwe Chi (6)	Ka Mar
1.	Seed requirement	(3) viss per acre	1.5 viss per acre
2.	Cultural Practice (spacing)	3' x 2' (with 2 plants left)	3' x 2' (with 2 plants left)
3.	Plant type	Indeterminate (straight upright)	Determinate (short and round)
4.	Plant population (per acre)	13,000	11,000
5.	Number of cotton flowers per plant	52.79	16.43
6.	Number of cotton flowers per viss	4.5	5
7.	Yield per acre	1,525viss (2,501kg/ac)	361.45viss, (593kg/ac)

When these two varieties were compared, we could see much difference in yield, e.g. 2,501 kg/ac for Ngwe Chi (6) and 593 kg/ac for Ka Mar. The reason was Ngwe Chi (6) variety is 'indeterminate type' and it produces many more branches after cotton has been picked once and irrigation had been done. So, the number of cotton buds increases and so does the yield. On the contrary, for Ka Mar (hybrid) variety, it is determinate type and flowering stage is only 'once'. Although the time of picking cotton is short and easy, it cannot compete with Ngwe Chi (6) in number of flowers and in

yield per acre. Not only studying on demonstration plots, but also studying on farmers' plots on which Ngwe Chi (6) were cultivated, it was learnt that Ngwe Chi (6) variety is more disease-resistant than other cotton varieties.

When cost and income of two varieties were compared in Table 5.7.31, although yield per acre of Ngwe Chi (6) variety from demonstration plot was over (1500) viss, the cost was increased by about half as compared to Ka Mar (hybrid) variety which produces (400) viss per acre at maximum. However since there is big difference in the yield, still net profit for Ngwe Chi (6) variety surpasses that of Ka Mar (hybrid) variety, e.g. 1,127,400 Kyats/ac for Ngwe Chi (6) against only 155,000 Kyats/ac for ka Mar (hybrid) variety.

Table 5.7.41 also shows the net profit of Ngwe Chi (6) under the yield of 400 viss unlike 1,500 viss. This is because some farmers may not be able to afford to apply chemical fertilizer as was in the demonstration farm. The net profit is now 223,500 Kyats/ac which is still higher than that of Ka Mar (hybrid) variety. Therefore, Farmers are more interested in Ngwe Chi (6) variety than Ka Mar (hybrid) China variety because its yield is stable and the higher yield can be enjoyed if it is well-looked after.

Table 5.7.41 Margin Analysis for 2 Cotton Varieties at Different Yields

Sr.	Particular	Ngwe Chi (6) Yield per acre: (1500) viss	Ka Mar (hybrid) yield per acre: (400) viss	Ngwe Chi (6) Yield per acre: (400) viss
1.	Land preparation	32,500	32,500	32,500
2.	Natural compost	20,000	20,000	10,000
3.	Chemical fertilizer	139,000	91,000	38,000
4.	Pesticide/ Insecticide	38,600	35,500	30,500
5.	Plant Protection (labour for spraying)	42,500	35,500	35,500
6.	Picking cotton	100,000	30,000	30,000
	Cost total, Kyats/ac	372,600	244,500	176,500
	Income per acre, Kyats/ac	1,500,000	400,000	400,000
	Net profit per acre, Kyats/ac	1,127,400	155,000	223,500

Source: JICA Study Team (based on MAS data)

In connection with study on Ma Hlaing 5/6 variety, a local variety cultivated in Ayardaw township, it still produces about (100) viss yield per acre. It was learnt that local variety was not as much pest-resistant as Ngwe Chi (6) and so the costs of pesticide and fertilizer were higher than Ngwe Chi (6) of (400) viss yield per acre. As a result, net profit became low in cultivating local variety.

6.4) Soil Test (pH) and Recommendation for Soil Condition

In conjunction with new variety test trial, soil tests were carried out by TS MAS officers. In The Central Dry Zone area, there are mainly two soils types prevalent. They are called Red brown savanna (Alfisol) and Compact (Vertisols). These soils are well correlated with poor weather conditions like low rainfall and hot weather climate. In general, their soil pH is above 6.5 and in some places it reaches as high as pH 8 and even 9.

Following are the pH results carried out in the field of new variety test trial. Measurement by a soil test kit and pH meter shows the indicator result of about pH6.5 - 8.5. pH from 6.5 to 7.5 is counted as within a normal range for most crops' cultivation in the CDZ, however pH over 7.5 usually starts giving some difficulties to crop growing. In some cases, pH reached as high as 8.5 where saline problems were showing up. In sum, though most of the soils and pH where new variety test trials were tried were suitable, some places showed salinity problems.

Table 5.7.42 Summary of the Result Soil Test

No.	Division	Township	Village	Soil type	pH	Crop
1	Sagaing	Ayadaw	Taw Hla	Compact	6.0	Pigeon pea
2			Ma Gyi Sauk	-do-	6.5	Groundnut
3				-do-	6.5	Green gram
4				-do-	6.5	Sunflower

5	Magway	Pwintbyu	Let Panwe, Alfisol	Alfisol	6.5	Green gram
6			Kan Thar Gyi	Compact	6.7	Chickpea
7			Let Panwe, Alfisol	Alfisol	6.5	Green gram
8	Magway	Chauk	Sadaung	-do-	6 - 7	Pigeon pea
9			Pakan Nge	-do-	7 - 8	Green gram
10	Mandalay	Tada-U	Nga Zin Yine	-do-	6.5 - 7	Sunflower
11				-do-	7 - 7.5	Green gram
12			Chaung Gwa	-do-	7	Green gram
13				-do-	7 - 7.5	Pigeon pea
14		Ngazun	Ywa Thit	-do-	6.5 - 8.5	Green gram
15			Ka Lar Ywa	-do-	6.5 - 8.5	Groundnut
16			Ywa Thit (East)	-do-	6.5 - 8.5	Green gram

Source: JICA Study Team

To get better yield, using better variety alone is not enough to achieve what is expected. There should always be selection of arable and suitable lands by crop as recommended below according to MAS guidelines:

Table 5.7.43 (1) Summary of the Recommendation by Crop and by Soil Condition

Particular	Pigeon pea	Peanut	Green gram	Sunflower
Soil Type	Good aeration	Sand-like soil / Sandy loam	Good aeration	Iron / Lime content
Soil Texture	Loam / Clay loam	Sandy loam / Sandy clay loam	Loam/ Clay loam	-
Soil pH (Recommendable)	5.5 - 8.2	5.4 - 8.2	5.5 - 8.2	5.0 - 5.8
Soil pH (the Best)	6.0 - 7.5	6.0 - 7.5	6.0 - 7.5	6.0 - 7.5
Soil Depth	More than 0.9 m	0.75 - 1.8 m	-	More than 1.5 m
Electricity Conductivity 1.5 ds/m	The yield will be reduced to 10%.	-	The yield will be reduced to 10%.	-
Electricity Conductivity 2.0 ds/m				The yield will be reduced to 100%.
Electricity Conductivity 2.3 ds/m	The yield will be reduced to 25%.		The yield will be reduced to 25%.	
Electricity Conductivity 3.5 ds/m		The yield will be reduced to 10%.		
Electricity Conductivity 3.6 ds/m	The yield will be reduced to 50%.		The yield will be reduced to 50%.	
Electricity Conductivity 4.1 ds/m		The yield will be reduced to 25%.		
Electricity Conductivity 4.9 ds/m		The yield will be reduced to 50%.		
Electricity Conductivity 6.0 ds/m		The yield will be reduced to 100%.		
Electricity Conductivity 6.5 ds/m			The yield will be reduced to 100%.	

Source: MAS Guidelines

Table 5.7.43 (2) Summary of the Recommendation by Crop and by Soil Condition

Particular	Sesame	Chick pea	Maize	Cotton
Soil Type	Good Aeration	Good Aeration	Good Aeration	Good Aeration
Soil Texture	Loam / Silty Clay loam / Silty loam / Clay loam	Silty loam / Clay loam	Silty / Silty Clay loam / Silty loam / Silty Clay	Silty clay / Silty Clay loam / Silty loam / Clay loam
Soil pH(Recommendable)	4.5 - 8.5	5.5 - 8.2	6.2 - 6.6	5.2 - 8.2
Soil pH(the Best)	5.8 - 7.0	6.0 - 7.5	6.6 - 7.0	6.0 - 7.6
Soil Depth	> 1 meter	> 1 meter	> 1 meter	> 1 meter
Electricity Conductivity 0.5 ds/m	The yield will be reduced to 5%	No yield reduction	The yield will be reduced to 5 %	No yield reduction
Electricity Conductivity 1.5 ds/m		The yield will be reduced to 10%		
Electricity Conductivity 2.0 ds/m				
Electricity Conductivity 2.5 ds/m	The yield will be reduced to 15 %	The yield will be reduced to 25 %	The yield will be reduced to 15 %	
Electricity Conductivity 3.6 ds/m		The yield will be reduced to 60%		
Electricity Conductivity 4.0 ds/m				
Electricity Conductivity 6.0 ds/m	The yield will be reduce to 40 %		The yield will be reduced to 40 %	
Electricity Conductivity 6.5 ds/m	The yield will be reduced to 60%	The yield will be reduced to 100 %	The yield will be reduced to 60 %	
Electricity Conductivity 7.7ds/m				
Electricity Conductivity 8.0 ds/m				The yield will

Electricity Conductivity 9.6 ds/m	The yield will be reduced to 100 %		not suitable	be reduced to 10 %
Electricity Conductivity 12 ds/m				The yield will be reduced to 25%
Electricity Conductivity 13 ds/m				
Electricity Conductivity 17 ds/m				The yield will be reduced to 50 %
Electricity Conductivity 27 ds/m				The yield will be reduced to 100 %

Source: MAS Guidelines

5.8 Pilot Project Implementation for Livestock Sector other than Training

Under the livestock sector for FY 2008/09, 3 pilot components were implemented in the selected 12 villages and 6 TS as shown in Table 5.8.1. The objectives of pro-poor oriented goat raising and pig raising programmes are same as those in FY 2007/08, which were proposed to improve living standard of the poor stratum such as landless households and small-scale farm households. Meanwhile, livestock feeding improvement program is to teach livestock owners proper knowledge about animal care, nutritious feeding, disease control etc.

As of beginning of February 2010, total goat population has increased from original 529 to 925 head including goats raising by 2nd generation beneficiaries. Moreover, number of beneficiaries has also expanded from original 120 to 190. Contrary to goat raising, piggery has seriously been affected by swine flu broken out in April 2009. As of February 2010, however, 56 pigs are still reared and in addition number of beneficaries has also increased from original 40 to 76 adding 36 beneficiaries of the 2nd generation.

Table 5.8.1 Summary of the Livestock Pilot Projects with those Objectives

Sector	Component	Village	Pilot Objectives
Livestock	08L1 Pro-poor oriented goat revolving programme	Thu Nge Daw Na Kyaw Hta Kan Ma Kyauk Ta Lone Ar La Ka Pa Boe Min Gyi Kin Za Yit North Pabe South Pabe Gwe Pin Cho Zee Bwa Legaing	· To increase income, especially for landless people and small scale farm households, by delivering 5 she-goats each. · To expand goat raising under the revolving system to other poor stratum
	08L2 Pro-poor oriented piggery revolving programme	Pha Yar Htoo Ar La Ka Pa Ga Doe Gine Kan Zwe	· To increase income, especially for landless people and small scale farm households, by delivering 2 piglets each for fattening. · To expand pig raising under the revolving system to other poor stratum
	08L3 Livestock feeding improvement programme	Tada U TS Ngazun TS Myinmu TS Ayadaw TS Chauk TS Pwintbyu TS	· To train livestock owners about proper feeding, animal care, disease control etc. · To improve lack of feeding sources · To teach livestock owners on how to make UMB concentrate · To increase power and productivity of ruminants

5.8.1 Outputs from the Pilot Implementation

The livestock related pilot projects had been started in August 2008, and it passed about 17 months after provision of the original stocks. Those pilot projects are observed going well so far as compared to FY 2007 projects though 19 beneficiaries had stopped goat raising, and piggery project had been affected by swine flue seriously. To date, number of beneficiaries of goat raising who had fulfilled the handover to 2nd generation beneficiaries has reached 58.

Concerning piggery, 40 original beneficiaries had finished fattening and handed over to 36 2nd generation beneficiaries to date despite severe condition of pig market with swine flu. Learned from FY 2007 project, local breed were procured to keep survival rate high because they are considered stronger than hybrid one. These outputs are summarized in the following Tables 5.8.2 – 5.8.4.

Table 5.8.2 Summary of the Outputs by Livestock Pilot Projects

Sector	Component	Village	Major Outputs from the Pilot Implementation
Livestock	08L1 Pro-poor oriented goat revolving programme	Na Kyaw Hta	· 41 original goats were delivered to 10 landless beneficiaries. Of which 6 beneficiaries had fulfilled handover. · Semi-intensive management had stopped in late 2008. · 6 beneficiaries had stopped raising after handover. · Now 22 goats (19 does and 3 bucks) are being raised by 4 beneficiaries of 1st generation and 32 goats by 2nd generation of 6 beneficiaries respectively.
		T hu Nge Daw	· 55 original goats including 10 kids were delivered to 10 beneficiaries including 2 landless HHs. · 8 beneficiaries of 1st generation had finished revolving to 8 beneficiaries of 2nd generation, and then they had stopped raising. · Now 22 goats by 3 beneficiaries of 1st generation and 41 goats by 2nd generation are being raised continuously.
		Kan Ma	· 42 original goats were delivered to 10 beneficiaries including 6 landless HHs. · Goat raising is still continued by 1st (10 members) and 2nd (6 members) generation. · Handover was done in December 10 2009. · Now 37 goats by 1st generation and 27 by 2nd generation are raised.
		Kyauk Ta Lone	· 54 original goats (50 adults and 4 kids) were delivered to 10 beneficiaries including 2 FHHs and 21 kids were born to date. · 2nd group of the 1st generation has stopped raising after revolving · 1st generation has just fulfilled handover in Jan 1st 2010. · Now 32 goats by 1st generation and 50 by 2nd generation are raised.
		Ar La Ka Pa	· 42 original goats (40 female and 2 male) were delivered to 10 landless beneficiaries, and organized 2 groups. · Both groups had fulfilled handover 42 goats to 10 members of 2nd generation. · Now 42 goats by 1st, and 45 goats by 2nd generation are being reared.
		Boe Min Gyi Kin	· 50 original goats including 5 kids were delivered to 10 beneficiaries (FHHs) composed of 2 groups (5 members each). · Both groups had fulfilled handover of 44 goats to 2nd generation of 10 members of also two groups. · Now 57 goats by 1st and 70 by 2nd generation are being raised.
		Za Yit	· 52 original goats (50 adults and 2 kids) were delivered to 10 landless beneficiaries. · As of February 2010, no beneficiary has handed over yet. · Now 101 goats (76 does and 25 bucks) are raised, and ready to handover.
		Pabe (N)	· 42 original goats were delivered to 10 beneficiaries of landless HHs. · All of them had handed over totally 42 goats to 10 members of 2nd generation as of February 2010. · Now 35 goats by 1st and 41 by 2nd generation are being reared.
		Pabe(S)	· 42 original goats (40 does and 2 bucks) were delivered to 10 beneficiaries including 1 FHH. · However, no beneficiary has handed over even now (February 2010). · 1o members have already been nominated as 2nd generation. · Now 69 goats (59 does and 10 bucks) are being raised
		Gwe Pin Cho	· 42 original goats (40 does and 2 bucks) were delivered to 10 landless beneficiaries. · Handover from 1st generation has not yet finished as of February 2010. · Now 55 goats (46 does and 9 bucks) are being raised
		Zee Bwa	· 42 original goats (40 does and 2 bucks) were delivered to 10 landless beneficiaries. · 5 members of 2nd generation have been delivered 15 female goats from 1st generation. · Now 49 goats (43 does and 6 bucks) being raised

		Legaing	· 44 original goats (40 does and 4 bucks) were delivered to 10 landless beneficiaries. · 5 members of 2nd generation have been handed 20 goats from 1st generation. · Now 55 goats (43 does and 12 bucks) by 1st and 27 goats by 2nd generation being raised
	08L2 Pro-poor oriented pig revolving programme	Pha Yar Htoo	· 22 original piglets (11 female, 11 male) were delivered to 10 beneficiaries including 6 landless HHs. · All of them had fulfilled duty of handover, and then stopped raising because of price drop. · Now 6 members of 2nd generation are still rearing 10 piglets as of beginning of February 2010.
		Ar La Ka Pa	· 20 original piglets (7 female, 13 male) were delivered to 10 beneficiaries including 6 landless HHs. · All pigs were sold to handover after fattening. · But now only one beneficiary of the 1st generation and 10 beneficiaries of the 2nd generation are still rearing pigs.
		Ga Doe Gine	· 20 original piglets (9 female, 11 male) were delivered to 10 landless beneficiaries. · All pigs were sold for revolving to 10 2nd generation beneficiaries. · Now only 10 members of the 2nd generation are still rearing pigs.
		Kan Swe	· 20 original piglets (11 female, 9 male) were delivered to 10 beneficiaries including 3 landless HHs. · As of February 2010, 18 original pigs were sold after fattening but the village committee decided not to ask them handover considering low profit due to swine flu.
	08L3 Livestock feeding improvement programme	All of the villages above mentioned	· Demonstration and extension on UMMB making, general training on livestock, sanitation using ash and lime powder, disease control, castration etc were provided by TS LBVD officers for beneficiaries in concerned villages.

Table 5.8.3 Status of Goat Raising for FY 2008/09 (as of Jan/Feb 2010), No.1

1st Generation

Division	TS	Villages	Original Stocks Provided						Stocks Died			Kids Born			Handover			Goats Sold			Current Status		
			Adult			Kids																	
			F	M	Total	F	M	Total	F	M	Total	F	M	Total	F	M	Total	F	M	Total	F	M	Total
Mandalay	Tada U	Na Kyaw Hta	36	5	41	0	0	0	8	12	20	22	25	47	24	1	25	7	14	21	19	3	22
		Thu Nge Daw	38	7	45	7	3	10	6	3	9	33	19	52	35	6	41	19	16	35	18	4	22
	Ngazun	Kanma	37	5	42	0	0	0	7	16	23	15	27	42	24	0	24	0	0	0	21	16	37
		Kyauk Ta Lone	44	6	50	0	4	4	11	18	29	50	40	90	36	14	50	26	7	33	21	11	32
	Sut-total		155	23	178	7	7	14	32	49	81	120	111	231	119	21	140	52	37	89	79	34	113
Sagaing	Myinmu	Ar La Ka Pa	40	2	42	0	0	0	2	3	5	26	21	47	40	2	42	0	0	0	24	18	42
		Boe Min Gyi Kin	42	3	45	3	2	5	6	2	8	31	27	58	40	4	44	0	0	0	30	26	56
	Ayadaw	Zayit	50	2	52	0	0	0	19	7	26	45	30	75	0	0	0	0	0	0	76	25	101
	Sut-total		132	7	139	3	2	5	27	12	39	102	78	180	80	6	86	0	0	0	130	69	199
Magway	Chauk	Pabe North	40	2	42	0	0	0	19	11	30	40	32	72	38	4	42	0	7	7	23	12	35
		Pabe South	40	2	42	0	0	0	8	16	24	27	33	60	0	0	0	0	9	9	59	10	69
		Zee Bwa	40	2	42	0	0	0	34	17	51	40	33	73	15	0	15	0	0	0	31	18	49
		Gwe Pin Cho	40	2	42	0	0	0	11	12	23	21	22	43	0	0	0	4	3	7	46	9	55
	Pwintbyu	Legaing	40	4	44	0	0	0	5	9	14	27	19	46	19	2	21	0	0	0	43	12	55
	Sut-total		200	12	212	0	0	0	77	65	142	155	139	294	72	6	78	4	19	23	202	61	263
Total			487	42	529	10	9	19	136	126	262	377	328	705	271	33	304	56	56	112	411	164	575

Table 5.8.4 Status of Goat Raising for FY 2008/09 (as of Jan/Feb 2010), No.2

2nd Generation

Division	TS	Villages	Original Stocks Provided						Stocks Died			Kids Born			Handover			Goats Sold			Current Status		
			Adult			Kids																	
			F	M	Total	F	M	Total	F	M	Total	F	M	Total	F	M	Total	F	M	Total	F	M	Total
Mandalay	Tada U	Na Kyaw Hta	24	1	25	0	0	0	3	1	4	7	4	11	0	0	0	0	0	0	28	4	32
		Thu Nge Daw	35	6	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	6	41
	Ngazun	Kanma	24	0	24	0	0	0	0	0	0	2	1	3	0	0	0	0	0	0	26	1	27
		Kyauk Ta Lone	36	14	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	14	50
	Sut-total		119	21	140	0	0	0	3	1	4	9	5	14	0	0	0	0	0	0	125	25	150
Sagaing	Myinmu	Ar La Ka Pa	40	2	42	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	40	5	45
		Boe Min Gyi Kin	40	4	44	0	0	0	0	1	1	15	12	27	0	0	0	0	0	0	55	15	70
	Ayadaw	Zayit	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	Sut-total		80	8	88	0	0	0	0	1	1	15	15	30	0	0	0	0	0	0	95	22	117
Magway	Chauk	Pabe North	36	4	40	0	0	0	1	0	1	2	0	2	0	0	0	0	0	0	37	4	41
		Pabe South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Zee Bwa	15	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	15
		Gwe Pin Cho	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pwintbyu	Legaing	19	1	20	0	0	0	1	0	1	5	3	8	0	0	0	0	0	0	23	4	27
	Sut-total		70	5	75	0	0	0	2	0	2	7	3	10	0	0	0	0	0	0	75	8	83
Total			269	34	303	0	0	0	5	2	7	31	23	54	0	0	0	0	0	0	295	55	350

Table 5.8.5 Status of Pig Raising for FY 2008/09 (as of Jan/Feb 2010)

1st Generation

Division	TS	Villages	Original Piglets Provided			Pigs Died			Pigs Sold for Revolving			Piglet Born			Pigs Bought			Pigs Sold			Current Status		
			F	M	Total	F	M	Total	F	M	Total	F	M	Total	F	M	Total	F	M	Total	F	M	Total
Mandalay	Ngazun	Pla Yar Htoo	10	10	20	1	1	2	9	9	18	0	0	0	0	0	0	0	0	0	0	0	0
Sagaing	Myinmu	Ar La Ka Pa	7	13	20	0	4	4	7	13	20	6	8	14	0	0	0	0	0	0	6	4	10
	Ayadaw	Ga Doe Gine	9	11	20	0	0	0	9	11	20	0	0	0	0	0	0	0	0	0	0	0	0
Magway	Pwintbyu	Kan Swe	11	9	20	0	2	2	11	7	18	0	0	0	1	0	1	0	0	0	1	0	1
Total			37	43	80	1	7	8	36	40	76	6	8	14	1	0	1	0	0	0	7	4	11

2nd Generation

Division	TS	Villages	Original Piglets Provided			Pigs Died			Pigs Sold for Revolving			Piglet Born			Pigs Bought			Pigs Sold			Current Status		
			F	M	Total	F	M	Total	F	M	Total	F	M	Total	F	M	Total	F	M	Total	F	M	Total
Mandalay	Ngazun	Pla Yar Htoo	0	2	2	0	0	0	0	0	0	0	0	0	-	-	-	0	0	0	0	2	2
Sagaing	Myinmu	Ar La Ka Pa	7	13	20	0	0	0	0	0	0	0	0	0	-	-	-	0	0	0	7	13	20
	Ayadaw	Ga Doe Gine	10	10	20	0	0	0	0	0	0	0	0	0	-	-	-	0	0	0	10	10	20
Magway	Pwintbyu	Kan Swe	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	0	0	0	0	0	0
Total			17	25	42	0	0	0	0	0	0	0	0	0	-	-	-	0	0	0	17	25	42

5.8.2 Issues Arisen through the Implementation of Livestock Pilot Projects

During the 17 months after the delivery of goats and piglets, some issues have arisen to date. This section summarizes those specific issues arisen during the implementation of the livestock pilot components commenced in FY 2008/09.

1) Goat Raising

In FY 2008/09 pilot project, all the beneficiaries were selected by relevant LBVD officers in consultation with village representatives such as village PDC chairman, 100 households leaders, etc.

In Bo Min Gyi Kin and Thu Nge Daw villages, farm households were selected as beneficiaries; 10 farm households (FHHs) in the former and 7 FHHs in the latter. Target people should be selected mainly from landless HHs who are living on farm casual works and from poor strata in the CDZ, though some small scale farm households will be able to be beneficiaries.

Regardless of individual or collective management, all the beneficiaries constructed goat housing with raised floor at low cost learned from the lesson in FY 2007/08. Therefore, it is considered that goat's behavior preferring higher place has been understood by beneficiaries and also model-typed goat housing is good for healthier management of goats.

Though semi-intensive management had been tried by 2 groups (10 members) in Na Kyaw Hta village, which required more cost for feeds such as rice bran, broken rice etc, finally they had stopped this method in late 2009 and changed into normal grazing method because of high cost for feeding, and after that this group completely stopped goat raising.

A goat raising beneficiary in Zayit village who is in charge of herding for his group could buy a second handed bicycle by selling dung since other 4 members allowed him to use the profit of dung for his own use.

U Mg San, formerly a farm worker, could buy a bicycle selling goat dung of his group.

2) Pig Raising

In Pha Yar Htoo and Kan Swe villages, 6 farm households each out of total 20 members were selected as beneficiaries. Most of them are small scale farm households but more landless HHs should have been selected with high priority if considering purpose of the pilot project of reducing poverty.

In FY 2007/08, hybrid pig was provided to Legaing village but in this FY 2008/09, the pigs provided to 4 villages were all local breed. Villagers say that local breed is more tolerant for poor feeding condition than hybrid one. Therefore when we provide them piglets, we had better procure local breed nearby each pilot project village.

U Tin Mg Lwin, previously a farm labour but now he became a seed broker after fulfilling handover of the revolving pigs, which was his dream.

Feeding is also one of issues in piggery pilot project. All the beneficiaries say they feed purchased rice bran and broken rice almost every day for which they have to spend 250 to 330 Kyats for 2 pigs in addition to kitchen waste. In order to get higher profit from piggery, feed cost must be reduced by using more kitchen waste, water hyacinth etc.

We should consider suitable fattening period to make pig bigger and to sell them at higher price as much as possible taken into consideration lessons in Legaing village in FY 2007/08. Therefore, it is required for committee and TS LBVD officers to monitor fattening condition of pigs to decide when to sell them at the suitable marketable live body weight.

3) Improved Feeding System (inclusive of UMB making)

Beneficiaries of goat raising revolving project are making UMMBs at a village under guidance of a TS LBVD officer.

Generally speaking, villagers are not so interested in animal care, animal health, nutritious feeding and disease control, which are very important factors to realize higher productivity and low mortality rate of animals. Though TS LBVD officers visited their villages in charge more frequently than usual as shown in Table 5.8.5, and met many villagers as shown in Table 5.8.6, all activities they had tried to expand have not been well disseminated as we had expected as of February 2010. For example, demonstration on UMMB making were done in the concerning villages but no beneficiaries have tried to use it after the demonstration. The reasons for low interest in UMMB will be attributed to low awareness of people about healthier feeding for goats and also lack of money to purchase raw materials, etc.

Table 5.8.6 Number of Times Visiting Villages by TS LBVD Officers

TS	Number of Times Visiting Villages		Total	Remarks
	July to October '08	Oct.'08 to Jan. '09		
Ayadaw	48	25	73	
Ngazun	45	31	76	
Tada U	47	45	92	
Myinmu	30	32	62	
Chauk	96	32	138	
Pwintbyu	45	30	75	

Source: Data recorded at relevant TS LBVD Offices

Table 5.8.7 Accomplishment in 6 TSs (as of February 2009)

Activity		Accomplishment to Date			
		Extension		+ Demonstration	
		Nr. of Villages	Nr. of Participants.	Nr. of Villages	Nr. of Participants.
1	UMMB making	104	3,501	34	896
2	Improved livestock housing	70	2,489	35	533
3	Urea treated straw	68	2,239	43	541
4	Castration	189	1,208	188	1,034
5	Disease control	373	8,761	275	7,789
6	Pasture development (ipil ipil)	120	1,815	28	525
7	Disinfection	126	2,932	48	1,637
8	General training on livestock	273	4,369	15	348
9	Silo/silage making	10	218	14	246
Nr. of Villages / Villagers (Net)		401	10,038	294	7,789

Source: Data recorded at relevant TS LBVD Offices

5.9 Pilot Project Implementation for Cottage Industry

Under cottage sector, there is only one programme that is 08C1 Village Revolving Fund Establishment pilot project. Under this project, there are 3 sub components as 1) tractor provision to Ar La Ka Pa village, 2) engine weaving equipment provision to Ma Gyi Sauk village, and 3) manual weaving machine provision to Magyi village. In fact, for the first 2 villages, village level revolving fund is to be pursued while in Magyi village, only group revolving is planned since the scale is not so big to cover all the village.

Table 5.9.1 Summary of the Cottage Pilot Projects with those Objectives

Sector	Component	Village	Pilot Objectives
Cottage	08C1 Village Revolving Fund	Ar La Ka Pa	· To establish a village revolving fund through providing tractor to be used for agriculture enhancement.
	08C1 Village Revolving Fund	Ma Gyi Sauk	· To establish a village revolving fund through providing equipment and machineries for the promotion of cottage industry in the village.
	08C1 Village Revolving Fund	Magyi	· To establish a group revolving fund through providing equipment and materials for the promotion of weaving industry in the village.

5.9.1 Outputs from the Pilot Implementation

Outputs are summarized in the following Table 5.9.2.

Table 5.9.2 Summary of the Cottage Pilot Projects with those Objectives

Sector	Component	Village	Major Outputs from the Pilot Implementation
Cottage	08C1 Village Revolving Fund	Ar La Ka Pa	· One tractor was provided, and as of January 2010 net 1,220,125 Kyats was saved and parts of it were utilized for village development activities.
	08C1 Village Revolving Fund	Ma Gyi Sauk	· An additional knitting machine and one engine-weaving machine were provided, and as of January 2010 net 1,075,970 Kyats was collected (of it, 594,200 was loaned out to engine weaving sector).
	08C1 Village Revolving Fund	Magyi	· Five multiple layer manual weaving machines were provided, and 42,450 Kyats has been collected as of January 2010.

5.9.2 Issues Arisen through the Implementation of Cottage Pilot Projects

This section summarizes the issues arisen during the implementation of the cottage pilot components in FY 2008/09. In this section, specific issues in each particular pilot component are summarized:

1) Village Revolving Fund Establishment in Ar La Ka Pa Village

Ar La Ka Pa village has a population of 6,401 persons and 1,263 households. Of all the households, 690 own farmland (including farmers owning under 5 acres) and 573 households are farmers. Main crops cultivated in Ar La Ka Pa village are paddy, groundnut, cotton and sesame in rainy season and wheat, groundnut and chickpea in winter. About half the total households earn their living depending on agriculture.

So, villages' request to provide a tractor was reasonable, which was changed from the original plan of road shop, and it could be a helping hand to improve agricultural sector. It can be assumed that villagers made a right decision. It is sure that the tractor will be able to serve in one way or another for total arable land of 6,837 acres (lowland (le) 1,916 acres, upland (Ya) 4,174 acres and Kaing Kyun 747 acres).

Tractor purchasing group from Ar La Ka Pa village, who are keen to find a good-quality tractor, made strong efforts to be able to purchase a tractor. The Project made known the amount of money, which would be provided for purchasing a tractor to villagers and gave necessary assistance to villagers. It is clear that villagers were very eager to buy a tractor of good quality. It can be seen by the fact that

they had by the time saved 1,000,000 Kyats as village fund to be able to buy a good tractor, on their side. A tractor worth of 8,600,000 Kyats could be successfully bought. The tractor was Zector 67/11 made in Chekoslovakia. It was of 65HP. Together with a tractor were a 3-teeth plough, a 16-tooth harrow, and an E-50 rotary, it was learnt.

The tractor and its accessories provided to Ar La Ka Pa *Village by the Project.*

Tractor Committee was formed with 17 members. They were 1 group leader, 1 accountant, 1 auditor, 1 for tractor maintenance, 1 tractor operator, 1 treasurer and 11 members. The Committee was formed with such members for sustainability of tractor and for being able to refund the prescribed installment for the cost of tractor to the Main Committee. The Main Committee was to keep the profits gained from tractor rental so that village revolving fund could be established.

The prime aim of Tractor Committee was to purchase one more Tractor after saving the profits gained from tractor rental. By so doing, they aimed to save more fund for village development activities. JICA Study Team Leader reminded the tractor committee to consider about the current price of tractor when it was purchased not to exceed than the limited budget. And then he also advised the committee to refund the installments for the cost of tractor equivalent to the price of farm-gate rice so that the installments would be consistent with the inflation of different years. As the years went by, the price of rice would become higher and so would the price of tractor.

When the Main Committee kept those funds gained from the tractor refundment, they arranged to carry out a double-effective plan for villagers who were really in need of help for some money. That plan was to establish a village fund;

Co-operative Counterpart of the Project explains necessary things to members of Tractor Committee of how to keep financial statistics and rules and regulations of co-operative.

1) All the income from tractor rental fee by the user farmers shall be first submitted to the Main Committee and necessary expenses for maintenance, diesel, engine oil, etc. by the tractor committee is to be returned to the tractor committee.
2) A responsible person from township co-operative and a village PDC Chairman and other members will be included in the Main Committee.
3) The Main Committee would keep the refundment submitted by the tractor committee and during that period, the Main Committee would disburse out loans to villagers who were really in need of help (with 2% to 5% interest), or otherwise spend for the purpose of village development.
4) The villager would have to repay the loans within the limited period and by so doing village fund was planned to increase.

The Tractor Committee, in accord with the guidance of Co-operative Counterpart, kept the financial accounts of tractor rental such as income and expense according to the rules and regulations of

co-operative. The following is the up-to-date record of income and expense of a tractor, from which we can know there is already over 1 million Kyats savings. In addition, so far 2 times disbursements were done for village development; 1) payment of buying a bull (300,000 Kyats relating to the improvement of one of FY 2007/08 pilot project of '07L5 Local Cattle Improvement', and 2) repairing motor for animal drinking water 115,000 Kyats). Though loaning to poor villagers with low interest has not yet started as of January 2010, the village fund seems bright in future.

Table 5.9.3 Balance Sheet of Tractor from November 2008 to January 2010

Date	Particulars	Income Kyats	Expenditure Kyats	Balance Kyats	Remarks
Nov, 2008 - Jan, 2010	Harrowing (223) ac	1,884,000			
	Ploughing (131.7) ac	1,978,000		3,862,000	
	Driver		237,450	3,624,550	
	Diesel		1,423,350	2,201,200	
	Stationery		10,025	2,191,175	
	Maintenance		363,350	1,827,825	
	Building to store the tractor		192,700	1,635,125	
	Payment for buying Bull		300,000	1,335,125	V. development
	Repairing Motor for animal drinking water		115,000	1,220,125	V. development
	Total	3,862,000	2,641,875	1,220,125	

Source: Income and expenditure record of tractor committee

2) Village Revolving Fund Establishment in Ma Gyi Sauk village

In Ma Gyi Sauk village, there are already 3 cottage groups of embroidery, knitting, and weaving. The members of these groups have to pay rental fee of the machines to the main committee established at the village level, which is the basic mechanism of village revolving fund. Aside from the cottage activities, livestock beneficiaries and/or agricultural beneficiaries under relevant pilot projects in this village can also contribute to this village fund.

Of the 3 cottage industries, the most successful one is knitting. This pilot strenghtened the knitting cottage activity by providing additional one double layer knitting machine in 2008 (in 2007, 5 machines were provided). Also provided was an additional engine-weaving machine (in 2007, 2 already provided). No additional embroidery machine was provided in FY 2008/09 since this business was not brisk. As of mid October 2008, knitting group had organized another sub- group (6th group) and was provided with a double layer knitting machine and raw material during October 2008. An engine driven weaving machine was procured in early February 2009 and installed in mid February 2009.

As aforementioned, the income to the fund is rental fee for those machines. The rental fees are;

Knitting machine:

- 6,000 Kyats per month if used under monthly contract,
- 200 Kyats per day use

Embroidery machine

- 3,500 Kyats per month, then changed to 50 – 200 Kyats per product and then changed to 150 Kyats per day use

Engine weaving:

- 20,000 Kyats per month

Aside from the incomes above, the committee received another income from livestock sector by selling sheep and goat and also from interest for raised bed onion cultivator. The total income arrives at 1,195,470 Kyats as of January 2010, and total expenditure at 119,500 Kyats which is mostly for

repairing and maintenance. The balance therefore arrives at 1,075,970 Kyats as of January 2010. Out of this balance, total 594,200 was lent out to the engine weaving sector. The engine weaving needed about 400,000 Kyats to prepare for raw materials and another 100,000 Kyats for mechanical adjustment, etc. The Table 5.3.9 shows although the revolving is made only within the groups, it is at least helping one sector from the other sectors. Without this mechanism, the engine weaving sector would have stopped completely.

Table 5.9.4 Balance Sheet of the Revolving Fund at Ma Gyi Sauk Village as of Jan. 2010

No.	Item	Total Income (Kyats)	Total Expenditure (Kyats)	Cash Balance (Kyats)	Remark
1	Knitting	340,600	88,000	252,600	252,600 lent to weaving sector
2	Embroidery	45,100	3,500	41,600	41,600 lent to weaving sector
3	Motorized weaving	28,000	28,000	-	All for repair
4	Sheep and goat raising	766,770	-	766,770	300,000 lent to weaving sector 26 sheep and 73 goat sold.
5	Raised bed onion	15,000	-	15,000	
	Total	1,195,470	119,500	1,075,970	All together 594,200 Kyats lent to weaving sector

Source: Accounting records from the Main Committee at Ma Gyi Sauk village

3) Group Revolving Fund Establishment in Magyi village

Weaving group in Magyi village was provided with 5 unit of multi- layer hand looms and raw material during the 2nd week of October 2008 and the beneficiaries had started using them under the revolving fund rules. By the end of October 2008, each loom had produced minimum 8 sets to maximum 15 sets of products by the beneficiaries. A wrap wheel was additionally purchased at Amarapura at the end of December 2008 and the wheel (rotor) for weaving group was sent to the village on 16th January 2009.

The group had been producing cloth for Thailand market, and from November 2008 to January 2009, they had produced 83 sets of the cloths. One set of the cloth fetched a net profit of about 1,500 Kyats, totaling to 124,500 Kyats (1,00 x 83 sets). This gave one beneficiary 8,300 Kyats per month as average net profit. In this area, daily wage of farm casual labor was 500 Kyats, and if they were engaged in the farm wage work they could have earned over 10,000 Kyats (500 x 20 days). Why the profit was so small was the shrinkage of the Thai market on which they used to heavily depend. Apart from the profit to the members, they submitted to the group fund 300 Kyats per set of woven product as rental fee of the machine.

From February 2009, they started to weave a cloth for Kachine race since the market in Thailand has not been recovered due to prolonged financial problem associated with the world-wide crisis. They wove total 30 sets of the cloth during 3-month period, and earned about 60,000 Kyats as net profit. After that, they explored local market and intermittently continued the weaving.

Multiple layer weaving machine, which can weave sophisticated design.

During the month of October 2009, U Myo Win, a loom-master and designer, came to the village and advised to change the old design into a new one because previous products earned no order from border area market and the new design has a market at present. The new design was woven on 4 looms. When finished products were obtained, they bought only 1 product as a sample.

Therefore, the beneficiaries found it difficult to sell their finished products. For Ma Naing group, they got only income from 1 set finished product out of 8, and they

were also in trouble because the rest 7 sets of finished product are to be accepted at the price of 4,000 Kyats per set with late payment (settlement). From Ma Swe, only 1 piece could be produced and production was under pause. For the finished products produced from Ma Maw's loom, they have been sold for 5,000 Kyats per piece after finding retail customers with late settlement, it was learnt.

As such, these 4 looms which have produced new designs came to halt in October 2009. They also presented that previously before the looms were provided by the project their job opportunity was good because border area market was booming at that time and world financial crisis not yet occurred. Now, although they have village-owned looms provided by the project, they face with dormant market of multi-layer ribbon and cotton products due mainly to not-yet recovered economy at the Thailand border areas.

Only Ma Maw's loom was in running and producing cloths. She can lay emphasis on weaving, creating popular designs on the market, because she has more capital than any other weavers and she runs a small snack shop. That's why she can make efforts for popular designs on the market.

Till end January 2010, the weaver group has accumulated the group fund, original of which is rental fee of the weaving machines as well as wrapping wheel, as shown in the table below. So far, they have saved 43,850 Kyats from the weaving machine and another 1,400 Kyats from wrap wheel. Since their business is not brisk, it may take some time to accumulate enough amount with which they embark on new activities:

Table 5.9.5 Group Fund Saved as of End December 2009

No.	Name	Production (Weaving)			Income	Net Profit	Payment for Revolving Fund
		Set	Longyi	Shirt			
1	Ma Naing	55			357,500	157,380	16,500
2	Ma Su Khine						
3	Ma Wai	26	20		249,000	44,500	10,800
4	Ma Swe						
5	Ma Maw	34	39	4	391,000	144,500	16,550
	Total-1	115	59	4	997,500	346,380	**43,850 (weaving)**
No.	Name	Production (wrap wheel)			Income	Net Profit	Payment for Revolving Fund
		black	color	total			
1	Ma Nu Khine	1	6	7	10,300	8,900	**1,400 (Wrapping)**
	Grand Total				**1,007,800**	**355,280**	**45,250**

Source: Accounting record of the group, Magyi village

5.10 Pilot Project Implementation for Living Improvement

Under living improvement sector, there are 3 pilot projects which are summarized in the table below with the objectives. Of the 3 pilot projects, 08I2 paddy husk power generation project took long time to get land acquisition permission from the authority. In fact, the permission came in January 2009, and the construction started in the beginning of February 2009. Though the project was completed within February 2009, test operation is now under way as of end of February.

As per 08I1-2. Improved Cooking Stove Promotion Pilot Project, a trial was carried out in Magyi village at first. In that village, one stove was demonstrated and then the villagers started disseminating it by themselves. Till February 2009, there are about 20 stoves in Magyi village apart from the planned 3 villages.

Table 5.10.1 Summary of the Living Improvement Pilot Projects with Objectives

Sector	Component	Village	Pilot Objectives
Living Improvement	08I1-1. Firewood Substituting Bio-fuel 08I1-2. Improved Cooking Stove	Nga Zin Yine Kan Pyuu Pabe North	· To save firewood as well as cooking time by introducing energy efficient cooking stoves.
	08I2. Paddy Husk Power Generation	Mon Taw Gyi	· To supply electricity to villagers by bio-gas from paddy husk.
	08I3. Children's Nutrition Improvement	Pabe North	· To improve under-nutritional children in the village. · To provide a venue for the villagers toward collective action for village development

5.10.1 Outputs from the Pilot Implementation

Outputs are summarized in the following Table 5.10.2.

Table 5.10.2 Summary of Major Outputs from the Living Improvement Pilot Projects

Sector	Component	Village	Major Outputs from the Pilot Implementation
Living Improvement	08I1-1. Firewood Substituting Bio-fuel 08I1-2. Improved Cooking Stove	Nga Zin Yine Kan Pyuu Pabe North	· One set of Jetropha oil extractor was provided to the target 3 villages. · Upon demonstrating of improved stove, about 10 stoves have been used in Nga Zin Yine village, no one in Kan Pyuu, and more than 100 households, almost all, in Pabe North village.
	08I2. Paddy Husk Power Generation	Mon Taw Gyi	· One paddy husk generator was established, and all 380 households are provided with electricity.
	08I3. Children's Nutrition Improvement	Pabe North	· One nutrition improvement center was established and till January 2009, 3 batches of children composed of about 60, were provided lunch 3 times per week. · The center is utilized as a venue for village meeting, Buddha's book reading for elder villagers, and as a assembly place of village life and livelihood improvement, etc.

5.10.2 Issues Arisen through the Implementation of Cottage Pilot Projects

This section summarizes the issues arisen during the implementation of the living improvement pilot components in FY 2008/09. In this section, specific issues in each particular pilot component are summarized:

1) 08I1-1 & I1-2 Firewood Substituting Bio-fuel and Improved Cooking Stove Promotion

Demonstration of making energy efficient cooking stove was firstly conducted in Magyi village on 4th October 2008. It was the trial if what was made could be useful or not. On 25th November, 13 villagers in Magyi continued to make for their own household use, and it was proved good in use. It could save firewood by about half. With this successful trial, improved cooking stove was extended in 3 villages as Naga Zin Yine, Kan Pyuu and Pabe North late 2008.

Through the extension, 2 kinds of stove were introduced as shown in the photos below. Basic concept between the 2 stoves is more or less same as it is enclosed with clay soils in order to ensure energy efficiency which can contribute to reducing firewood for cooking. The stove, shown in left photo, is a little sophisticated one by having 2 cooking places. Advantage associated with this stove is that, of course, it can cook 2 meals simultaneously contributing more firewood saving. The inner side of this stove is structured in 2 stories and ash can drop from the upper room where firewood is burnt to the down room through iron grating. This structure can facilitate even wet firewood to be burnt easily by blowing air from the downside room.

Photo 1: An improved stove having 2 cooking places and the inner room is structured in 2 stories.

Photo 2: Another type of cooking stove, simpler one. Has one cooking place only.

The stove in right (Photo 2) has simpler structure than the first one, which cooks only one item at a time (smaller hole at the end of the body is chimney). The simple one is not structured in 2 stories but still has same function to some extent. Placed at the bottom is iron grating through which ash can drop to a hole made underneath the stove though the function is not as efficient as the 2-storied one. This stove is in fact movable, so that users can move from inside of kitchen house to outside, e.g. to house compound, reducing the risk of catching fire. In fact, there are many villagers who prefer cooking outside to inside the kitchen house during summer because they want to avoid the risk of catching fire.

1.1) No outcome in a village where abundant firewood available: Kan Pyuu village

In Kan Pyuu village, an improved stove same as the one shown in Photo 1 was made during the demonstration in October 2008. It was used by the family at first, but a couple months later, it was left unattended and has not been used to date. No extension to other households in the village was made. It is observed that the villagers are not interested in constructing the improved stove due mainly to following facts:

1) The village has abundance of firewood in nearby areas, therefore they think no need of saving firewood,
2) The area is not as hot as Magway division where there is high risk of fire, and also located just beside a lake and thus they naturally think of less risk of catching fire, and
3) Poor households with big family size prefer to use conventional stoves, as they think the improved stove consume more time for cooking (in fact, this is not tried and even the cooking time can be saved by at least one-third).

1.2) Mixed outcome in a village where another useful stove is available: Naga Zin Yine

In Nga Zin Yine village, demonstration of making the stove shown in Photo 2 was conducted on 23rd October 2008 with total 25 participants (3M + 22 F). The sample stove was utilized at U Sein Win's house. Second time demonstration of the stove was made on 14th January 2009 with 14 interested participants. They all made improved stoves during the demonstration. As at end of May 2009, a total of about 20 stoves have been constructed. Since there are about 200 householseds, and thereforetill then about 10% of the village household had been covered with the improved stove. The users are very much convinced with the advantages of the cooking stove, i.e: wood saving by at least one-third to at maximum half, reduction of heat reflection, time saving for cooking, and especially prevention from fire hazard.

However, still in this village people are not much interested in the improved stove. This is because there is a simple half-cut-pot-like cooking stove which is sold at a cost of only 300 – 350 Kyats per piece. The stove is not so durable that it can be broken in 1 year according to the villagers. However, with that cheap price, now nearly about half the villagers use the pre-fabricated stove, resulting in not much interest in the stove introduced by the project.

Photo 3: Pre-fabricated half-cut-pot-like cooking stove, sold at only 300-350 Kyats per piece. It is not durable but the cheap price attracts the villagers.

Therefore, in this village even some of the first 20 users have changed to the pre-fabricated stove. Not only that but also the soil in this village is a little sandy. The sandy soil can hardly make the stove very durable and long lasting. As of January 2010, there are only about 10 villagers who are using the originally introduced cooking stove by the project.

1.3) Good outcome in villages where hot weather prevails and little firewood available

In North Pabe village located in Chauk TS, Magway division where very hot and dry weather prevails, 15 households had continued making improved cooking stoves during December 2008 after the demonstration. Another 5 households made the stove in January 2009, and the construction has continued one after another. According to the village chairman, out of total 140 households, about 120 households have introduced the improved stove as shown in Photo 1 or alike including improvement of conventional mud-enclosed cooking stove till the end of December 2009.

They adressed at least 1/3 to half firewood can be saved as compared to conventional stoves, and cooking time is also reduced, though, by about 20% - at maximum 1/3. Thanks to the structure enclosed with clay soils, users can leave the stove without putting out fire (though still risky). Another advantage with this stove in this area is that the villagers can now fully utilize dried pigeon pea stem as firewood which are very much abundant in this area. According to villagers, stem of pigeon pea tends to be flickering when burnt increasing the risk of catching fire. With this situation, many villagers hardly used the dried pigeon pea stems. However, the stove is well enclosed so there is very little risk of causing fire around. Villagers, especially the chairman himself as the village PDC chairman, are very pleased with the stove introduced.

In this village, motivated by the continuous construction of improved stove a villager erected a very nice cooking stove shown in Photo 4. The coooking place is elevated so that the user no longer needs to sit on the ground or bend deeply during cooking. She for example just sits on a chair during

cooking, completely free from back ache. The husband is a farmer and also a cook. During novitiation ceremony, he cooks heavy amount of food and therefore he knew how difficult it is one cooks with conventional stove like 3-stone (brick) stove placed directly on the ground. He sometimes cooks himself in his house, and both of them are in fact very happy with the modern stove.

Photo 4: An elevated cooking stove constructed by a villager.

1.4) Jetropha Oil Extractor

In connection with the introduction of improved cooking stove, Jetropha oil extractor was also tried for the primary purpose of utilizing the oil cake as substitute of firewood. In Nga Zin Yine village, Jetropha oil extractor was delivered on January 9, 2009, and it was sent and demonstrated at Kan Pyuu village on January 6, 2009. Pabe north was provided with the extractor in mid February 2009.

During the demonstration in Kan Pyuu village, township responsible person from Ayadaw PDC and MAS were presented with much interest, however, the villagers showed less interest in it. The township PDC prefer to install the machine at the Ayadaw town, instead of placing at the village. The village has produced a lot of Jetropha seeds, but the village is obliged to sell the seeds to the township authorities, according to planned quota. For the time being, the village's production had not yet met to their quota, and therefore there is a difficulty of utilizing Jetropha within the village.

Jetropha Oil Extractor (manual) provided to 3 villages as test trial.

In Nga Zin Yine village, after the demonstration, one villager extracted 1 gallon of Jetropha oil and mixed it with 4 gallons of diesel. The mixed oil was used to run a hand-tractor, and it was successful. However, the prime objective for this pilot trial was to test if the oil cake can work as firewood substitute or not. From this point of view, all 3 villages have made a briquette out of the oil cake, and it was confirmed that the piece of briquette could last burning about 40 minutes. It was therefore verified that the oil cake of Jetropha can be utilized as firewood substitute.

Blocks shown in left photo are briquette made out of Jetropha oil cake, and this can burn about 40 minutes as shown in right photo. Therefore, the oil cake can work as firewood substitute but in rural area since there are still abundant firewood, villagers showed less interest.

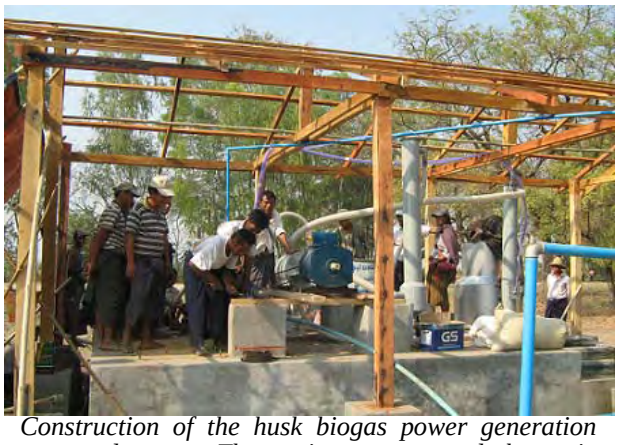
However this practice has not been extended in the villages because there are still conventional firewood in and around the villages. Therefore from the view point of trial, it was successful but from the view point of extension in rural areas it is not. In fact, it is recommended that this kind of practice should be promoted in urban areas where firewood is scarce or should be purchased. If there is a designated place in urban area to which all the Jetropha seeds in the catchment area are delivered and at which the oil is extracted and also the briquette is made out of the cakes as firewood substitute, this programme may work well. Otherwise it should not be tried in rural area.

2) 08I2 Paddy Husk Power Generation Project

Location for this type of power plant has to be carefully selected because it burns husks to get bio-gas which in turn invites a risk of catching fire. Villagers had been looking for ideal site, and finally settled in a place outside the village. The place was, however, lower than the surrounding areas easily affected by standing water each time after rainfall (in fact, this was the major reason why the area had been left unutilised for long).

Committee was established with 5 members plus 10 collectors for the O&M, and it mobilized villagers who owned bull cart. There are about 380 HHs out of whom about 150 HHs have bull cart. The cart owners were requested to bring 5 carts of soils each, and the work started on January 10, 2009. According to the committee, a total of about 450 carts of soils had been brought into the place and compacted in order to raise the ground so that the power plant can be erected.

The villagers had carried out the above earth work voluntarily as a precondition of erecting the generation plant by the Project. Not only that but also additional works were volunteered by the villagers since the Project had asked their maximum participation in the construction. What they have done was, for example, digging of holes for fencing around the compound, digging of holes for lamp posts, etc. For this work, villagers were mobilised and about 20 persons each per day had participated alternately for one week.



Construction of the husk biogas power generation now under way. The project constructed the main part only while ancillaries were done by the villagers.

In addition to the above labour works, the committee had to spend on ancillary facilities such as storage for paddy husk, toilet for staff and staff house. The Project was in fact to provide the major part of the plant only, e.g. erecting of the power plant, wiring and provision of 2-ft fluorescent tubes to all the households, one each per household. To establish the ancillary facilities, they bought about 900 bamboo poles, 700 thatches for roofing, 13 wooden poles, etc on credit. Including labour charges of weaving bamboo sheet, the committee had to spend as much as over 700,000 Kyats which was availed by credit. The committee has been settling the credit by paying monthly instalment out of the income from electricity charge.

The operation was commenced on February 20, 2009. Committee members the Team interviewed remembered that day very clearly. All the villagers were very much surprised with the 2-ft long fluorescent light brightness. The light brought about not only visual brightness but also psychological brightness. Villagers enjoyed chattering under the light, children enjoyed studying, some villagers continued working, and some are no longer feared of catching fire from candle with the help of the electricity. In fact, this village is located far away from centre of the township, making difficult to extend the national grid to the village. No villagers had therefore expected to have

electricity before.

The plant requires 6 baskets of paddy husk (equivalent to about 9.8 Kg) per hour to run 75HP engine and 20 KVA dynamo. If an acre of paddy field produces 100 baskets of paddy (equivalent to 1,274 viss per acre or to about 5.2 tons per ha), about 191 baskets (382 viss) of paddy husk can be produced based on the assumption of 30% of paddy being husk in weight and 2 viss per one basket of husk. It means that 100 baskets of paddy harvest per acre can run the system about 32 hours (191/6). The system provides electricity about 3 hours per day, and therefore one cannot be afraid of material shortage since the village is surrounded by a huge area of paddy production. Burnt husk, after extracting biogas from the husk, are also used to paddy nursery, contributing to growing healthy seedlings.

The electricity is provided to all the 380 HHs, 2 monasteries (3 tubes x 2 places = 6), the rural health centre (2 tubes) and the primary school (4 tubes). The charge was set at 1,000 Kyats per month per household. First collection date was March 20, 2009, one month later than the commencement of the operation. The committee members had to visit around the villagers 4 times altogether and came up with a total of 320,000 Kyats. If all the 380 HHs had paid 1,000 Kyats each, there should have been 380,000 Kyats in March. It means there is a gap of 60,000 Kyats. This was because of exemption from the payment for 10 elder households who do not have children, 10 collectors who are also committee members, and unfortunately those who do not pay due to several reasons including poverty, just excuse, etc. Collections in April and May were around 300,000 Kyats each, lower than that of the 1st month.

On the other hand, the committee has to spend 90,000 Kyats per month for the 3 workers (30,000 x 3), 30,000Kyats for engine oil, 60,000 Kyats for husk transportation, and another 20,000 Kyats for supplementary usages. Total expenditure is therefore estimated at about 200,000 Kyats. With the income of about 300,000 Kyats, they have a positive balance of 100,000 Kyats out of which credit has been settled. After settling the credit, the committee has a future plan of renovating the current rural health centre from bamboo thatched one to brick made one and putting up of village library.

The charge for the fluorescent light electricity is 1,000 Kyats per month per household. This is now compared with what they used to spend on lighting with candle. Table 5.10.3 on the right hand summarizes the simple interview results to some villagers. One candle costs them 50 Kyats per piece. Small family may use only 2 candles per night as exampled by HH-B, but in most cases they use 3 candles per night and if there are school children they need addition 2 for their studying. With this consumption of candle, they usually had to spend 3,000 to as much as 7,500 Kyats per month per household.

Table 5.10.3 Comparison of lighting charge in Mon Taw Gyi village, Ks

HH	Before, Candle	After, Candle	Before, Ks	After, Ks
A	3	1	4500	1000+1500
B	2	1	3000	1000+1500
C	3	1	4500	1000+1500
D	5	1	7500	1000+1500
E	5	2	7500	1000+3000
F	5	1	7500	1000+1500
G	3	1	4500	1000+1500

Remark: Children for HH-E wake up early morning and do studying, consuming additional candle.

With the biogas generated rural electrification, however, they are now paying 1,000 Kyats for the charge and plus 1,000-1,500 Kyats for 1-2 candles. Biogas electrification can therefore reduce the cost for lighting by at least 500 Kyats per month (case of HH-B) to at maximum 5,000 Kyats per month (cases of HH-D & HH-F). The former case brought about 17% reduction (500/3,000), and the latter case brought about as much as 67% reduction (5,000/7,500).

Sometime after they started the operation, they had to encounter some difficulties. That power plant was constructed with 4-piston-engine. Committee members were not familiar with such engine and so there occurred minor difficulties at the earlier period of running the engine every now and then.

The mechanic (introduced by local consultant) only knows how to repair 2-piston-engine skillfully. Therefore, the committee thought that there can be difficulty in repairing the engine provided by the Project in the long run. In fact, the engine needed repairing in July 2009, and the committee had to look for another suitable mechanic and then got the engine repaired.

That mechanic was from Kyaung Taw Yar village which is situated quite close to Mon Taw Gyi village. It is learnt that he knows how to repair 4-piston-engine skilfully and he also owns a rice mill and a lathe. He is well-acquainted with paddy-husk bio-gas power generation because he is supplying a monastery in Kyaung Taw Yar village with electricity by means of his rice mill which works as power generator as well by using rice husk. It can be said that the committee has made a right decision to bring about better conditions.

Previously, for operation and maintenance, 3 workers were appointed with the payment of 30,000 Kyats each per month. However, they could not pay full attention to the power plant as they had to carry out their bread-earning jobs on the other hand. For this reason, the committee, beginning from May 2009, appointed 2 new workers who can pay full attention to the power plant with the payment of 30,000 Kyats each per month. This arrangement aimed at contributing towards bringing about improvement for village electrification.

Those two workers live in the power plant compound and they are, in fact, the persons who mostly keep in touch with the electrification. One of the committee members, U Khin Mg Tin, said, ‘‘we let operation and maintenance workers live in the plant compound. This made them keep in touch with the plant daily. If and when a mechanic is sent for repairing the engine, they have to help the mechanic. That's why now they know how to repair the engine if it is not a major problem. We expected such a thing happen. So we carefully chose the persons who could live in the plant compound and who are interested in electrification.” He explained of how they had to try to improve workers for the power plant.

Electrification committee members are used to getting together in the plant compound and the compound is really a place for them where meetings are held nowadays. Things they used to discuss about were how to improve and develop the power plant in the long run with their own efforts. They occasionally get advices from experienced persons to be able to maintain the plant. Especially, the committee members rely on the mechanic from Kyaung Taw Yar and according to his advice some parts of the machine were replaced with new ones to make the engine be in better and better conditions than ever.

By spending the fund gained from the charge of electrification, in the month of October 2009, some parts which needed to be replaced with new ones to improve quality of the engine were changed. The boiler into which paddy-husk is put to burn has an iron sieve inside it. Due to intense heat, the sieve inside the boiler expanded or contracted. There appeared a block to come ashes down at the place where the sieve dented. The sieve with 1.5 inches in thickness was ordered to Ye Nan Chaung Industrial Zone and fixed instead of previous one with 0.5 inches in thickness. Still, the space between the sieve and water under it was so wide that the boiler had to be lowered down. Only then could the gas be made into proper

Several parts were improved/replaced out of the electricity fee collected.

density. Such rectification was done by the committee.

Besides, with an aim at increasing running power of engine, a bigger gas-storage container, 2 gas receivers which induce the gas more powerfully, and a 4-inch-pipe instead of 3-inch-pipe was installed by themselves. This is in fact a big outcome of unity of committee members and technicians among themselves. The committee made efforts to find a well-experienced technician. They only buy and fix new parts of the engine when it is inevitable.

At the commencement of electrification, electricity charge was fixed 1,000 Kyats per month. The committee found it difficult in collecting the charges if there were nights without electrification within the month. For this reason, electrification charge was changed to 50 Kyats per night and if there were nights without electrification under various circumstances, no charge was collected. On the other hand, the O&M workers under the committee always check the engine if it is in running condition, not to cause inconvenience for regular electrification.

Electrification charges from households were collected at the rest house situated in the middle of the village with the help of loud-speaker, announcing the names who still do not pay the charges. If a household failed to pay the charge for over a month, electrification is temporarily stopped and only when the charge is paid will the ban be lifted. The collection efficiency in this village is always more than 90%. Since the committee has to deal with the whole village, the members have to follow prescribed rules and regulations on one hand, and they have to keep accounts of income and expenditure and make them known to all villagers every month on the other hand.

Following table summarizes the income and expenditure of the power plant as of October 2009. As is shown, they have collected a total amount of 2,419,000 Kyats while they have spent a total of 2,651,055 Kyats. The balance is in fact red, -232,055 Kyats, which is due to the credit of as much as over 700,000 Kyats they had spent for erecting ancillary facilities on their own as aforementioned.

Table 5.10.4 Balance Sheet of Paddy Husk Bio-gas from February to October 2009

No.	Activity	Income (Kyats)	Expenditure (Kyats)	Net Profit (Kyats)	Remarks
1	Charges collected	2,419,000			Max.350,000/month
2	Repairing cost		1,165,705		
3	Carriage (paddy-husk)		197,500		
4	Employee Salary		570,000		
5	Cost for ancillaries		717,850		
-	Total	2,419,000	2,651,055	-232,055	

Source: Monthly Income & Expenditure, Electrification Committee of Mon Taw Gyi village.

3) 08I3 Children's Nutrition Improvement Center Project

The work of construction commenced on 13th August, 2008, and the building was completed at the beginning of September 2009. In such a way, a sole centre of Pabe village tract, served as not only for nutrition improvement but also as "Village Development Centre" came into existence.

3.1) Feeding Programme

The programme of feeding nutritious food to children for the first time was carried out beginning from 5th September, 2008. There included 23 children and they were provided with three nutritious meals in a week on Monday, Wednesday and Friday. It took 4 weeks. And then during the month of November 2008, altogether 21 children were fed with nutritious meals on Monday, Wednesday and Friday for the second group for about 6 weeks. Another 20 children were started for the third time from January 2009. Since the lunch provision for the third time was intermittently done, it lasted for about 5 month. Then, the fourth time started in September 2009 to feed 10 children, and lasted about 2 months also intermittently.

Table 5.10.5 Feeding Programme in the Nutrition Improvement Center

Group	Nr. (age)	Started	Duration	Frequency
1st group	23 (3-5 years olds)	September, 2008	4 weeks	3 times a week
2nd group	21 (5-8 years old)	November, 2008	6 weeks	3 times a week
3rd group	20 (3-5 years old)	January, 2009	5 months	Intermittently, 4-6 times per month
4th group	10 (3-5 years old)	September, 2009	2 months	Intermittently, 4-6 month per month

Source: the Nutrition Centre Committee, Pabe North Village

Nutrition center, also works as Village Development Center crowded with Children

Scene of children having their nutritious meal donated and provided by well-wishers.

In connection with selection of children who suffer from nutrient deficiency and who should be selected before the commencement of the feeding programme, all children between 3 and 5 years in the village were gathered and then selected with the help of BMI measurement. The village development committee said that they gave first priority to children who are very poor and nutrient-deficient.

They also said that when they selected the children for the second time, they gathered children of 3-8 years age, excluding the first-time children, and then selected should-be children. It is also said that rural health centre has been giving a helping hand to the committee. For the first-time and second-time children, having enough money donated and contributed by well-wishers, responsible persons from respective Ministries, local consultants and villagers, they could be provided with nutrients effectively. However, for the third-time children, the committee was facing with a problem of getting fund (donations) to go on the programme.

For the first-and-second-time children, pork, chicken, bean and chicken boiled-rice could be fed for lunch and in the afternoons egg, bread, banana, etc. could be provided depending on convenience. But for the third-time children, except for the days when there were donors, they could be provided with only egg, bean, etc. for their meals. The only same thing for those 3 times is making the children take tablets containing vitamins which were donated by donors after having their lunch. In fact, when it was the time to select the third-time children, there were only a few children left out from the first and second lunch provisions and so they included in the third practice children of the first-and-second-time. It means most of the children in the village had been covered till the 2nd time and none was left by the time of the third practice.

The Management Committee for nutrient-feeding was composed of 9 members. A group which is to give close supervision on feeding-days has been assigned to do so and there are mothers of some children on it. On feeding-days, children are taught of personal hygiene, behavior and moral lessons. This arrangement is meant for children to gain hygienic knowledge, to become polite and to develop their general knowledge in addition to provision of nutritious meals. In fact, many beneficiary mothers always tell us that their children have become very polite and in good manners for eating.

3.2) Multipurpose Use of the Centre

The Project provided the centre (building) to be used as a 'Children's Nutrition Centre', though, it became a place where village development activities were carried out and implemented. In connection with religion, on important religious days, monks are invited to the centre and offered with alms-food and sermons are delivered by monks. As weekly performance, once a week (especially on Sabbath days) elderly persons of about 10 – 15 in the village recited Buddha's teachings at the centre. It is also learnt that a non-stop recitation of 'Pahtann' (the wheel of Dhamma) was celebrated at the centre in March, 2009.

Village Development Centre seen together with a newly-built small library, donated by the village PDC Chairman.

Other activities such as preventive vaccination for polio, examining of villagers' health by health group at irregular intervals, holding of departmental meetings and talks, etc. were carried out at the centre. Not only the aforementioned benefits but also a small library-housing was donated by Pabe village-tract chairman (he donated 150,000 Kyats). He said, "Long long ago, a Co-op shop was opened on this ground and things or goods were distributed. Other beneficial measures to village were also taken. When Co-op system was no more, nothing was done on this ground. Now, we are very much pleased with having a 'Village Development Centre'.

3.3) Livelihood Improvement Activities

In the last week of December 2008, two counterparts went to the centre and explained the village PDC chairman of why they had to come there. Then arrangements were made to use Children's Nutrition Centre as 'an assembly place' from which their livelihood improvement is to start. A workshop was held, and the discussion for livelihood improvement in Pabe (North) village was attended by about 100 villagers including some villagers from Mingan. During the discussion, villagers emphasized on the activity that needs financial help at first. When counterparts led the discussion to the activity that does not need financial help, villagers suggested to do village sanitation work and to repair roads in the village.

Scene of Pape (North) village discussion for livelihood improvement on a self-help basis.

In connection with village sanitation work, it was discussed and suggested to do once in two weeks, to keep dust bin at every home (if they cannot keep dust bins, dig a hole for garbage), to burn plastic waste and to pile up garbage in one place which can be used as compost. As of January 2010, almost all the households in the village have a dust bin and regulary collect litters. Sweeping their coumpund is also done once in 2 weeks. When they collect fallen leaves, they are mixed with cow dung to make compost or otherwise taken to farm land to burn.

The road within the village is damaged in the rainy season every year and villagers face with such difficulty. At the discussion, the difficulty was designated as communal difficulty and all agreed to repair the road collectively. In early 2009, the

road rehabilitation and repairing were carried out. In fact, the villagers on an ad hoc basis used to carry out such road repairing but not regularly. They agreed to carry out such works every after rainy season has finished, and the work was done in early 2010 as well.

Pabe (North) villagers, on the other hand, wanted to keep abreast with the other two villages which exist in the same village-tract. In Pabe village-tract there are three villages, namely, Pabe (North), Pabe (South) and Mingan. The Project provided a diesel generator to Mingan village for electrification in FY 2007/08 and so there has been electrification in Mingan. Pabe (South) village which is adjacent to Mingan has been making arrangements to connect a power line from Mingan.

However, Pabe (North) village is far from the two villages and therefore connection of the wire is not possible. Villagers do not have fund to be able to buy a generator by themselves although they wish for electrification. During the workshop, after knowing that they will need about 40 lakh (4,000,000 Kyats) for electrification, villagers come to fully understand to raise their income first to be able to collect village fund for buying a generator. There are altogether 140 households in Pabe (North) and each household will have to contribute about 28,000 Kyats to the village fund to get the needed amount of money. To be able to contribute so, the following ways were suggested during the workshop:

1) As a part of catering for Children's Nutrition activity, vegetable cultivation programme which is being implemented will be extended. Villagers have to buy vegetables from places around Kyaukpadaung. If vegetable cultivation can be extended, they will be able to save money and even sell vegetables to neighbouring villages if the cultivation is successful. Besides, housewives can spend time effectively and children can enjoy nutrient vegetables. Such things were discussed.

2) It was discussed that if plum seeds were collected and sold, 3,000 - 5,000 Kyats could be earned per year. Villagers came to notice that kind of work could earn extra income and more plum trees would be grown. Plum flesh and jaggery are local products and if they are made into plum jam women can have more job opportunity. Plum jam will be distributed through a woman who always goes to Yangon to sell local products.

3) The price of jaggery is so low at present and so there are only a few workers who produce jaggery. Therefore the yield of toddy-palm nut becomes high. At present, toddy-palm nuts can be collected by anybody free of charge. The outer cover of toddy-palm nut is used as fuel and the flesh is fed to cattle. If toddy-palm nuts are made into toddy-palm shoots, they can be sold and extra income can be earned. In some regions, toddy-palm shoots are being produced on business scale, though in Pabe (North) village and its neighbouring area there is nobody to do so. Toddy-palm nuts are available in abundance free of charge in the region and if they become toddy-palm shoots they can be sold at the price of 10 kyats per shoot. Many villagers were interested in that work and three villagers decided to carry out that practically.

4) Growing of perennials such as mango, custard apple, plum, jatropha, etc. at fences to earn extra income was discussed. Although Jatropha growing does not earn a lot, collecting Jatropha seeds and selling them can earn extra money for landless people. So it should be done. The current price of Jatropha seed is 4,000 Kyats per basket and if someone can collect and sell half a basket of Jatropha a day he will earn 2,000 Kyats. More money can be earned if it is sold as Jatropha oil.

5) Custard apple, plum and mango trees grown in their home compound are of poor local varieties and so it seems no earning. In places of local varieties, if approved varieties of plum, mango and custard apple are grown two plants per variety in every home, they will become valuable village

products in the next three years, it was suggested. However, it is learnt that it is necessary to obtain new varieties and technologies (e.g. how to graft). If aids from outside are provided, seedling farm can be established. Seedlings of good quality can be distributed not only in the village but also to neighbouring villages. It was also discussed that long-term income can be obtained by selling thanakha seedlings.

With some of above activities having started already, the Village Fund reached about 7.5 lakh (two villagers donated 70,000 Kyats each as soon as after their wedding ceremony, and it is included). Additional 1.5 lakh will be donated from two monks from two monasteries in Pabe North village. So as of January 2010, it can be said the committee could save altogether 9 lakh (900,000 Kyats). Their first priority to use Village Fund is the village electrification. They always think and dream that "if we have a generator for electrification and electrification committee" by comparing with the diesel engine and electrification committee of Mingan village. Through the livelihood activities, they would be able to purchase the diesel engine and dynamo for the village electrification in future.

5.11 Evaluation of FY 2008/09 Pilot Project as at February 2009

As aforementioned in Chapter '4.9 Evaluation of FY 2007/08 Pilot Project as at February 2009', an evaluation workshop was held in Mandalay for 3 days from February 9 to 11 2009. This workshop invited village representatives, TS MAS and LBVD officers, district and divisional officers as well. After the villagers reported the pilot project having been carried out in their villagers, TS officers reported the floor the achievements from the pilot project of 08A2, 08L1,2,3 meant for extension. After the presentation, all the participants carried out a mid-term evaluation to these pilot projects including cottage sector (in terms of the system of revolving fund).

5.11.1 Evaluation of 08A2 Organic Farming Promotion

Organic farming promotion, pilot project 08A2, has tried to disseminate several technologies through extension. Some technologies may work in some places but the same technologies may not yield same results depending upon the field condition. Therefore there is a difficulty of evaluating the project as a whole. Instead, the evaluation was made by each technology wherein rating was done from 1 – 3 (1 for no-good result to accrue, 2 for good result to expect, and 3 for very good result to accrue). Table 5.11.1 shows the results, which are summarized by major technology and by participant's cadre, and following statements are indication from the table as well as excerpts the participants raised;

1) Technologies except for 'Early Transplanting' was given 2.0 mark in average by all the 3 cadres or a little higher than that. Interestingly there was no one who gave either mark 1 (no-good) or mark 3 (very good) in the technologies of IMO making and Dapog. All the participants just rated these technologies are merely good.

2) Unlike the above result, there is divided opinion in 'early transplanting technology'. There are 4 villagers who gave mark 1 while 2 villagers gave mark 3. In the group of TS officers, there is no one who gave mark 3 to the technology while as many as 10 division/ district officers gave mark 3, or vice versa, namely 4 TS officers gave mark 1 whereas no division/ district officer did. The reason behind this is the early transplanting is usually done from 12 – 18 days after sowing, which should accompany good water management and even land leveling, which are very often difficult in CDZ context.

Table 5.11.1 Evaluation for Agriculture Extension Activity

Participants	Evaluation	IMO Making		Dapog		Early Transplanting		Sparse Transplanting	
		Person		Person		Person		Person	
		Nr.	Score	Nr.	Score	Nr.	Score	Nr.	Score
Villagers	No-good (1)					**4**	**4**		
	Good (2)	16	32	15	30	11	22	14	28
	Very Good (3)					2	6	4	12
	Total	16	32	15	30	17	32	18	40
	Average	2.0		2.0		**1.9**		2.2	
Township	No-good (1)					**4**	**4**		
	Good (2)	20	40	18	36	7	14	11	22
	Very good (3)							1	3
	Total	20	40	18	36	11	18	12	25
	Average	2.0		2.0		**1.6**		2.1	
Division/ District	No-good (1)								
	Good (2)	13	26	13	26	2	2	11	22
	Very good (3)					10	20	1	3
	Total	13	26	13	26	12	22	12	25
	Average	2.0		2.0		**1.8**		2.1	

3) Most farmers in Pwintbyu area had high interest on advanced technologies, however, they raised that the technology introduced should be of cost-benefit for the farmers. Then an advanced

farmer in Legaing village said, "We would like to offer good location at the road side for conducting demonstrations on paddy at our village for the better expansion of good agricultural practices to wide range of farmers. Farmers are not hesitating to change from their conventional methods, if the technology can convince the real benefits for them."

4) A TS officer stated that early transplanting cannot be separated with sparse transplanting, to obtain benefits of early transplant. However, in the Central Dry Zone, due to difficulty in terms of water management, even in irrigated paddy land, early transplanting is hardly applicable for most farmers. Therefore, they usually resulted with late transplanting combined with narrow transplanting to achieve high plant population.

5) A district manager stated that not all the agricultural technologies are benefited in everywhere, but each technology has it's strength and advantage for specific area. The duty of agriculture extension workers is therefore to educate farmers with applicable technologies for them. The extension staff also should emphasis on conservation of the soil, for sustainability in agriculture. Hence, we need to urge everybody to start only with few acres, through the contact farmers, to convince soil improvement through organic farming promotion activities.

6) Major requirement for the sustainability of Agriculture activities in CDZ is "water" and "water management", expressed by a district manager. Hence, if possible, there should be a request to JICA for further support to attain water for CDZ farmers, e.g., reconstruction, upgrading and repairs of existing natural ponds and small reservoirs near the villages, with least costs. This will be of highly appreciable by CDZ farmers and livestock as well.

7) A district manager said that above all agricultural techniques are useful according to the condition. The main thing is to extend education, to the farmers till they really accept and adopt them. It will need time, as the farmers are always reluctant to change. For example, even in same Magway Division where OISCA is operating, IMO Bokashi technology, Dapog, Early and sparse transplanting technologies by OISCA cannot be widely spread. There are lots of limitations for CDZ farmers to accept new technologies. That is why the mark-2, just good, had come.

5.11.2 Evaluation of 08L1, L2, and L3 Livestock Pilot Projects

In field of livestock extension, there are 3 pilot projects, e.g. Goat revolving, Pig revolving and Livestock feeding improvement. These 3 pilot projects were evaluated as one package using DAC 5-aspect methodology, efficiency, effectiveness, impact, relevance and sustainability. Table 5.11.2 summarizes the results, giving mark 4 or a little over than it in most cases except sustainability.

Sustainability was given 3.8, 3.2, and 3.4 by village leaders, TS officers, and district/ divisional officers. What they thought was that at moment the revolving process is being well done with assistance/ supervision from relevant TSs, however the villagers may not be able to revolve until all the landless household in the specific village is covered.

Table 5.11.2 5-Aspect Evaluation for Livestock Pilot Program

Sector	Participants	Efficiency	Effectiveness	Impact	Relevance	Sustainability
Livestock	Village Leaders	4.1	4.0	4.0	4.0	**3.8**
	TS Officers	4.0	4.0	4.0	4.0	**3.2**
	District, Division	4.0	4.0	4.0	4.0	**3.4**

Following are excerpts among the participants;

1) A villager raised that they accept that the opportunity to have livestock raising is very much beneficial for their landless poor people. Especially, goats are suitable with the dry weather condition with less input and pigs can be raised as saving money for future. However, villagers

had poor knowledge in livestock health care practices. He suggested well experienced persons to visit often to his village and share good advices, for the wellness of the livestock activity improvement and sustainability.

2) A TS manager stated that sustainability of revolving system very much depends on confirmed and fixed procedure at village level. Supervision and management by LBVD township officers is also important. If there is less support for logistics, it will be difficult to cover all the relevant tasks in timely manner. A participant from TS PDC added a comment that the PDC office always give priority to administration, social and economy of the general public. Hence, after the project, for the sustainability of the activities, the PDC can coordinate and administrate the activities, which are properly assigned to the PDC staff, with exact data and plan.

3) A participant remarked that sustainability relies on close supervision and strong support of the relevant organizations, as well as proper management with good will at village level committees. However, most villagers are quite occupied with their daily routine works and cannot give much time for community affairs in regular basis. In relation to this, a divisional manager stated that we need to have strong support by local authorities, coordination with department concerned for strict supervision and management of these programs to be sustained.

5.11.3 Evaluation of Cottage Sector Pilot Project including the Projects of FY 2007/08

In field of cottage sector, a comprehensive evaluation was made covering the system of village revolving fund and also for project level. The projects referred were Tinsmith strengthening and guitar key strengthening in Khaungkawe village, weaving in Magyi village, knitting and engine weaving in Ma Gyi Sauk village, tractor provision in Ar La Ka Pa village, sandstone strengthening in Mingan village, paddy dryer and road station in Legaing village.

Table 5.11.3 summarizes the results, giving mark 3.0 – 3.6. During an evaluation session held one year ago, that is February 2008, the participants gave very high evaluation results to most of the cottage pilot projects, ranging mark 3.2 at the lowest to 4.3 at the maximum. This means it looks the sustainability has lowered as compared to one year ago. In fact, this tendency can be observed in this kind of pilot project. Project participants who were proved certain input, e.g., equipment and materials, tend to give higher marks appreciating the input for initial stage of the operation. However, after some time has passed, they usually realize the realty to operate, maintain, manage the project and also create good profit, now giving reasonable rating of evaluation.

Table 5.11.3 5 Aspect Evaluation for Cottage Sector Pilot Program

Sector	Participants	Efficiency	Effectiveness	Impact	Relevance	Sustainability
Cottage	Village Leaders	3.3	3.0	3.0	3.4	3.4
	TS Officers	3.6	3.1	3.2	3.6	3.2
	District, Division	3.5	3.0	3.2	3.3	3.1

Following are excerpts among the participants;

1) A villager expressed that they will put their best efforts for the sustainability of the cottage activities in the village, as the people have income opportunities by doing so. They are confident that other villagers also have same mind-set with them.

2) A TS manager said that for the sustainability of the cottage activities in the villages, proper supervision, especially for accounts and finance is required. However, since nature of the work differs in each cottage industry, relevant township officers of Cooperative department can only closely supervise the activities placed under the cooperative law, 1992. For other cottage activities under the project, the role of village main committee is important for close supervision,

especially to maintaining of the revolving system.

3) A divisional officer said that almost all the cottage sector activities involved cash investment. Income generated from first beneficiaries should be properly collected and to be used for maintaining and expanding current activities and also for village development. Therefore, duty and responsibility is mainly on current beneficiaries, Village PDC and main committee members. Relevant beneficiary groups have to seriously consider for competition, market, and potential alternatives for efficient utilization of machines, equipments and material supported by the project.

5.12 Evaluation of FY 2008/09 Pilot Project as at February 2010

Pilot projects started in FY 2007/08 and FY 2008/09. Two to three years have been passing for the pilot projects commenced in FY2007/08, and one to two years for those which started in FY 2008/09. Nearing to the completion of FY 2007/08 and FY 2008/09 Pilot Projects, in this session, final evaluation is carried out for FY 2008/09 pilot projects from the view point of 5 aspects – Efficiency, Effectiveness, Impact, Relevance, and Sustainability.

Table 5.12.1 summarizes the evaluation results about FY 2008/ 2009 pilot projects carried out by JICA Study Team, counterparts and national staff as of February 2010. The evaluation was carried out by 3 members of the Study Team (TL, livestock and project management), 4 counterparts in charge of overall management (chief CP), agriculture sector, livestock sector and cottage sector and also 3 national staff who have been monitoring the relevant pilot projects. A form was distributed to all those members and they rated in a range of 1 – 5 by pilot project and by 5-aspect. Thereafter, simple mathematical averages were calculated, which are shown in the following Table 5.12.1:

Table 5.12.1 5-aspect Evaluation of FY 08/ 09 Pilot Projects by JICA Study Team with Counterparts, Feb 2010

Sector	Component	Efficiency	Effectiveness	Impact	Relevance	Sustainability
Agriculture	08A1. Improved Paddy Cultivation Promotion Programme	3.5	3.5	3.7	3.8	3.3
	08A2. Organic farming promotion programme (with IMO)	3.3	2.8	2.8	3.2	2.7
	08A3. Improved seeds regeneration project	3.6	3.6	3.6	3.6	3.6
	08A4. Pro-poor oriented Mushroom culture promotion project (Zee Bwa)	2.8	3.0	3.0	2.6	2.5
	08A4. Pro-poor oriented Mushroom culture promotion project (Za Yit)	2.6	2.6	2.6	2.4	1.7
	08A5. Small-scale irrigation promotion project (shallow well + treadle pump)	3.3	3.3	3.2	3.3	3.2
	08A6. Crop storage depots promotion project (Ma Gyi Sauk)	3.0	2.7	2.3	2.8	3.0
	08A6. Crop storage depots promotion project (Legaing)	3.2	2.8	2.3	2.8	3.0
	08A7. Minimum tillage promotion project	2.1	2.0	1.9	2.0	1.4
Livestock	08L1. Pro-poor oriented goat revolving programme	3.6	3.6	3.6	4.4	3.9
	08L2. Pro-poor oriented piggery revolving programme	3.0	3.0	3.1	3.9	3.3
	08L3. Livestock feeding improvement programme (UMMB, silo, Ipil Ipil, etc)	2.4	2.8	2.6	2.6	2.2
Cottage Industry	08C1. Community revolving fund establishment project (Magyi)	3.0	3.0	3.0	3.4	2.9
	08C1. Community revolving fund establishment project (Ar La Ka Pa)	3.6	3.5	3.5	3.9	3.8
	08C1. Community revolving fund establishment project (Ma Gyi Sauk)	3.4	3.1	3.1	3.5	3.4
Living Env.	08I1-1. Firewood substituting bio-fuel promotion project	2.4	2.3	2.3	2.1	2.0
	08I1-2. Improved cooking stove promotion project (Nga Zin Yine)	3.0	2.7	2.7	2.7	2.5
	08I1-2. Improved cooking stove promotion project (Kan Pyuu)	3.0	2.2	2.2	2.0	1.8
	08I1-2. Improved cooking stove promotion project (North Pabe)	3.6	3.4	3.8	3.9	3.8
	08I2. Paddy husk power generation project	3.5	3.6	3.9	4.1	4.0
	08I3. Children's nutrition improvement center project	3.1	3.5	4.0	3.8	3.7

Source: JICA Study Team

In the sector of agriculture, improved paddy cultivation promotion programme and improved seeds regeneration project were given the highest marks among all components. This was because both components were not only directly beneficial and relevant to farmers and small-scale landholders but also they were sustainable. And the second highest marks were earned by small-scale irrigation promotion project, and crop storage depots promotion project in Ma Gyi Sauk and Legaing villages respectively. The lowest marks were given to minimum tillage promotion project and pro-poor oriented mushroom culture promotion project. For the former component, leguminous crops were

unfortunately ruined by drought, and for the latter component, Zeew Bwa village lost its mushroom market because there were no more crude-oil tappers in its nearby villages and for Za Yit village natural mushroom was available in the rainy season.

For livestock sector, pro-poor oriented goat revolving programme got the highest evaluation. In fact, livestock pilot projects show more or less same results in evaluation as those in FY 2007/08. For pro-poor oriented piggery revolving programme, it got lower mark than goat revolving, though all the marks are over or equal to 3.0. This was due partly to an effect of swine flue. Livestock feeding improvement programme was evaluated lower than average since there were no beneficiaries who practically carried out after demonstration and extension.

For cottage sector, establishment of revolving fund has been practiced either at group level or at village level. It is seen that the evaluation result varies from village to village and among them. Ar La Ka Pa village was given the highest mark since the tractor provided by the project has been earning good income for village fund. And it is sure the fund will grow bigger and bigger, because Ar La Ka Pa village has the largest households among all target villages and its major income is dependent on agriculture. The rest 2 villages were given good marks, either.

For living environment improvement sector, paddy husk power generation project and children's nutrition improvement center project were highly evaluated than other components. On the contrary, firewood substituting bio-fuel promotion and improved cooking stove promotion project earned lower evaluation. In this pilot project, an extractor for *Jetropha* oil was fabricated and it worked. However, since the availability of seeds is not yet enough, the extractor was less used. For improved cooking stove, it was not needed in village where there are still lots of firewood available in and around the village. For North Pabe village, it was required due to high risk of fire in that village and also shortage of firewood.

CHAPTER 6 CONCERTED MONITORING AND EVALUATION BY STAKEHOLDERS

6.1 Rationale and Objectives

Pilot projects have been carried out since 2007, covering 4 sectors of agriculture, livestock, cottage and living improvement. A lot of experiences and lessons have been obtained through the pilot project implementation. These can become a good case example for the organizations that are engaged in similar projects and development activities. Meanwhile, lessons and experiences obtained by those organizations will also provide good references for the finalization of the Action Plan of this Development Study. A joint monitoring tour/workshop was therefore planned to share achievements, lessons, and experiences between the said organizations and JICA Study Team in the time of August 2008.

Overall objective of this monitoring tour/workshop is to share lessons and experiences of the pilot projects between the JICA team and participating organizations. Specifically, by the end of the tour/workshop, all the participants are to achieve followings as the objectives of this tour:

1) To share the experiences, achievements, and lessons of the pilot projects being carried out under the said pilot project,
2) To familiarize development constraints and opportunities related to the development of the CDZ,
3) To exchange own experiences and ideas with the JICA team and thereby the participants enrich modality of the development activities, and
4) To facilitate concerted efforts towards the development of the CDZ based on the feedback from the participants.

6.2 Tour/Workshop Mechanics

In cooperation with JICA Myanmar Office, the first announcement for invitation was sent to concerned organizations at the end of July 2009 and the second one at the mid August 2009 to confirm the number of the participants. In parallel with those issuances, logistic arrangements for lodging, transportation, meals, and advance notification to the concerned TS offices and ministries as well as arrangement for the villages to be visited were made. In the pilot villages, beneficiaries prepared summary of each pilot project by themselves for the presentation. In addition, inquiries were also prepared by the JICA team to ask all the participants to collect their views and recommendations or proposals for further improvement of the projects.

As shown in Table 6.2.1 below, the tour/workshop was implemented for a net 3 days including wrap up workshop. The villages visited are; Mingan and North Pabe in Chauk TS and Legaing and Mon Taw Gyi in Pwintbyu TS, all of which are located in Magway division. Chauk TS falls under Type I category while Pwintbyu TS in Type V category according to typology set up under this Study in relation to action plan formulation. Type I presents the harshest environmental condition while Type V represents the best environmental condition in terms of agricultural production. Therefore, the participants could compare both environmental conditions.

The contents of the tour/workshop are; 1) study tour to the villages where pilot projects were implemented, 2) presentation by beneficiaries in each village, 3) evaluation (impression) of each pilot project and achievement of the tour/workshop objectives by the participants, and 4) collection of their comments for further improvement, 5) presentation of the outline of the Development Study and pilot projects along with interactive discussions, presentation of the evaluation results of each pilot project (session –1 of the workshop), and discussion on necessary activities/projects to further improve livelihood of the people in the CDZ (session-2 of the workshop).

Table 6.2.1 Schedule of the Monitoring Tour/ Workshop (Net 3-day)

Date	Time	Activity	Overstay
August 26 (Wed)	9:30 – 10:30	Opening and briefing on CDZ Poverty Reduction Programme	Nyaung-U
	10:30 – 14:30	Mingan village, Chauk TS (Goat Revolving, Primary School, Diesel Power Generation, Sandstone Production)	
	14:30 – 16:00	North Pabe Village, Chauk TS (Rural Development Center, Living Improvement Activities)	
27 (Thu)	7:30 -	Move to Legaing Village, Pwintbyu TS	Magway
	11:30 – 15:00	Legaing village, Pwintbyu TS (Integrated Crop Management (paddy), Paddy Dryer + Storage, Mushroom Cultivation, Pig Revolving, Goat Revolving, Rural Sales Development Center)	
	15:00 – 16:00	Mon Taw Gyi village, Pwintbyu TS (Paddy Husk Biogas Power Generation)	
28 (Fri)	9:00 – 10:30	Presentation by the Project Team (JICA), Q&A	Nyaung-U
	10:30 – 12:00	Workshop by the Participants (Feedback from participants, Discussion)	

Source: JICA Study Team

Day-1: All the participants gathered in Nyaung-U and brief explanation of the monitoring workshop was made at a hotel conference room, then moved to Chauk TS by five vehicles, and visited the pilot project sites of rural development center ((lunch supply for the children), livelihood improvement (improved cooking stove, vegetable and fruit production) in North Pabe village, and goat raising revolving, primary school, diesel power generation and trollergy for sandstone processing in Mingan village respectively.

In both villages, a representative of the beneficiaries presented summary of each pilot project and exchange of views was conducted with the participants. All the participants were required to fill out the inquiry format for evaluation for Day-1, which was shown in the wrap-up workshop on Day-3. The promotion videos of the success stories of agriculture, livestock and cottage industry prepared by JICA Study Team were shown after dinner on that Day-1.

Day-2: Participants visited Legaing and Mon Taw Gyi villages in Pwintbyu TS. A beneficiary presented summary of each pilot project of the rural sales center, paddy dryer, crop storage, ICM (Integrated Crop Management for paddy) and goat and pig raising respectively. Participants filled inquiry format for Day-2 same as Day-1, and their results were shown in the wrap-up workshop on Day-3.

Day-3: Wrap-up workshop was held in the MAS Divisional Office in Magway. Team leader of the JICA team presented summary of the Development Study and pilot projects, and then Q & A was made. After that, evaluation results of Day-1 and Day-2 were shown in the session-1 to review the pilot projects that the participants had visited for those two days. As the session-2, plenary discussion on necessary projects and activities to further improve people's livelihood in the CDZ was made, and various activities/projects were proposed from the participants.

6.3 Participants to the Tour/Workshop

Participants to the tour/workshop reached as many as 59 members including JICA team and counterparts. They are mainly composed of; 1) concerned government officers, 2) international NGOs and organizations, and 3) officers from other JICA related projects. As Table 6.3.1 summarizes, there are 20 participants from the government, 8 from international NGOs and international organizations and 16 participants for other JICA related projects.

Table 6.3.1 Participants to the Monitoring Tour/ Workshop

Organization	Number	Remarks
Government (Agriculture)	15	
Government (Livestock)	2	

Government (Cooperative)	5	
International NGOs	5	Save the Children, AMDA, etc.
International Organizations	3	FAO, WFP, etc.
JICA related project	16	
JICA Study Team	8	Including counterparts
Others	5	(Journalist, freelance, local consultants)
Total	59	

Source: JICA Study Team

As aforementioned pre-tour/workshop inventory inquiry was issued to the participants, asking various questions as years in services, what projects they have been engaged in the CDZ, problems and best experiences they have had so far, expectations from this tour/workshop etc.

6.3.1 Years in Service for the Participants

Figure 6.3.1 summarizes the years of service of the participants. The result is roughly divided into two strata of 1 to several years and over 26 years. If considering age structure, it can be said that this tour/workshop provided them, especially for young generation, with good opportunity to see various types of pilot projects targeting not only farm household but also landless farm workers.

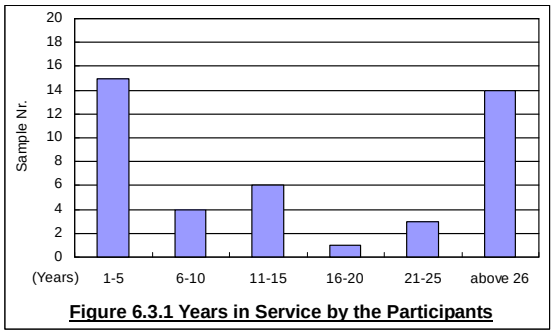


Figure 6.3.1 Years in Service by the Participants

6.3.2 Project Experiences in CDZ

Experience if the participants have ever been engaged in any project carried out in CDZ was asked. Out of 43 replies, 21 participants (49%) reported that they have experiences of working in CDZ, and in fact 8 of 21 replies are concerned to the JICA's Development Study. The types of activities/ projects can be summarized as below. Most of their experiences are related to agricultural sector.

Table 6.3.2 Project Experiences of Participants in CDZ

Type	No.	Remarks
Agriculture/livestock	11	UNDP, FAO, JICA
Food supply/food security	4	
Health care	3	
Community development	3	
Micro finance	3	
Forestry	2	
Water supply	1	
Poverty reduction	1	
Child care/education	1	
Cottage industry	1	

Source: Pre-tour/workshop inventory questionnaire, JICA team

6.3.3 Experiences as Development Practitioner/ Officer

Three inquiries concerning their past experiences were given to the participants, namely, 1) problem(s) you have faced or are facing as a development practitioner/ officer, 2) what kind of efforts you have extended to solve the problem(s), and the best experience(s) you have had as a development practitioner/ officer. Following table 6.3.3 summarizes the problems they have faced or are facing and relevant efforts they have made:

Table 6.3.3 Summary of the Problems the Participants have faced or are facing

Problems you have faced or are facing	Effort of how to solve the problems
Social issues, organizational issues, capacity issues	
No habit of working in cooperation and lack of knowledge on cooperative sector.	Cooperative-related explanations were made.
It was difficult to organize parents (mothers) of under 5 year children during the period of Public Health Care Project because they were hesitant to speak before public.	Made friends with mothers of children by visiting their homes and organized them to participate in the activity.
Always faced difficulties of relationship between us and villagers.	The most important thing is to enhance them and establish good relationship with villagers.
Sometimes face difficulties to get understanding from both farmers and development partners.	It is necessary to take time and to continue making efforts to get understanding through persevering discussions.
The problem faced by the project was to get the participation	To increase awareness of the people.

of people to establish community fund.	
All-level community lacks proper understanding on community development activity.	Patience, repetition, understanding and close collaboration with everybody.
A little bit weak in cooperation among institution.	To do more meetings, field visits and demonstrations and to form community level implementing groups.
Facilitation and mobilization of local people (beneficiaries) and to sustain development activities after outsider's withdrawal.	Meeting, communication, information dissemination, awareness raising, making involvement of private sector.
Capacity building for local staff.	To conduct internal training.
Sustainability of project activities is not sure.	To support by NGOs to be able to sustain in the long run.
Technical issues	
Water quality problem.	To study in detail before starting the project.
Soil conservation, water management, pest and disease control, weed problem etc.	Farmer meetings, farmer-to-farmer discussion, farmer field school.
Maintenance of infrastructure developed (eg. Pond, road, tree plantation).	Formation of management committees at proposal stage and to continue implementation and post-activity stages.
Lack of suitable varieties of crops for CDZ, soil conservation technique and unawareness of soil fertility management.	Identification of new varieties and demonstration of agro-techniques for all-round agriculture development.
Prices of crops are not stable and in extension work, the main problem is to support farmers with necessary things such as herbicide and fertilizer.	Sharing knowledge of how to observe the market/market price and making manure compost and vermin-culture compost.
Others	
Shortage of fund for micro-finance.	Try to establish village revolving fund.
Limited funding opportunities.	Try to keep evidence in programme activities.
Face the problem that there are a lot of government policy and procedure to implement project in the community.	According to the concerned government department or ministry, to understand and support for the project implementation.

Source: Pre-tour/workshop inventory questionnaire, JICA team

Following are best experiences that the participants have so far achieved through their activities, project, and some occasions working with partners. Since the participants are from different organizations, their experiences are diversified:

1) Villagers could have opportunity to purchase according to their choice (eg. Ar La Ka Pa: tractor, Magyi: handlooms. This is a pilot project under this Study).
2) Due to building relationship with mothers, they became self-confident and attended their meeting regularly and actively took part in the activity.
3) Groundwater survey well done.
4) To dig pond together with villagers is the great experience for us because through the process of the project we and villagers cooperated well.
5) Farmers field school and some demonstrations easy to follow.
6) Extension work in livestock breeding and veterinary field.
7) Sharing and learning from different organizations.
8) Many women actively participated in management committees.
9) Involving in the activities of crop improvement for CDZ, identification of major constraints in CDZ farmer's field, and participation in agri-based achievement in CDZ.
10) Making efforts to get strong cooperation.
11) Experiences of rural finance specialist.
12) FAO's formulation of KIGG, LIGG etc, and running development activities with revolving fund.
13) National consultant to livestock sector in NMTPF Programme initiated by FAO.
14) Initiation of microfinance activities in peri-urban area and replicating in Tsunami-affected area in Indonesia.
15) Good collaboration with private sectors.

6.3.4 Expectations to the Monitoring Tour/ Workshop

The inventory inquiry asked the participants what they expect from the tour/ workshop. Following are the summary of their expectations: as expected 'to share experiences/ information' came first, and then followed are 'to know farmer's/ people's situations and needs', 'to learn current development activities', 'methods of how to reduce poverty', 'to get ideas from this workshop', etc.

- To share experiences/information (7 pax)
- To know farmer's/people's situations and needs (5 pax)
- To learn current development activities (5 pax)
- Methods of how to reduce poverty (5 pax)
- To get ideas from this Workshop (4 pax)
- Methodology of conducting Monitoring Workshop (3 pax)
- Outcomes/ impacts from this Project (3 pax)
- Response of beneficiaries (2 pax)
- To understand the real situation of the Project (2 pax)
- Problems and solution (2 pax)
- To use suitable activities for our Project (2 pax)
- Participant's impression on CDZ Project (2 pax)
- The project system
- Success stories of beneficiaries
- To know key points of development of CDZ
- To get the experience for future project
- The effective way of livelihood improvement especially in bad weather like this year
- To meet future co-workers for new projects
- To get new activities with agro-forestry
- To know the situation of livestock in the area
- To learn the activities of microfinance projects
- To provide loans to the poor as microfinance like cow-bank
- To gain human resources development (HRD) knowledge
- To enhance food security at government level
- To observe water sanitation and health
- Long-term development of sustainability
- To get networking with other INGOs, NGOs and related government departments

6.4 Monitoring Tour

Representative of the beneficiaries in the villages where pilot projects were implemented prepared summary of each project on the provided big sheet for presentation. Table 6.4.1 shows an example of pilot project carried out at North Pabe village. One of beneficiaries of each pilot project presented on the day, and then interactive discussions with the participants was made.

A representative of North Pabe villagers presents their achievements to the tour participants.

Table 6.4.1 An Example of the Presentation to Tour Participants by Beneficiaries

Village: North Pabe Project: Rural Development Center
Project Description: Construction was completed on (4.9.2008). First batch of children (22.9.2008)
Membership: Committee was formed on (4.9.2008) with (7) members
Design of the project: To bring about village development

Achievements we are proud of	Efforts to come up with the achievement
1. Village development activities could be carried out at the center 2. Children could be provided with nutritious food 3. Recitation of Buddha's teachings can be done once a week 4. A village library could be built	1. Meetings, talks, discussions arranged by township-level authorities concerned were held at the centre (eg. educative talks, vaccination by Township Health Center) 2. By collecting contributions from villagers or with the help of individual donor, arrangements for children were made. 3. Village-tract PDC chairman donated the cost for a village library
Problem (s) encountered	How we have solved
1. There was no fund for feeding the children during the period of second batch	1. A meeting attended by each and every household was held to make them contribute whatever they could, however little.
Future plan(s)	How we are going to realize the plan(s)
1. Feeding nutritious food to children will be continued 2. The centre will be hired out for holding of wedding receptions and novitiation ceremonies	1. To get fund for feeding the children, some of the goats provided by the project will be sold 2. Hiring charges earned from the centre will be saved as Village Development Fund
Lessons we like to share with the visitors	
1. Beneficiary-children should be chosen in advance 2. Recitation of Buddha's teaching weekly and performing religious activities on important religious days could make the children more polite than before.	

Source: Village committee, North Pabe village, Chauk TS, Magway division

6.4.1 Degree of impression with ranking of the pilot projects (for Day 1)

The participants were asked to present the degree of their impression on the pilot projects that they had visited in North Pabe and Mingan villages on Day-1. Each pilot project was evaluated by scoring 1 to 5 in terms of impression, and 5 is the highest. The result of evaluation on Day-1 is shown in Figure 6.4.1. Higher marks were given on the pilot projects of the Rural Development Center in North Pabe village, and Primary School, Diesel Power Generation and Goat Revolving in Mingan village. It is recognized that participants considered those pilot projects are highly sustainable and contribute not only to improvement of the living standard of the beneficiaries but also livelihood of villagers as a whole including children, elders, etc.

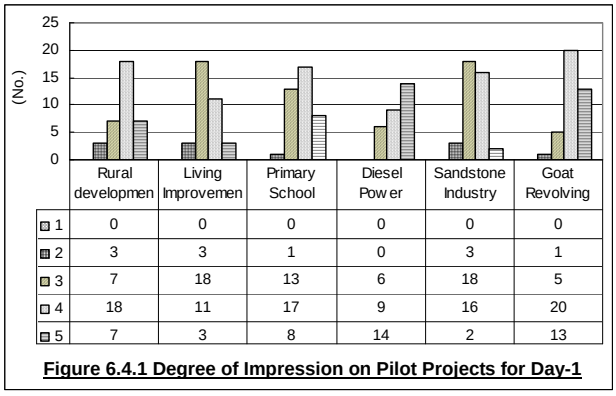


Figure 6.4.1 Degree of Impression on Pilot Projects for Day-1

6.4.2 Degree of impression with ranking of the pilot projects (for Day 2)

Same as the Day-1, participants gave the degree of impression to those projects they had visited on Day 2. The results of the evaluation are shown in Figure 6.4.2. Pilot projects targeting poor people such as mushroom cultivation and goat raising were evaluated relatively high. Likewise, Rice Husk Generator in Mon Taw Gyi village was highly evaluated. Several participants gave lower marks of 1 to 2 to Rural Sales Center (Road Station), Paddy Dryer, pig raising, mushroom production, ICM (Integrated Crop Management) and Rice Husk Generator. It was

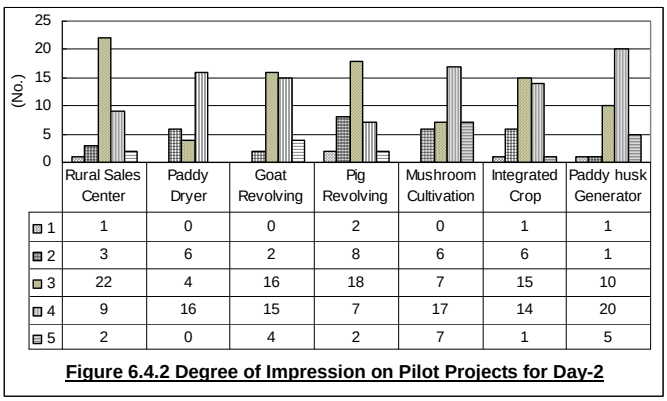


Figure 6.4.2 Degree of Impression on Pilot Projects for Day-2

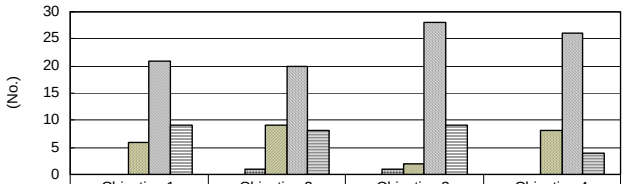
learnt from the questionnaire sheet that those participants thought such pilot projects may involve some weaknesses in terms of sustainability, novelty in technology, and marketability.

6.4.3 Achievement relating to the objectives of the Monitoring Tour/ Workshop

Participants evaluated about achievement related to the objectives of the monitoring workshop by scoring 1 to 5. Figure 6.4.3 summarizes the results of the scoring. Regarding objectives of "exchange own experiences and ideas with the Study team" and "facilitate concerted efforts towards the development of CDZ" were given higher marks than another two objectives which themselves are not low either

It is considered that most of the participants achieved the objectives of this workshop. It is said that interactive discussions on field and wrap-up workshop provided them good opportunity to share experiences and ideas to improve livelihood of the people in the CDZ.

1. To share the experiences, achievements, and lessons of the pilot projects being carried out under the said pilot project,
2. To familiarize development constraints and opportunities related to the development of the CDZ,
3. To exchange own experiences and ideas with the JICA team and thereby the participants enrich modality of the development activities, and
4. To facilitate concerted efforts towards the development of the CDZ based on the feedback from the participants.

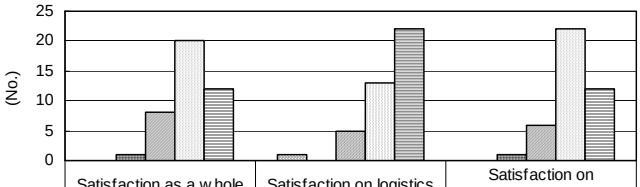


	Objective 1	Objective 2	Objective 3	Objective 4
1	0	0	0	0
2	0	1	1	0
3	6	9	2	8
4	21	20	28	26
5	9	8	9	4

Figure 6.4.3 Achievement of the Objectives by Participants

6.4.4 Monitoring programme overall evaluation

Participants evaluated satisfaction related to the monitoring workshop on the final day by also scoring 1 to 5. The contents of "Satisfaction" are; 1) satisfaction as a whole, 2) satisfaction about logistics, 3) satisfaction about their expectation what they had expected at the beginning of the workshop. Figure 6.4.4 shows the results of the degree of their satisfaction. As to satisfaction as a whole, 78% of the participants gave 4 to 5 marks, and 85% of them satisfied logistics in the level of 4-5, and 84% also considered their expectations were met in the level of 4-5.



	Satisfaction as a whole	Satisfaction on logistics	Satisfaction on expectation
1	0	1	0
2	1	0	1
3	8	5	6
4	20	13	22
5	12	22	12

Figure 6.4.4 Degree of Satisfaction by Participants

6.4.5 Comments if any

At the end of the questionnaire, any comments were asked. Some comments were related to pilot proejcts, giving some ideas to further improve the project performance and some comments were of overall. Following are the comments:

1) Instead of feeding nutritious food to children, there should be an arrangement for their parents to increase family income, and fund should be spent for stipend for outstanding students who cannot proceed their education.
2) Instead of tractors, two- wheeled power tillers and rotary cultivators could be provided because they are cheaper and easier to handle and maintain (in case of Ar La Ka Pa village).
3) To set up the monitoring system in the center committee to solve the problems, issues, and limitations of the project.

4) For small farmers, water harvesting activities (soil conservation activities) should be provided.
5) Soil conservation and soil fertility management should be initiated in specific areas of CDZ.
6) Revolving fund for community should be applied in CDZ.
7) Environmental consideration is the cause (basic) for success of all sectors.
8) Water availability is important.
9) The CDZ staff should organize villagers more and help them to enable them stand on their own feet so that the activities will be sustainable.
10) To provide masks for sandstone workers in Mingan village.
11) More projects are required, emphasizing on landless people and farm laborers.
12) Livestock (pig/goat raising) and agriculture (potato/mango) components should be extended to suitable areas.

6.5 Proposed Project/ Development Activities

An inquiry, which asks what projects/ development activities are needed to further improve the livelihood of the CDZ people, was made to the participants 2 times, e.g. before and after the monitoring tour. As summarized in Table 6.5.1, many participants raised agriculture related project/activities, then followed by water supply project, micro-finance including establishment of village revolving fund, livestock revolving projects like goat and pig, electrification, health and education, etc. It seems that ideas after the tour have become clearer and look diversified. Projects/activities, which were not included in the pilot project, are those as highlighted in the table.

Table 6.5.1 Projects/ Activities to Further Improve the Livelihood of the CDZ People

Proposed Project/ Activities (before the tour)	Proposed Project/ Activities (after the tour)
Providing agricultural technologies (4) Providing agricultural equipment (4) Water harvesting (2) Growing high quality crops (1) Solving major constraints in agricultural sector (1) Agri-related job opportunities (1)	Technical transfer for agriculture sector (technologies and ideas; upgrading seeds; ICM technology; panicle selection technology; water saving, water catchment, water harvesting; crop specific technology; etc) (13) Providing seeds to the poorest farmers (1)
Water supply project (7)	**Water supply project (6)**
Microfinance (4)	**Microfinance**/expanding village revolving fund mechanism (3)
Goat raising (1)	Goat revolving (3)
Pig revolving (1)	Pig revolving (3)
Electrification (1)	Electrification (cow dung, paddy husk, generator) (4)
Vaccination trainings and health care (2)	**Health care activities (2)**
School construction/education (4)	Educational activities (2)
Market opportunities (1)	More activities including marketing for cottage industry (1)
Food security (1)	Food security for multi-sector (1)
Good transportation system (2)	**Road and communications for all seasons (1)**
Providing technologies/materials for livestock (3)	
Small-scale aquaculture practice (2)	
Running small businesses (2)	
Participation of rural community (1)	
	Marketing for agricultural products (3)
	Soil conservation project (3)
	Dried goat meat processing at village level (1)
	Native chicken banking system (1)
	Upgrading of breeds for livestock (1)
	Mushroom cultivation (1)
	Community forestry and small-scale irrigation
	Self-standing farmer's organization (1)

Source: Pre-and Post-tour/workshop inventory questionnaire, JICA team

6.6 Wrap-up Workshop

The wrap-up workshop was commenced by the presentation by team leader of the JICA Study Team.

In the presentation, socio-economy, environmental conditions comparing with those of other areas, typology of 51 TSs, poverty line etc were explained, and then proceeded to the explanation of the revolving system and outcomes of the pilot projects. Interactive discussions were followed as summarized below:

1) Can the revolving fund in Ar La Ka Pa village be managed with 2 to 5 % interest rate? A: In Myanmar, annual inflation rate has ranged from 20% to as much as 60%. Therefore if the monthly interest rate is set at 5%, it can compete with the highest inflation rate of 60%. If the monthly interest rate is set at 2% only, it can compete with about 24% of annual inflation. In this way, the recommended interest rate is considered within a reasonable range.

2) Are there any concrete methods to make the pilot project more sustainable? A: We do not have to try out to let any project to be sustainable. Some projects may not be sustainable depending on the project design, depending on where the project is implemented, and who the project is targeting. What is important here in this pilot project implementation is to clarify all those factors by which project sustainability is affected. To share all these factors with partners, we can improve project design and implementation.

3) What is the most appropriate pilot project so far implemented in CDZ? A: Our basic standing position is that there is no almighty project which can apply to each and every sort of condition and target each and every people either. A project works in some specific conditions but in other cases it may not. Therefore project should be selected according to where to implement and who to be targeted.

4) How did Ar La Ka Pa village people set up rental fee of the tractor and is there any idea of depreciation cost taken into account? A: The rental fee was examined with reference to examples in neighboring villages, thereby it can be said it was set according to a market rate. In fact, the rate in the village is little lower by about 10% as compared to the example of neighboring village. In calculation, the profit can cover depreciation cost. However, there is a mechanism of setting up a village revolving fund by utilizing the profit of the tractor rental fee. The arrangement is to submit 60% of the profit to the village revolving fund. Under this arrangement, the rest of the profit can hardly compete the depreciation cost. In this project design, setting up of village revolving fund was put more emphasis than fully competing the depreciation.

5) Which pilot projects are going to continue and which ones are going to omit when implementing projects after the development study by JICA? A: the Team has drafted a poverty reduction action plan covering all the CDZ. The action plan, a sort of master plan, has a number of development interventions, now called project/programme, and those interventions are given priority according to where to implement and who to be targeted. With this arrangement, development partners will know which projects should be continued with what priority and vice versa. The plan is to accompany project design matrix (PDM). The PDM will clarify project risks which should be taken into account when designing and implementing those projects.

6) What is the reason for poverty in Myanmar though comparison of the socio-economic conditions between Myanmar and other countries were made ? A: this is quite difficult and sensitive issue. As an idea, one may say agriculture sector is by far important in the CDZ people, however, the sector alone cannot compete with the poverty now prevalent in the CDZ area. There is already time to transform the economic structure from agriculture centered-one to more secondary oriented one. As explained by power-point slide, agricultural land in Myanmar is not large enough to accommodate all the rural population. Here there should be an effort to create job opportunity for those landless people and one of ideas is to promote secondary industry, transforming the economic structure.

6.6.1 Session -1: Review of the Pilot Projects

Comments to further improve the project performance that the participants remarked during the tour were shown to review the pilot projects. The comments are summarized in Table 6.6.1 and based on the summarized ones, the participants started interactive discussions. During the discussions, pointed out are as follows:

1) It will be necessary to set up extension system extending technologies from villager to villager.
2) Concerning the beneficiaries who quit goat raising (group 1) in Legaing village, it will be necessary to set up a mechanism in order to inform current situation of goat raising to LBVD TS offices.
3) There are some weaknesses in the pilot projects. For example, beneficiaries of goat raising revolving do not acquire proper technologies for animal husbandry. The cause of death of goats in Legaing village will not be reasonable that they procured goats from the area 10 miles distant. More technical investigations are required.
4) It will be possible and necessary to inform livestock prices to villagers since TS LBVD officers regularly gather for meeting. It will also be necessary to teach beneficiaries strategies of how to sell goats and pigs at higher prices as possible as they can. It will be possible for goat beneficiaries in Mingan village to sell goats at higher price by themselves by establishment of goat cooperative, not relying on traders.
5) Regarding tractor utilization in Ar La Ka Pa village, most of collective use of a tractor in Japan has failed because users return the tractor without proper maintenance. It will be recommendable to employ a manager who is responsible for the management of the tractor by paying salary, and he is required to run the tractor as business.
6) It will be better to follow the regulation of the Ministry of Cooperative when organizing cooperative in the village.

Table 6.6.1 Recommendations to Further Improve the Project Performance

Project visited	Recommendations to further improve the project performance
Rural Development Center in North Pabe village	· Villager's participation is essential. · Not only child care but also elder care is needed. · Fund for long-term plan should be considered.
Livelihood Improvement activities in North Pabe village	· To provide more activities for vegetable cultivation (e.g. technology, seed; water supply) · It is necessary to get assistance from outside. · Villagers need to consider better plan for livelihood.
Primary School in Mingan village	· Villagers should find funding source for the completion of school. · It is necessary to organize the villagers to contribute their quota. · With proper guidance of the project, villager-to-villager organization should be done.
Diesel Power generation in Mingan village	· To install better posts of wire-line for safety from fire. · For long-term maintenance, communal unity is needed to build up. · More efforts are to be made by villagers to ensure sustainability.
Sandstone Production in Mingan village	· It is necessary to create a stable market for their products. · To produce sandstone wares, easier technology should be provided to save work. · To try to produce new products like sandstone floor tiles and others.
Goat Revolving in Mingan village	· To provide goats to really poor households. · Revolving system should be encouraged. · Regular extension services are needed.
Rural Sales Center in Legaing village	· To make more villagers involve in the center activities to cooperate with committee members. · To draw financial statement and auditing regularly. · There should be monitoring from the project side.
Paddy Dryer + Crop Storage in Legaing village	· Maintenance trainings should be conducted. · If a threshing machine is provided, it will be more effective. · Management should be strengthened.
Goat Revolving in Legaing village	· It is necessary to set up criteria and to select beneficiaries. · Trainings should be conducted for villagers to improve domestic animal husbandry knowledge.
Pig revolving in Legaing	· Before starting the project, it is necessary to consider whether there is scarcity of animal

village	feedstuff or not. · It is necessary to ensure if there is any monopolized market for selling pigs.
Mushroom Cultivation in Legaing village	· For buying inputs and selling mushroom, cooperative way will be effective. · To introduce other mushroom cultivation technology for narrow landowners. · To conduct training for making dried mushroom.
Integrated Crop Management (ICM) in Legaing village	· It is necessary to make farmer know clearly how different ICM and conventional practice are. · To prove that ICM is beneficial to farmers.
Paddy Husk Biogas Power generation in Mon Taw Gyi Village.	· Operation and maintenance training and financial management training should be conducted. · It is necessary to consider and develop ideas for sustainability together with villagers.

Source: Questionnaire filled during the tour to above pilot projects, JICA Study Team

6.6.2 Session -2: Recommended projects other than pilot project

Though questionnaire has asked the participants what projects and development activities are required to further improve the livelihood of the CDZ population, again the workshop requested the participants to come up with such projects by interactive way. Following are the projects or development activities that the participants recommended:

Table 6.6.2 Recommended Project and Development Activities Other Than Pilot Projects

No.	Title	Target
1	Native chicken farming	Village level
2	Slaughter house	Village level
3	Marketing system for all products	CDZ
4	Integrated village development project	Small scale farmer, landless
5	Farm product processing	Rural women
6	Tourism attractive area development	Villages such as Mingan village
7	Livelihood imp't of CDZ through integration of rural dev't activities	CDZ
8	Rural electrification	North Pabe
9	Small scale seed/grain business	Village level
10	Village network establishment	Villagers, VPDC
11	Membership-type self standing farmer organization	Farmers
12	Community based cottage industry development activities	Villagers
13	Technology transfer school for farm household	All farmers
14	Integrated soil management	Farmers
15	Revolving fund system for all sectors	Villages

Source: Workshop held on Day-3

CHAPTER 7 PROMOTION VIDEOS

7.1 Rational and Objective

As a part of extension activities, there included an arrangement of promotion by video-stories. Those video-stories were based on really-practicable agricultural techniques by farmers and success stories of a farmer and landless people. A DVD was arranged with 3 success-stories of agriculture (paddy), livestock (goat), and cottage industry sectors. DVDs were produced in FY 2008/09, and distributed to concerned townships beginning from March 2009.

Videos were distributed to villages in 12 townships where pilot project activities were being implemented. In addition, according to the arrangement of Magway Division MAS office, Aunglan township was added and so there were altogether 13 townships for this video promotion activity. As a DVD is arranged with agriculture sector in the core, and added with livestock and cottage industry sectors, it was not necessary for each ministry to correspond with DVDs. DVDs were therefore distributed to MAS, then from MAS to Township PDC, and finally from Township PDC to Village PDC chairmen.

7.2 Stories of the Promotion Videos

7.2.1 Agricultural Technical Video (Sub-title: How to conquer mother-in-law)

U Win Htay and U Bay Lu Wa are old friends. They lived in the same village and grew up there. However, U Bay Lu Wa got married with a woman from other village ten years ago and lived in his wife's village since then. He visited his native village to see his relatives and friends. He also visited U Win Htay's home and he was much surprised to see his friend's improved economy. He enquired that if his friend, U Win Htay, had won the State Lottery prize because his friend was living in a big grand house. U Win Htay replied that he became rich because it happened to him to learn modern technologies from MAS and he practiced those modern agricultural technologies in his paddy cultivation. So, he became rich within 4 - 5 years. His friend did not believe U Win Htay at all because he is also a farmer and he has been cultivating paddy in his wife's village for long.

A scene shows a good farmer is mixing urea and bokashi (Agricultural technical video).

U Win Htay explained that his cultural practice was not conventional one but high-yielding technology, using EM Bokashi systematically. His friend was interested in EM Bokashi and wanted to know about it. U Win Htay explained to his friend that EM Bokashi is natural fertilizer which can be made easily by using farmer's nearest waste materials such as cow-dung, paddy straw, wheat stem, sesame stem, bean's outer cover, rice bran, dried leaves, twigs, etc. Then he demonstrated making EM Bokashi for a heap. EM concentrate is used to culture microorganisms which are effective for agriculture, and if EM is not available indigenous microorganisms (IMO) which have same effectiveness as EM can be applied, he explained.

Afterwards, he also demonstrated how to make IMO step by step, followed by Bokashi making. He also pointed out important points such as if Bokashi compost is made by using EM, a layer or layers of Bokashi compost must be kept under cover because EM do not like air, and if it is made by using IMO no need to cover it because IMO like air, and so the heap requires to be turned up from time to time.

He also showed Bokashi compost already made near the main field. He pointed out that if Bokashi compost is applied together with chemical fertilizer, the cost for chemical fertilizer can be reduced.

A scene shows a man is inquiring how to apply bokashi to a good farmer (Agricultural technical video).

U Bay Lu Wa knew how to make Bokashi compost but he did not know how to use it. U Win Htay asked his friend how many baskets he gets if paddy is cultivated by conventional practice. His friend answered that the yield is 50 - 80 basket/acre. Then U Win Htay told his friend about high-yielding technology which ensures 120 - 140 basket/acre. He explained how to apply Bokashi compost.

U Bay Lu Wa was satisfied with what his friend had said. He told U Win Htay that he would use Bokahsi compost in his paddy cultivation to obtain high yield because he was always scolded by his mother-in-law for low yield of paddy from his field. U Win Htay said that it was not enough by knowing how to apply Bokashi and it was also necessary to cultivate good and pure seeds. U Bay Lu Wa asked his friend how to select and cultivate good and pure seeds.

U Win Htay explained his method of getting good and pure seeds by growing main panicles from primary stems. And then he explained the method of getting good and pure seeds by soaking them in salt water, removing unfilled grains. U Bay Lu Wa thanked his friend very much because he knew very well about how to get good and pure seeds and how to use Bokashi. He asked his friend what was left unsaid in connection with high-yielding technology. U Win Htay told him to be systematic in nursery preparation and transplanting for growing for seeds and for subsistence. Then he practically showed his friend the method of early and sparse transplanting.

U Bay Lu Wa said that he would apply U Win Htay's cultural practices to obtain high yield from his field. Actually, he followed high-yielding technology and paddy cultivation was successful. He was very pleased because he would not be scolded by his mother-in-law any more, he would be able to do charity, and he possessed wealth. He urged the audience to apply locally adaptable technologies and to use Bokashi compost systematically by experimenting it.

7.2.2 Livestock Technical Video (Sub-title: Destiny concerning marriage caused by goats)

Ko Zaw Zaw and Ma Cho have fallen in love with each other for two years. Ma Cho urged Ko Zaw to look for a stable job and save money for their marriage because he could not earn regular income. Ma Cho worked as a weaver in the village. Her mother wanted her to marry a tamarind broker from a city. He was told by his girlfriend that Tar Tee, a villager from a neighboring village, could marry his girlfriend after raising goats as an entrusted goat raiser. Tar Tee was also an orphan like Ko Zaw. Ko Zaw saw the light and decided to raise goats as an entrusted goat raiser. In his village there was a rich man who owned many goats but he did not have any herdsman. Ko Zaw went to the rich man and asked for 5 goats to be raised. He had already got 10 goats from other two goat owners. He was entrusted by the rich man for his 5 goats.

He was sleeping while herding the goats and dreaming of their happiness. At that time the goats were grazing in a farmer's field. The farmer was very angry with him and he had to apologize for that. Ko Okka, a tamarind broker from a city, visited Ma Cho's home and gave presents to Ma Cho's mother because he was trying to win the love of Ma Cho. However, Ma Cho did not love him at all. One of the five goats he took from the rich man died of disease. He invited a Vet-doctor to come and

see that goat. But the rich man thought that Ko Zaw did not look after the goats very well. So, he took his own goats from Ko Zaw.

Ma Cho, his girlfriend, was worried about the rest goats. Ko Zaw had already invited a Vet-doctor to his house. He made up his mind to discuss with well-experienced persons of goat raising and take their advice in the future. Dr. San Htun Oo, secretary of Upper Myanmar Livestock Breeding League, explained to Ko Zaw about the diseases which goats suffer and how to cure of those diseases. The following were the explanations made by Dr. San Htun Oo.

A scene shows that Veterinary Doctor is explaining goat disease (Livestock technical video).

Before a goat dies, he/ she will discharge liquid from his/ her nose. Such a thing mostly happens in summer. When a goat discharges liquid, flies will come and rest at nose because of odor smell. Then they will lay eggs at nose. Those eggs will get into the windpipe and then into the head. Goats suffering from such disease (*Oestrus Ovis*) can be differentiated when they are turned out for herding. They will always be at the back of a herd. That disease can be cured like this. Wipe off the liquid discharged from nose. Put some turmeric powder onto live coal in a stove and place the stove under the goat's nose. The disease can be cured easily. It is good to raise goats on high land.

However, what is better is to raise goats with a raised-floor because goats like cleanliness habitually. By raising with a raised-floor, outbreak of disease will become less and the rate of reproduction will increase. There is a disease to which much attention must be paid, called pneumonia. That kind of disease occurs during the transit period of one season to another. Especially, goat kids of 2 - 3 months of age suffer from that disease. The symptoms of that disease are a goat discharges liquid from nose, becomes thin, gets tired and is always at the back of a herd when it is turned out for herding. As soon as that disease is identified, inform LBVD office. If vaccination is done, it can be cured within 3 days.

There is also another important disease called 'Scabies'. It is caused by parasites. That disease can be known by seeing scabies on a goat's ears. Inform LBVD office immediately. A Vet-doctor will come for vaccination. Vaccination is to be taken every two months. After vaccination has been done for 3 times, the disease will totally be cured of. Moreover, feed UMMB to your goats to increase reproduction and to have fair coat. UMMB means Urea Molasses Mineral Block. It can easily be available at township LBVD. By feeding UMMB to your goats, scabies can be partly prevented, your goats will become healthier, their coats will become fair and rate of reproduction also will become better.

An interview scene shows a couple of livestock (Livestock technical video).

Ko Zaw, after he had been explained about goat raising by Vet-Doctor San Htun Oo, promised the doctor that he would raise goats with raised-floor, do sanitation work systematically and get his goats

vaccinated. Ko Zaw said that he started raising goats with raised-floor after meeting with LBVD. And he kept the goat housing clean and herded the goats to get enough feedstuffs. Therefore, goats become healthier and reproduction rate increased from 1 - 2 to 3 kids.

Ko Zaw's friend Pho Nyi who worked at a brokerage in a city returned to the village because he could not save any money although he worked there for two years. Pho Nyi visited KoZaw and saw many goats. He was told by Ko Zaw that goat raising was very profitable if it was done carefully and systematically. He told Ko Zaw to help him to be an entrusted goat raiser like Ko Zaw. Ko Zaw told his girlfriend that he would be able to marry her after he and goat owners had divided the goats among them. His girlfriend told him that the broker would ask for permission to marry her from her mother by paying 5 ticals of gold as deposit.

Okka came to see Ma Cho's mother and showed her the gold he had brought. Ma Cho told Okka she could not marry him. Ma Cho's mother told her daughter not to reject her arrangement. At that time Ko Zaw and Pho Nyi arrived at Ma Cho's house and told Ma Cho's mother not to give consent to the broker. Pho Nyi told the broker he knew about him because he worked at the brokerage with which the broker had dealt. He threatened the broker not to commit any wrongdoing with Ma Cho. Okka, taking his gold, hurriedly left. Pho Nyi explained Ma Cho's mother that the broker was just a womanizer. Ko Zaw also told his would be mother-in-law that he would look after her as his own mother and all his goats were for marrying Ma Cho. Ko Zaw and Ma Cho were given consent to marry by Ma Cho's mother. They felt very happy.

7.2.3 Cottage Technical Video (Sub-title: Left and Right)

Ko Tun Naing got married with Ma Win Win. Parents from both sides were no more. He could not afford to celebrate a reception. He just offered alms-food to monks. He lived separately with his uncle's family after the marriage. However, he continued working as a traditional slipper maker at his uncle's house taking piece work earnings. He saved money to be able to start his own business. He and his wife discussed about their future plan on the first day of their marriage.

An interview scene shows a couple of cottage industry (Cottage Success Story)

He went to a shop which sells raw materials for slipper making and met with a shop owner. And he tried to let him buy raw materials on credit. The shop owner told him he would let him do so if he used his uncle's successful brand name 'Thein Ka Bar' illegally. He did not want to do such a thing. He just wanted to penetrate the slipper market by using his own new brand. The shop owner did not believe him and refused to sell him on credit. He did not think other shop owners in Mandalay would let him buy raw materials on credit.

There are always 'downs' in life before 'ups'. They did not have enough money to buy necessary raw materials. They had only 50,000 Kyats. Their necessary capital was about 250,000 Kyats. His friends helped them by lending 100,000 Kyats. *A friend in need is a friend indeed.* In this way, they had 150,000 Kyats. They would have to try to let them buy raw materials worth about 100,000 Kyats on credit. He could persuade one of the shop owners who knew his uncle to let him buy raw materials on credit but the money was to be settled on an agreed date.

They started doing their own business of traditional slipper making, his wife systematically collected waste materials of products and sold them to save money. She could also manage their workers. In

connection with slipper making, her responsibility was to sew 'straps' of slippers. The couple tried to penetrate the Zegyo Market in Mandalay for their new brand 'Engine' slippers. They could organize some shop owners by giving a warranty of quality for their slippers. However, the shop owners would settle the money only after they had sold all of them.

The couple discussed and negotiated about the debt for raw materials as the fixed date was drawing nearer and nearer. His wife suggested him to borrow money from his uncle. But he did not want to do so because he branched out from his uncle's business and set up his own brand. His wife again suggested him to try with Village Co-operative Society as he was a member of it. *Difficulties can be overcome by negotiation.* They got the money needed for the debt from Village Co-operative Society but they had to promise to repay the money according to co-operative rules and regulations.

He could repay the debt for raw materials on the fixed date. The shop owner inquired about his business. He said he was paid for his products by shop owners only when they had sold them and so production could not be done continuously, but intermittently. The shop owner let him buy necessary amount of raw materials on credit because he kept his promise. He bought raw materials of about 200,000 Kyats on credit. *If you keep your promise, you will win the trust of others.* The couple delivered their products to shops. *Success can be achieved if you are honest and diligent.*

His uncle gladly informed him of his new brand 'Engine' slippers' successful condition. He received more and more orders from customers. His uncle urged him to save money so that he could extend the business. His wife was a treasurer at home and she already knew how to extend their business systematically. He was very sympathetic. When his workers were ill, he always took care of them. He sometimes helped them by paying advanced money. He never forgot his past worked as an employee. Even when there were urgent orders, he allowed his worker suffering from malaria to go to a clinic and take a rest. *An employer should take pity on his employees.*

A scene shows a couple of 'Engine' brand slippers (Cottage Success Story)

One of the raw materials shop owners in Mandalay persuaded him to buy raw materials on credit from his shop. He refused to do so and kept on being loyal to his raw materials shop owner who helped him when he was in trouble for capital. *Being loyal to a benefactor is a spiritual virtue.* He was forced to drink by the shop owner who persuaded him to buy raw materials from his shop. When he got home, he was already drunk. He threw out what he had drunk and eaten. His wife was so angry that she left the house. *Evil deed conditions evil result, however little it is.*

His wife stayed at his uncle's house and worked together with other workers. One day she vomited early in the morning. Her husband's aunt, after questioning her, convinced that she was pregnant. So, her husband's aunt urged her to go back to her husband's home. His uncle admonished him not to drink any more throughout his life. His uncle explained that it is better to be a person who controls his mind not to do evil things than a person who corrects himself again after doing evil things. His uncle also told him that his business became successful not only because of their efforts but also because of their observation of Buddhist five precepts, namely, 1) not killing living creatures, 2) not stealing other people's property, 3) not committing adultery, 4) not telling lies, 5) not drinking intoxicant.

As soon as he violated one of the five precepts such as drinking, his marriage was going to collapse,

his uncle added. He promised his uncle he would not drink any more because he had suffered a lot. His uncle also admonished him not to follow bad ways which lead to poverty. He apologized his wife for his wrongdoing and told her to come back to their home as he alone could not manage their workers. He told his wife that they were like a pair of slippers, one left and other was right. The right one could not go on a trip without the left one, he said. As soon as he knew his wife was in the family way, he wished for twin, like left and right slippers, a girl and a boy.

7.3 Monitoring of the Video Promotion

7.3.1 Monitoring Methodology

For monitoring, follow-up forms, in which the number of video-show, the number of villagers who watched video, the number of villagers who imitated a certain activity from the stories due to agitation of characters and the number of villagers who copied video-stories were asked, were given to Village PDC chairmen requesting them to fill out the forms. Those forms were to be filled out beginning from April 2009 and they were to be collected in August and December in order to carry out follow-up survey, for example, who imitated which activity after having seen the video-stories. A final evaluation of the video monitoring is therefore as at December 2010.

Table 7.3.1 summarizes the delivery and collection of the follow-up sheets by township. The rates of collection in August 2009 and December 2009 were 82 % and 52 %. For Tada-U, Ayadaw, the rates of collection in both August and December were over 100%, and Wetlet township in August, Minbu township in December were respectively over 100%. Why such a thing happened was that township offices, foreseeing there would be villagers who would copy the video-stories, copied follow-up sheets for more number. That's why the numbers of collection were greater than the number of delivery. However, in 7 townships there were uncollected follow-up sheets in December 2010.

Table 7.3.1 Delivery and Collection of Follow-up Sheets for Video

Division, TS		Monitoring as of August 2009			Monitoring as of December 2009			Remarks
		Delivery Sheet	Collection Sheet	Collection Rate, %	Delivery Sheet	Collection Sheet	Collection Rate, %	
Mandalay	Tada-U	40	52	130	40	52	130	
	Ngazun	40	10	25	40	17	43	
	Kyaukse	22	20	91	22	20	91	
	Myittha	32	23	72	32	-	-	
Sagaing	Myinmu	40	33	83	40	-	-	
	Ayadaw	40	72	180	40	72	180	
	Monywa	40	36	90	40	-	-	
	Wetlet	30	33	110	30	-	-	
Magway	Chauk	40	34	85	40	-	-	
	Pwintbyu	40	33	83	40	42	105	
	Salin	40	30	75	40	-	-	
	Minbu	40	8	20	40	42	105	
	Aunglan	27	-	-	27	-	-	
Total		471	384	82	471	245	52	

Source: JICA Study Team

7.3.2 Extension Results of Video Promotion

1) How many times of video-show

Table 7.3.2 shows how many times of video-show for agriculture, livestock, and cottage industry stories have been done in respective townships as of December 2009. As per the table, from April to December 2009, agricultural story has been shown for 5,414 times, livestock story for 4,539 times, and cottage industry story for 4,524 respectively in 13 townships. In July, all stories were shown more times than those in other months. To be exact, 1,561 times for agricultural story, 1,454 times for livestock story, 1,452 times for cottage industry story in July 2009. From April to November the

number of video-shows become fewer and fewer. Among those 3 stories, it is learnt that agricultural story were shown more times than the rest two.

Through follow-up survey, it is learnt that video-stories were shown at video shops as well as teashops in villages. Video discs were usually kept by village PDC chairmen and they targeted the video shops, very often seen in almost all villages in the CDZ, and teashops with video-set as the places for the promotion. Moreover, since village PDC chairmen kept the discs, the stories could be shown to a mass of villagers. For example, in Ayadaw township, a village PDC chairman took the disc with him to the place where Fire Brigade members and villagers used to get together and the stories were shown.

Table 7.3.2 Number of Video-show

Agricultural VIDEO		How many times have video show been held in the video house?									
		Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
Mandalay	Tada-U	0	0	100	88	78	96	88	116	129	**695**
	Ngazun	25	24	44	91	1	19	26	32	38	**300**
	Kyaukse	0	15	277	364	136	103	65	6	6	**972**
	Myittha	0	0	94	95	-	-	-	-	-	**189**
Sagaing	Myinmu	158	169	191	262	-	-	-	-	-	**780**
	Ayadaw	0	57	114	109	17	6	2	2	0	**307**
	Monywa	0	106	110	102	-	-	-	-	-	**318**
	Wetlet	0	84	60	70	-	-	-	-	-	**314**
Magway	Chauk	0	0	43	49	-	-	-	-	-	**92**
	Pwintbyu	0	70	126	95	96	100	101	85	84	**757**
	Salin	0	144	203	212	-	-	-	-	-	**559**
	Minbu	0	1	22	24	14	13	18	19	20	**131**
	Aunglan	-	-	-	-	-	-	-	-	-	-
Total		**183**	**670**	**1,484**	**1,561**	**342**	**337**	**300**	**260**	**277**	**5,414**
Livestock VIDEO											
Mandalay	Tada-U	0	0	100	88	78	96	88	116	129	**695**
	Ngazun	25	24	21	20	0	15	15	14	14	**148**
	Kyaukse	0	15	277	364	128	100	65	6	6	**961**
	Myittha	0	0	87	81	-	-	-	-	-	**168**
Sagaing	Myinmu	158	164	188	264	-	-	-	-	-	**774**
	Ayadaw	0	57	114	108	16	6	2	2	0	**305**
	Monywa	0	101	110	102	-	-	-	-	-	**313**
	Wetlet	0	23	57	63	-	-	-	-	-	**143**
Magway	Chauk	0	0	43	49	-	-	-	-	-	**92**
	Pwintbyu	0	60	111	79	0	0	0	0	0	**250**
	Salin	0	144	203	212	-	-	-	-	-	**559**
	Minbu	0	1	22	24	14	13	18	19	20	**131**
	Aunglan	-	-	-	-	-	-	-	-	-	**-**
Total		**183**	**589**	**1,333**	**1,454**	**236**	**230**	**188**	**157**	**169**	**4,539**
Cottage VIDEO											
Mandalay	Tada-U	0	0	100	88	78	96	88	116	129	**695**
	Ngazun	25	24	21	20	0	18	14	14	13	**149**
	Kyaukse	0	15	277	364	128	100	65	6	6	**961**
	Myittha	0	0	77	90	-	-	-	-	-	**167**
Sagaing	Myinmu	159	166	184	252	-	-	-	-	-	**761**
	Ayadaw	0	57	113	108	16	6	2	2	0	**304**
	Monywa	0	101	110	102	-	-	-	-	-	**313**
	Wetlet	0	22	56	64	-	-	-	-	-	**142**
Magway	Chauk	0	0	43	49	-	-	-	-	-	**92**
	Pwintbyu	0	60	111	79	0	0	0	0	0	**250**
	Salin	0	144	203	212	-	-	-	-	-	**559**
	Minbu	0	1	22	24	14	13	18	19	20	**131**
	Aunglan	-	-	-	-	-	-	-	-	-	**-**
Total		**184**	**590**	**1,317**	**1,452**	**236**	**233**	**187**	**157**	**168**	**4,524**

Source: JICA Study Team

2) Video Audience

Table 7.3.3 shows the number of villagers (above 10 years old) who have seen the video-stories by township. 71,650 villagers watched agricultural story, 59,312 villagers watched livestock story, and 59,120 villagers watched cottage industry respectively. Total villagers were 190,082 though it is estimated many of them must have been over-counted among the 3 sectors (meaning that one person

saw all the 3 stories since the video time is about 20 minutes each).

Average population (above 18 years) of a township in CDZ is 147,000 according to the relevant township report 2004. If calculated according to that average, there will be 1,764,000 people in 12 townships (excluding Aunglan TS). It can also be calculated that about 10% of total population (above 18 years) have seen video-stories as aggregated percentage, or about 4% when taking 71,650 persons who have seen only agriculture video thereby who are supposed to have seen other 2 sectors videos. In other words, it can be assumed at least about 4 percent of the grown-up population in 12 townships must have seen at least one of the video-stories.

Table 7.3.3 Number of Villagers (above 10 years) who have seen video-stories

Agricultural VIDEO		How many villagers have seen the video show?									
		Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
Mandalay	Tada-U	0	0	660	611	623	947	820	1,101	1,095	**5,857**
	Ngazun	1,650	1,660	1,472	1,858	6	139	176	190	228	**7,379**
	Kyaukse	0	90	902	1,156	438	397	241	30	30	**3,284**
	Myittha	0	0	2,103	2,122	-	-	-	-	-	**4,225**
Sagaing	Myinmu	412	457	526	902	-	-	-	-	-	**2,297**
	Ayadaw	0	3,584	5,469	5,412	465	140	40	70	0	**15,180**
	Monywa	0	1,851	1,378	1,243	-	-	-	-	-	**4,472**
	Wetlet	0	1,936	4,180	2,508	-	-	-	-	-	**8,624**
Magway	Chauk	0	0	675	816	-	-	-	-	-	**1,491**
	Pwintbyu	0	1,486	2,058	1,510	1,328	1,406	1,339	1,113	1,182	**11,422**
	Salin	0	1,660	1,970	1,887	-	-	-	-	-	**5,571**
	Minbu	0	70	644	640	95	90	108	125	130	**1,902**
	Aunglan	-	-	-	-	-	-	-	-	-	-
Total		**2,062**	**12,794**	**22,037**	**20,665**	**2,955**	**3,119**	**2,724**	**2,629**	**2,665**	**71,650**
Livestock VIDEO											
Mandalay	Tada-U	0	0	660	611	623	947	820	1,101	1,095	**5,857**
	Ngazun	1,650	1,660	1,335	1,377	0	115	118	135	149	**6,539**
	Kyaukse	0	90	902	1,156	424	398	241	30	30	**3,271**
	Myittha	0	0	1,595	1,638	-	-	-	-	-	**3,233**
Sagaing	Myinmu	375	436	532	839	-	-	-	-	-	**2,182**
	Ayadaw	0	3,684	5,484	5,439	445	140	40	70	0	**15,302**
	Monywa	0	1,633	1,378	1,243	-	-	-	-	-	**4,254**
	Wetlet	0	808	2,105	2,258	-	-	-	-	-	**5,171**
Magway	Chauk	0	0	675	816	-	-	-	-	-	**1,491**
	Pwintbyu	0	1,316	1,906	1,372	0	0	0	0	0	**4,594**
	Salin	0	1,660	1,970	1,887	-	-	-	-	-	**5,517**
	Minbu	0	70	644	639	95	90	108	125	130	**1,901**
	Aunglan	-	-	-	-	-	-	-	-	-	-
Total		**2,025**	**11,357**	**19,186**	**19,275**	**1,587**	**1,690**	**1,327**	**1,461**	**1,404**	**59,312**
Cottage VIDEO											
Mandalay	Tada-U	0	0	660	611	623	947	820	1,101	1,095	**5,857**
	Ngazun	1,650	1,660	1,335	1,377	0	126	122	139	149	**6,558**
	Kyaukse	0	90	902	1,156	424	398	241	30	30	**3,271**
	Myittha	0	0	1,509	1,712	-	-	-	-	-	**3,221**
Sagaing	Myinmu	389	430	523	838	-	-	-	-	-	**2,180**
	Ayadaw	0	3,584	5,434	5,389	445	140	40	70	0	**15,102**
	Monywa	0	1,636	1,378	1,243	-	-	-	-	-	**4,257**
	Wetlet	0	808	2,105	2,258	-	-	-	-	-	**5,171**
Magway	Chauk	0	0	675	816	-	-	-	-	-	**1,491**
	Pwintbyu	0	1,316	1,906	1,372	0	0	0	0	0	**4,594**
	Salin	0	1,660	1,970	1,887	-	-	-	-	-	**5,517**
	Minbu	0	70	644	639	95	90	108	125	130	**1,901**
	Aunglan	-	-	-	-	-	-	-	-	-	-
Total		**2,039**	**11,254**	**19,041**	**19,298**	**1,587**	**1,701**	**1,331**	**1,465**	**1,404**	**59,120**

Source: JICA Study Team

3) Villagers' activities after having seen video-stories

Tables 7.3.4, 7.3.5 and 7.3.6 show villagers' activities on agriculture, livestock, and cottage industry sectors after they have seen video-stories. For agricultural sector, 3,530 villagers in 12 townships carried out new activities after having seen video-stories, for livestock sector 226 villagers carried out new activities, and for cottage industry sector 138 villagers carried out new activities. The activities

carried out by villagers were of course different depending on sector.

In agriculture sector, selection of seeds by soaking in salt water was carried out by most of the farmers and there were altogether 1,602 villagers who followed that activity. Next is reduced area wet-bed nursery. There were 23 activities in agriculture sector and 3,530 villagers in 12 townships tried practically those activities. An extension officer said that the promotion activity on improved paddy cultivation technology and activities shown in video had multiple-effect coupled with MAS extension activities carried out under agriculture related pilot project. So he assumed there were many villagers who followed different activities.

In livestock sector, 14 activities including vaccination were followed by 226 villagers in 12 townships. Among all activities, vaccination was mostly followed and there were altogether 77 villagers in 12 townships. Out of 14 activities in livestock sector, 8 were connected with "raising" or "breeding". Therefore, villagers took interest in livestock raising & breeding after having seen video-story for livestock sector.

In cottage industry sector, villagers carried out 6 activities such as knitting, sewing, etc. Cottage industry activities require enough capital for villagers to set up of their own. In other words, the number of villagers reported in knitting and sewing activities can be assumed that they are not owners but workers. According to a report by TS officers, some of them who have watched the video went to the machine owner and started being engaged in the industry as workers but not as owners yet.

Table 7.3.4 Number of villagers and their activities (Agriculture sector)

Activities	Number of Villagers Actually Tried Agricultural Activities												
	Tada-U	Ngazun	Kyaukse	Myittha	Myinmu	Ayadaw	Monywa	Wetlet	Chauk	Pwintbyu	Salin	Minbu	Total
Selection of seeds by soaking in salt water		26		73	161	8	79	7		504	188	556	1,602
Reduced area wet-bed nursery	10		19	406	46			17		547		43	1,088
Selection of main panicles and sowing them		42	5			3				329	665		1,044
Bokashi compost making and application plus chemical fertilizer											1,008		1,008
Sifting seeds with a sieve										799			799
Drying seeds under the sun										694			694
IMO Bokashi compost making and application			2	406		3	13	99	39				562
Harvesting with less loss and waste										515			515
Early and sparse transplanting			6	406				42					454
Weeding										430			430
Systematic application of chimical fertilizer	274				1					110			385
Early Transplanting	5		35		39					30	67	161	337
Bokashi compost making and application	10		1						10		57	206	284
Removing different variety										248			248
Systematic land preparation					10					134			144
EM/ IMO Bokashi compost making and application			59										59
Water Management										59			59
Rice husk vinegar making and application				17								25	42
Getting germinated seeds		26								15			41
Rice husk charcoal making and application				22									22
Dapog method				9				3					12
Systematic soil preparation					5								5
Shallow transplanting					4								4
Max Nr. of Villagers	274	42	59	406	161	8	79	99	39	799	1,008	556	3,530

Source: JICA Study Team

Table 7.3.5 Number of villagers and their activities (Livestock sector)

Activities	Number of Villagers Actually Tried Livestock Activities												
	Tada-U	Ngazun	Kyaukse	Myittha	Myinmu	Ayadaw	Monywa	Wetlet	Chauk	Pwintbyu	Salin	Minbu	Total
Vaccination						4		3			70		77
Goat raising					65							9	74
Cow raising					47								47
Chicken raising					44								44
Sheep raising					41								41
Goat raising (with raised-floor)								4			1	33	38
Pig raising					23								23
Goat raising (entrustment)	33					7					8		48
Urea Molasses Mineral Block									12				12
Chicken raising (for eggs)					10								10
Fish breeding					4								4
Good breed												3	3
Disinfection (Goat housing)			2										2
Duck raising					1								1
Disease control (Sheep/ Goat)								1					1
Max Nr. of Villagers	33	0	2	0	65	7	0	4	12	0	70	33	226

Source: JICA Study Team

Table 7.3.6 Number of villagers and their activities (Cottage industry sector)

Activities	Number of Villagers Actually Tried Cottage Industry Activities												
	Tada-U	Ngazun	Kyaukse	Myittha	Myinmu	Ayadaw	Monywa	Wetlet	Chauk	Pwintbyu	Salin	Minbu	Total
Weaving					87								87
Sewing				51									51
Making baskets and chairs					39								39
Making hats					3								3
Weaving bamboo-matting					3								3
Making hand-fans					2								2
Max Nr. of Villagers	0	0	0	51	87	0	0	0	0	0	0	0	138

Source: JICA Study Team

4) Expansion due to video copy

Table 7.3.7 shows the number of villagers who copied video-stories. Twenty-three villagers in Myittha township, 16 villagers in Ayadaw township, and 29 villagers in Minbu township - total 68 villagers in the 12 townships – got video-stories copied. It is learnt that villagers in Ayardaw township had to go to town where there are computer shops to get DVD copied. The number of villagers who followed the activities after having seen video-stories and the number of villagers who copied video-stories were quite different, it is learnt. It is assumed that there are no computer shops (where DVD can be copied) in villages and if they go to town to get DVD copied, the charge is at least 2,000 Kyats per disc and the charge is considerably high for villagers.

Table 7.3.7 Number of villagers who got DVD copied

Township		How many villagers have made a copy of the VIDEO provided in that month?									
		Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
Mandalay	Tada-U	0	0	0	0	0	0	0	0	0	**0**
	Ngazun	0	0	0	0	0	0	0	0	0	**0**
	Kyaukse	0	0	0	0	0	0	0	0	0	**0**
	Myittha	0	0	12	11	-	-	-	-	-	**23**
Sagaing	Myinmu	0	0	0	0	-	-	-	-	-	**0**
	Ayadaw	0	3	11	2	0	0	0	0	0	**16**
	Monywa	0	0	0	0	-	-	-	-	-	**0**
	Wetlet	0	0	0	0	-	-	-	-	-	**0**
Magway	Chauk	0	0	0	0	-	-	-	-	-	**0**
	Pwintbyu	0	0	0	0	0	0	0	0	0	**0**
	Salin	0	0	0	0	-	-	-	-	-	**0**
	Minbu	0	0	21	8	0	0	0	0	0	**29**
	Aunglan	-	-	-	-	-	-	-	-	-	**-**
Total		**0**	**3**	**44**	**21**	**0**	**0**	**0**	**0**	**0**	**68**

Source: JICA Study Team