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VI.1 Proceedings of Kick Off Workshop (March 2009)

**MINISTRY OF AGRICULTURE AND COOPERATIVES
THE REPUBLIC OF ZAMBIA**

**THE STUDY
ON
THE CAPACITY BUILDING AND
DEVELOPMENT
FOR
SMALLHOLDER IRRIGATION SCHEME
IN
NORTHERN AND LUAPULA PROVINCES
IN
THE REPUBLIC OF ZAMBIA**

**PROCEEDINGS
OF KICK-OFF WORKSHOP**

MARCH 2009

**JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
SANYU CONSULTANTS INC., TOKYO, JAPAN**

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CHAPTER 1 RATIONALE AND WORKSHOP OBJECTIVES

Based upon an agreement made on June 27, 2007 between the Ministry of Agriculture and Cooperatives (MACO), Republic of Zambia, and Japan International Cooperation Agency (JICA) for a study of smallholder irrigation schemes in Northern and Luapula Provinces, a study team was dispatched by JICA, the responsible agency for Japanese Technical Cooperation, hence the commencement of the Study. The main objectives of the Study are:

- 1) To formulate Action Plan (AP) to promote smallholder irrigation scheme development for improving the agriculture productivity in Northern and Luapula Provinces, and
- 2) To transfer and build the capacity in smallholder irrigation development for counterpart personnel and concerned communities.

In this regard, a 1-day kick-off workshop was held, calling as many as over 70 participants from relevant offices of the 2 provinces of Northern and Luapula. By the end of the Workshop, the participants were, as its objectives, expected to be able to:

- 1) Know about the Study and internalize the concept of smallholder irrigation development,
- 2) Identify district-wise irrigation potentials in the two provinces,
- 3) Identify and share Strengths, Weaknesses, Opportunities and Threats relevant to MACO, and
- 4) Identify problems and those causes related to the food security in the two provinces.

CHAPTER 2 PROGRAMME AND WORKSHOP MECHANICS

2.1 Workshop Programme

The programme of the workshop is given of the following table, a one-day workshop composed of mainly 4 sessions, e.g. study overview (presentation by the Team), a simplified situation analysis identifying irrigation potential by district, stakeholder analysis by simplified SWOT, and problem analysis in a tree structure:

Table 2.1 Programme of the Kick-off Workshop

Date	Time	Activity
31.03.2009	08:00 – 08:30	Workshop Registration
	08:30 – 09:00	Introduction and Welcoming Remarks
	09:00 – 10:00	Study Overview (presentation by the JICA Team Leader)
	10:00 – 10:15	Tea Break
	10:15 – 12:30	Situation Analysis (Identification of Irrigation Potential)
	12:30 – 14:00	Lunch Break
	14:00 – 15:00	Stakeholders Analysis (Simplified SWOT)
	15:00 – 16:45	Problem Analysis (Identification of Problems in a Tree Structure)
	16:45 – 17:00	Tea Break and Closing
01.04.2009	07:00 – 09:00	Departure of Participants

2.2 Workshop Participants and Mechanics

Participants are from relevant offices of Ministry of Agriculture and Cooperatives (MACO) in the 2 provinces of Northern and Luapula. Following table shows the numbers of the participants by their stations, and the list of the participants is attached in Appendix 2.

Table 2.2 Participant by Office

Cadre	Northern province	Luapula province	Total
Province	12 (1F, 11M)	3 (0F, 3M)	15 (1F, 14M)
District	29 (3F, 26F)	13 (0F, 13M)	42 (3F, 39M)
Camp officers	9 (3F, 6M)	3 (0F, 3M)	12 (3F, 9M)
Total	50 (7F, 43M)	19 (0F, 19M)	69 (7F, 62M)

The methodology for the workshop is of group work, presentation by group leaders, open-forum discussions, brainstorming, etc., which are all based on participatory approach.

2.3 Welcoming Remarks

Mr. Luhamba Liembani, Provincial Agricultural Coordinator (PACO) of Northern province, made a welcoming remark blessing the commencement of the Study. He addressed the process how the study had been prepared up until today and encouraged the participants for active participation in the workshop.

He ended his speech with clear message to the participants –“Finally, the Study has been started after receiving the preliminary study team in 2007. This is one of the opportunities for us to realize the importance of irrigation, and we can contribute ourselves by putting our knowledge into the action plan of the Study. As for today’s workshop, please contribute your knowledge as much as possible so that no district is left behind. Although it is a study, some districts will be selected as pilot sites, and those experiences will be spread out to other areas.”

2.4 Opening Remarks

The guest of honor, Mr. Mwalimu Simfukwe, who is the Permanent Secretary (PS) of the Northern Province made an official visit to the workshop. After the self-introduction of all the participants and the singing of the national anthem, the PS officially opened the workshop. The PS started his speech by addressing how timely it is to start this kind of study to enhance transfer of technology to the communities and ensure sustainability of the measures to be developed. He also emphasized that JICA has been a reliable partner for a long time; e.g. PaViDIA project has provided nearly two billion Kwacha and is supporting 40 micro-projects.

He continued that the two provinces have comparative advantages with lush greenery, bio-diversity, abundant rainfall and surface water. In fact, untapped water resources are one of his concerns of the two provinces; the abundant water just goes waste as very few farmers irrigate their crops.

The PS further discussed that the Government puts a higher priority to smallholder irrigation schemes as it allocated 30 percent of MACO for irrigation development in 2009; this was a tremendous budget increase. He informed the participants that the provincial administration has spent more than 300 million Kwacha, since 2007, on the development of three small-scale irrigation infrastructures, namely CHINENKE, LUKULU NORTH and NGULULA that are expected to irrigate 3,200 ha of farmland.

He also encouraged MACO staff to disseminate technological information that the staff will learn in this workshop and through the Study so that capability of farmers can be developed and the management of the infrastructure by the users can be secured. Additionally, he referred to the necessity of the community benefits assessment on the irrigation projects. He concluded his opening remarks by referring to a statement by Thomas Paine, “the world is my country, all mankind are my brethren and to do good is my religion.”

CHAPTER 3 STUDY OVERVIEW

The Team Leader, Mr. K. HASHIGUCHI, took the participants to the study overview by presenting PP

slides attached in the Appendix 3. The presentation covered such 6 areas as; 1) the goals and objectives of the Study, 2) work schedule, 3) definition of smallholder irrigation, 4) pilot project implementation, 5) irrigated agriculture, and 6) organizing of farmer groups. Following are the excerpts from the presentation:

- Overall goal of the study is to secure the food security in the Republic of Zambia through promoting irrigated agriculture in community based smallholder irrigation schemes, and the process of the study centers on the following which themselves are the objectives of the study; 1) to formulate Action Plan (AP) to promote smallholder irrigation scheme development for improving the agriculture productivity in Northern and Luapula Provinces, and 2) to transfer and build the capacity in smallholder irrigation development for counterpart personnel and concerned communities.
- The National Irrigation Plan, established in July 2005 covers 6 areas, out of which No.3 category undertakes smallholder irrigation. The category aims to utilizing water from *dambos*, rivers, streams, lakes and other water bodies for food and cash crops in rural areas, to which the Study will make contributions.
- The Study is phased into 2; namely, phase 1 and phase 2. Phase 1 deals with situation analysis, draft action plan formulation, identification and also implementation of some pilot projects mainly for temporary weirs, and the Phase 2 undertakes dissemination of pilot projects of temporary diversion weirs, implementation of pilot projects on upgrading of temporary weirs to permanent ones, rehabilitation of existing schemes, new development of permanent weirs, etc. Phase 2 will learn a lot of lessons, and by feed-backing the lessons, the draft action plan will be finalized.
- An idea of smallholder irrigation is that 1) the size should not be more than 50 ha which requires full-scale of EIA, and operation and maintenance should be done by the smallholder farmers not done by the government. With respect to construction, conventional arrangement in which construction by government and donors can fall in the category of smallholder irrigation, and on top of that, construction by the smallholder farmers given technical assistances by extension officers should firstly fall under the category of ‘smallholder irrigation’. In any case, however, operation and maintenance should be done by beneficiary farmers themselves as far as smallholder irrigation is concerned.
- In sum, the study pursues the beneficiary farmers’ initiative to the maximum extent while to the minimum extent external assistances should be taking into account 1) budgetary constraints by government and donors as well, 2) capacity building of the beneficiary farmers, 3) project sustainability. The study believes that the more hardships the farmers have gone through, the more capacity they can develop by overcoming them, and the more difficulties they have overcome the higher sustainability we can expect.
- The pilot project is to undertake temporary diversion weirs as the entry, and then to try to upgrade the temporary ones to permanent ones. Temporary diversion weirs should be put up with locally available materials such as grasses, twigs, wooden logs, clay soils whatever available in the farmers’ locality. Upgrading can be done with wet-masonry and in cases by concrete. This operation arrangement centers on a principle that the farmers where potential exists should not wait until someone else comes to develop the potential with cement. The Study therefore tries to start with whatever farmers can do, for example very simple irrigation structure, wherever possible, then upgrading.
- The Study also centers on such idea that we should always utilize the government extension

structure already put in place to the maximum extent. In other words, the pilot implementation arrangement tries to operate in line with the government recurrent extension activities. This approach contrasts with a large-scale project going through feasibility study, designing and construction, which may take 3 years before farmers get benefit.

- As per action plan formulation, the Study is to undertake different types of irrigation, apart from simple diversion weirs and those upgraded ones, since the plan should be comprehensive. The plan is to include 1) temporary diversion weir, 2) upgraded one with either wet-masonry or concrete, 3) rehabilitation of existing ones, 4) new development of permanent structures, 5) reservoir irrigation and 6) pump irrigation (manual and engine lifting).
- Pilot project is to start in as early as April 2009, undertaking temporary diversion weirs. During the phase 1, year 2009, the pilot project will center on temporary diversion weirs only on a demonstrative basis. Then, in phase 2, year 2010, extension of the temporary weirs will be tried through peer-to-peer training. The logic is that the extension officers engaged in phase 1 pilot project will be the trainers of fellow extension officers, and the trained fellow officers are to extend the temporary diversion weirs.
- In connection with above, a training course will be arranged at the beginning of phase 2, corresponding to the beginning of dry season of year 2010, during which the extension officers engaged in 2009 pilot project will implant the technologies necessary for the establishment of simple diversion weirs to their fellow extension officers. Then, the trained fellow officers will be fielded to their jurisdictional areas to extend the temporary diversion irrigation schemes. In this connection, an example of extension tried in Malawi was referred in that about 270 sites had been developed in just one-year.
- Aside from the above temporary diversion weirs, the pilot project is to carry out upgrading of the temporary ones to the permanent ones, rehabilitation of existing facilities, and new development of permanent ones. These implementations will be done only during phase 2 since the limited time of phase 1 does not allow us to have lead-time enough to prepare and implement permanent ones.
- Arrangement of pilot project implementation is 1) collaborative work (the basic principle), 2) designing by the Team and core CPs, 3) frontline initiative by the camp extension officers, e.g., in mobilization and organizing of farmers, 4) day-day monitoring by the camp extension officers, .5) evaluation by both sides, 6) finance supported by JICA, and contributed by the Government.
- As per agriculture sector, the Study takes into account 1) soil care, 2) right crop in right place, 3) poly culture. Under irrigation the soils are utilized 2 times a year, losing nutrients very quickly. Without due care, the soils are easily degraded becoming barren lands in many cases. The Study will introduce compost making in different ways, e.g. utilizing aerobic bacteria and anaerobic bacteria, etc. Right crops in right places can be decided by examining yield by crop across districts. Poly culture, so-called accompany-crops, will be introduced through pilot project implementation.
- Organizing process of farmers proceeds with physical facility construction. It is not segregated from hardware parts that are the construction of weir, digging of canal, etc. Through the process of construction, participating farmers will know who should be the real leaders for them, how the institutional arrangement of the farmer group should be, how problem solving should be proceeded, etc. Construction is not just physical phenomena, but can be a good tool of capacity building. Adults learn by doing, hence farmers learn and build capacity through doing actual physical activities.

After the presentation by the Team Leader, there was a question and answer session. Following are the questions raised and answers:

Q1. How long is the lifespan of the temporary weirs?

A1. Basically, only one year. Unfortunately, these weirs cannot stand against the flood during the wet season. So, weirs have to be dismantled at the end of cropping season so that farmers can keep major parts of them for the next season. In Malawi, for example, 287 sites of small scale irrigation scheme had been developed in just one season totaling 500 ha to 520 ha. Although the total irrigated area doesn't seem to be big, it is actually comparatively sufficient given the fact that the biggest irrigation scheme in Malawi is approximately 620ha only.

As far as irrigation is concerned, it was the typical attitude of the extension workers in Malawi waiting for the donors' assistance such as cement and concrete. After the study, however, they were able to start taking initiatives through the discussion with farmers. Accordingly, they have another project for upgrading the scheme from temporary weirs to wet-masonry weirs.

Q2. As the plant materials are required for the temporary weirs, how do you expect for the farmers to prevent environmental damage in the long run?

A2. Temporary weir structure needs natural materials but major part of the structure can be used for many times. In most of the cases, farmers can collect trigs and construct again. Therefore, we can minimize the inputs of natural materials in the long run.

Q3. With regard to the aerobic composting, what is rice ball, and is the rice already cooked?

A3. We cook the rice first and grab it by hand so that it becomes a ball shape. By putting the rice ball in a shadow place or under the leaves, the rice ball can catch some local microorganism.

Q4. How many rice ball are required for a unit of compost?

A4. Once some microorganisms are captured, we can multiply the density of them by putting morass or other additives. More detailed information will be incorporated into the technical manuals that we will provide by the end of the Study.

Q5. For the implementation of the pilot project, how do you reach out to the community especially in remote area?

A5. How do you usually reach out? Just we would like to operate on what you usually do.

Q5. We walk. Transportation facilities are available but the issue is fuel for them.

Q6. We have dumpy level which needs repair. Can the project undertake the repair or new procurement.

A6. Instead of dumpy level, there is a simple tool called line level. It is only around US\$ 3 –5, with which we can align canal very easily.

Q7. How do you select potential sites? We already have data, so you can go into the second phase. Actually, the issue is money for construction of permanent weir.

A7. We would like to get data from you and would like to visit the field to observe the real situation on the ground. Although we understand the necessity of the earlier implementation of the pilot project, for this financial year, the budget is very much limited. So, we will be implementing only temporary weirs in this financial year.

Q8. How can you proceed the implementation of phase 2 pilot project.

A8. For the phase II, districts should be discussed and selected by this kind of workshop. Also, we are not forgetting the concrete type weir as well. But if you think of only concrete structures, you might have to wait for another assistance.

CHAPTER 4 SITUATION ANALYSIS (IDENTIFICATION OF IRRIG'N POTENTIAL)

Potential for smallholder irrigated agriculture in each district was analyzed based on comparative advantages of the districts in the two provinces. Major steps of this activity, so-called “situation analysis,” is as follows:

- Identification of attributes that may explain the potential of the district,
- Comparison and ranking of the districts on each attribute,
- Comprehensive evaluation of the potential districts, and
- Ranking of the significance of the attributes in determining the potential for smallholder irrigated agriculture

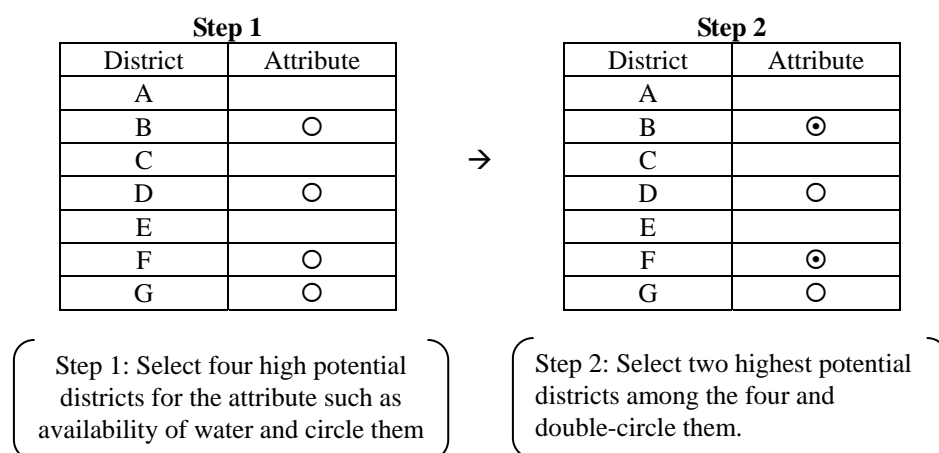
4.1 Identification of Attributes that may Explain the Potential of the District

Possible attributes for the situation analysis were discussed among all the participants of two provinces in a plenary session. The suggested attributes are as follows:

- | | |
|--------------------------------------|--|
| - Production/ Season | - Local leadership influence |
| - Availability of local labor | - Potential market/ distance to it |
| - Topography | - Less Livestock Interference |
| - Soil type and fertility | - No. of farmers already practice irrigation |
| - Current irrigation system used | - Availability of local materials |
| - Road infrastructure | - Total Ranking Crop Pests and Diseases |
| - Current area under irrigation | - Community Initiative |
| - Perennial water bodies and streams | - Weather climatic condition |
| - Availability of water | - Land ownership |

4.2 Comparison and Ranking of the Districts on Each Attribute

Participants were divided into two groups by province. On each attribute, DACO, SAO and camp extension officers representing each district discussed the comparative advantages of all the districts in the province. Based entirely upon their individual experience and knowledge about the districts, districts were ranked in a two-step process. First, four and six districts for Luapula and Northern provinces respectively were selected as high potential districts in the attribute. Then, two and three districts respectively were further selected among them as the highest potential districts.



In the discussion, some attributes were omitted because the participants considered them unsuited for the ranking or simply due to lack of time for the discussion. The omitted items in Luapula province

were: 1) Crop Pests and Diseases, 2) Community Initiative, 3) Weather climatic condition, and 4) Local ownership, and in Northern province were: 1) Community Initiative, 2) Local leadership influence, 3) Perennial water body, 4) Availability of water, 5) Production, 6) Crop pests and disease, 7) No. of farmers practicing irrigation, 8) Availability of local material, 9) Soil fertility, 10) Livestock Interfering, 11) Water rights, 12) Culture influence, 13) Land ownership.

4.3 Ranking of the Significance of the Attributes

In the case of Luapula province, participants made a ranking of attributes themselves so that the significance or the importance of attributes can be identified. The ranking of the attributes is shown below:

- | | |
|---|------------------------------------|
| 1) Availability of water | 8) Availability of local labor |
| 2) Soil type and fertility | 9) Availability of local materials |
| 3) Potential market/ distance to it | 10) Current irrigation system used |
| 4) Production/ Season | 11) Local leadership influence |
| 5) Road infrastructure | Current area under irrigation |
| 6) No. of farmers already practice irrigation | Perennial water bodies and streams |
| 7) Topography | Less Livestock Interference |

Note: some items were not ranked

4.4 Comprehensive Evaluation of the Potential Districts

After a series of discussion and ranking exercise on all the attributes, participants made a comprehensive ranking of the districts for the potential of smallholder irrigated agriculture in general. The result of the situation analysis is shown in Table 4.1 and 4.2.

Table 4.1 Result of the Situation Analysis in Luapula Province

Significance of the attributes	1	2	3	4	5	6	7	8	9	10	11	-	-	-	Total Ranking
Districts/ Attributes	Availability of water	Soil type and fertility	Potential market/ distance to it	Production/ Season	Road infrastructure	No. of farmers already practice irrigation	Topography	Availability of local labor	Availability of local materials	Current irrigation system used	Local leadership influence	Current area under irrigation	Perennial water bodies and streams	Less Livestock Interference	
MANSA	⊙	○	⊙	⊙	⊙	⊙	○	⊙	○	⊙	○	⊙			2
MILENGE	○	⊙	○			○			⊙		⊙	○	○	⊙	4
CHIENGE		○											○		6
KAWAMBWA	⊙	⊙	⊙	○	⊙	○	⊙	○	⊙	○	⊙	○	⊙	○	1
SAMFYA														⊙	7
NCHELENGE			○	○	○		○	○		○					5
MWENSE	○			⊙	○	⊙	⊙	⊙	○	⊙	○	⊙	⊙	○	3

Table 4.2 Result of the Situation Analysis in Northern Province

Districts/ Attributes	Current irrigation system used	Perennial shallow stream	Potential market	Road infrastructure (feeder road)	Topography	Total Ranking
KASAMA	⊙	○	⊙	○	⊙	4
MUNGWI	⊙	○	⊙	⊙	⊙	3
MBALA	⊙	⊙	⊙	⊙	⊙	1
MPULUNGU				○		11
NAKONDE	○		○	⊙	○	8
ISOKA	⊙	○	○	○	○	7
CHINSALI	○			○		10
MPIKA		⊙	⊙	⊙		2
MPOROKOSO	○	⊙	○		⊙	5
KAPUTA			○		○	12
LUWINGU	○	⊙			○	6
CHILUBI		○				9

CHAPTER 5 STAKEHOLDER ANALYSIS (SIMPLIFIED SWOT)

A simplified SWOT analysis, a strategic planning method, was carried out to analyze Strengths and Weakness of MACO and Opportunities and Threats that MACO faces. First, an explanation of the method was made by the facilitator in a plenary session. Then, participants were divided into two groups by the level of office they work for: district or upper level staff such as PACO, DACO, and SAO and camp level staff namely extension officers.

As of the group of district level officers, it was further divided into two groups simply for a better facilitation. To identify MACO's internal and external factors for promotion of smallholder irrigated agriculture, active discussion was conducted. After the discussion, each group made a short presentation on their own result of the analysis to other groups, which was also followed by an additional discussion. The results of the simplified SWOT analysis are shown below:

Table 5.1 SWOT Analysis for District Office of MACO (1)

STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> - Knowledgeable man power - Locally available materials - NIP in place - Already existing community groups 	<ul style="list-style-type: none"> - Transfer of staff - Low women participation in irrigation activities - Poor GRZ funding - Unavailability of irrigation equipment locally - Poor extension linkages. - No standard extension approach - Shortage of staff - Inadequate transport - Top down approach 	<ul style="list-style-type: none"> - Water availability - Good road network - Fertile land - Presence of cooperating partners - National stability - Political will - Existing of infrastructure - Locally available materials 	<ul style="list-style-type: none"> - Low adoption rate - Migration among villagers - Land tenure - Economic crisis - Sudden withdrawal of support - Policy changes - Unsustainable projects - Death

Table 5.2 SWOT Analysis for District Office of MACO (2)

STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> - Qualified staff - Well established organizational structure - Trainable staff 	<ul style="list-style-type: none"> - Inadequate survey equipment - Inadequate transport - Erratic Financial support 	<ul style="list-style-type: none"> - Readily available water resources - Ready market - Available arable land - Available local materials for construction - Agricultural policy in place - Donor support 	<ul style="list-style-type: none"> - Poor infrastructures - Cross cutting issues (HIV & AIDS) - Lack of willingness of farmers - Natural calamities - Deforestation - Donors pulling out - Global financial crisis

Table 5.3 SWOT Analysis for Camp Office of MACO

STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> - Irrigation furrows - We have trained technical staff 	<ul style="list-style-type: none"> - Lack of opportunities for capacity building - Logistical support is inadequate - Inadequate technical staff 	<ul style="list-style-type: none"> - Perennial streams - Local resources - Ready market - Grants - Water bodies - Abundant arable land - Favorable water condition - Supporting programmes - Skilled labor - Communication network 	<ul style="list-style-type: none"> - Drought - Bad road conditions - Bad road network - Death - Floods - Deforestation - Land tenure - HIV/AIDS - Expensive farming input prices - Political interference - Pests and diseases

CHAPTER 6 PROBLEM ANALYSIS (IDENTIFICATION OF PROBLEMS IN A TREE STRUCTURE)

The last activity of the day was a problem analysis. In this activity, major problems related to agricultural livelihood in the two provinces were analyzed. After an explanation of basic principles of the problem analysis, all the participants were divided into two groups. The groups were divided again by province rather than type of organization as agricultural problems are mostly attributed to physical condition of the area. Originally, core problem was prepared by the Study Team, “food security is not guaranteed.” However, participants suggested deciding the core problem by each group as the groups might have different view. Then, the group of Luapula province set the core problem as “low production” and Northern, “food insecurity.”

After setting the core problem, participants started discussing what the direct causes of the core problem are. For example, Luapula group suggested “low productivity,” “dependency on rain-fed crops” and “inadequate land under production” as major direct causes of low production. As like, causes of these problems were further analyzed. After the analysis, each group made a presentation of their result for the entire participants so that officers from both provinces could share their findings and understanding on the current situation. The result of problem analysis in Luapula and Northern provinces are shown in Figure 5.1 and 5.2.

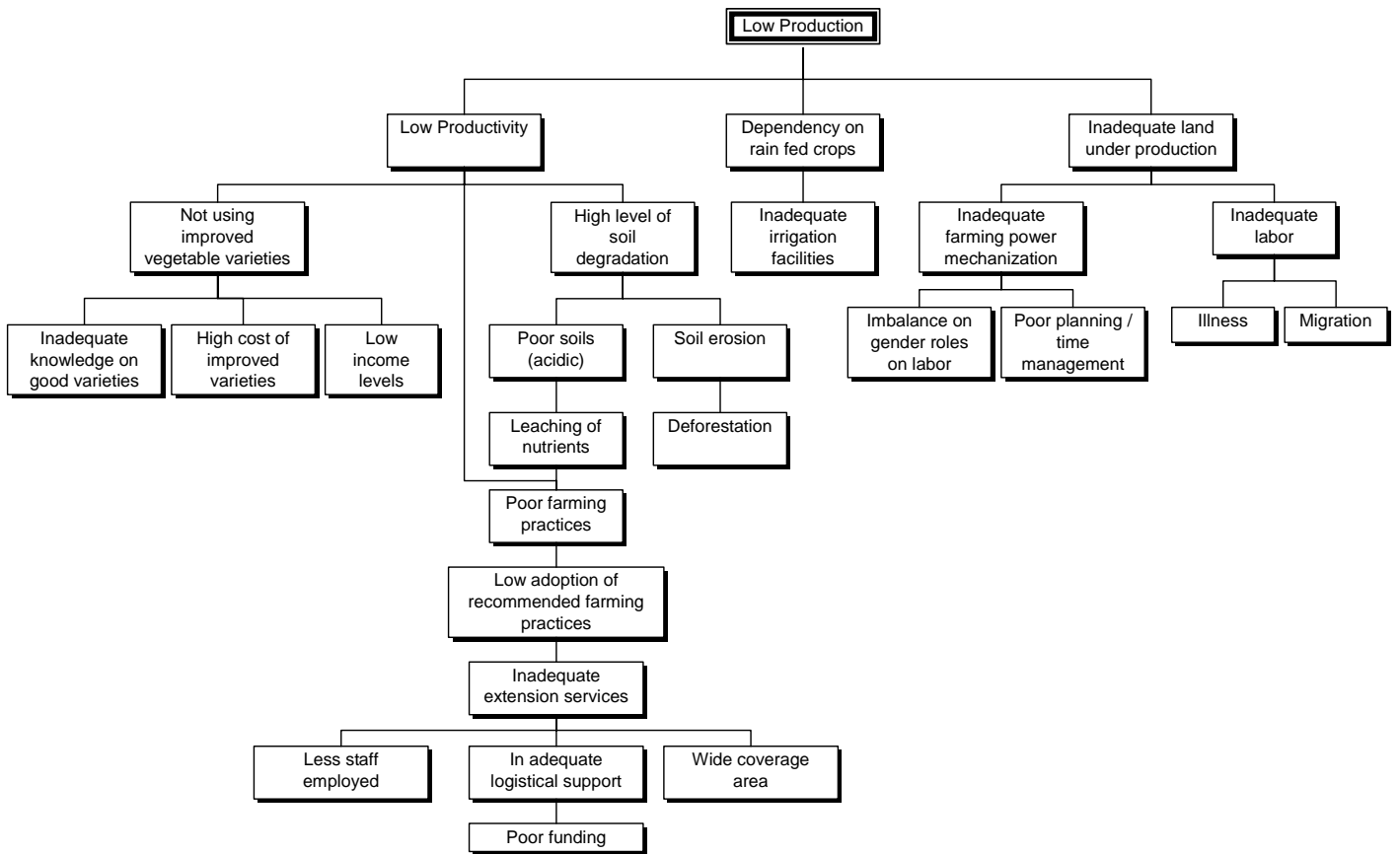


Figure 5.1 Problem Tree in Luapula Province

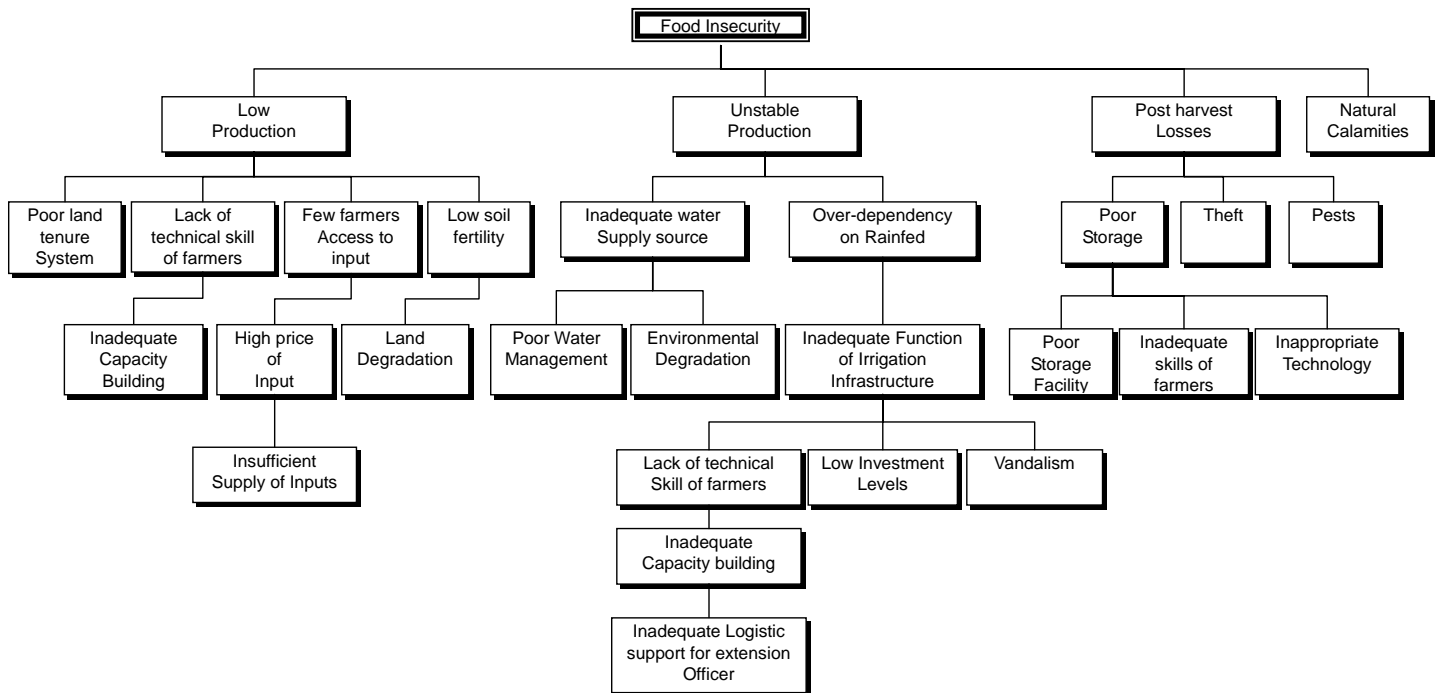


Figure 5.2 Problem Tree in Northern Province

CHAPTER 7 CLOSING REMARKS

One of DACO made a speech as a conclusion of the activities in the workshop. He was proud of the active participation of all the officers as well as heated discussion during the workshop. He thanked all the contributor of the day.

After that, Mr. Hashiguchi gave a vote of thanks for the participation. He said he would like to express his sincere gratitude, and thanked to the today's presentations. He and his team members were able to capture the current situation of the two provinces related to smallholder irrigated agriculture. He further mentioned that the study team was going to visit offices and sites where the participants were from, and to start working with the participants hand in hand.

Lastly, Provincial Agriculture Coordinator (PACO) of Northern province made closing remarks, saying that he appreciated an active participation and discussion in the workshop. He, then, called for further cooperation from the MACO personnel for the successful conduct of the Study from now on. MACO officers were asked to provide necessary information to the Study Team when asked and work closely with the team. Expressing his appreciation to all the participants, he officially closed the one-day workshop for the Study.

ATTACHMENT 1 PHOTOS



Official Opening Mr. Mwalimu Simfukwe, the Permanent Secretary (PS) of the Northern Province



Participants from the target 2 provinces listening to the remarks of the Permanent Secretary



JICA Team Leader makes presentation, inviting the participants to the study overview



JICA Team Leader gives an upgraded type of wet-masonry diversion weir which used to be a temporary diversion weir.



After the presentation, now the floor is opened for interactive discussions.



A question and answer session; a participant asks and tries to clarify what was not clear in the presentation.



Participants from different camp extension areas are now discussing what are their SWOTs.



Participants from different cap extension areas are now clarifying their SWOTs.



Participants at district level including provincial level are now identifying their SWOTs.



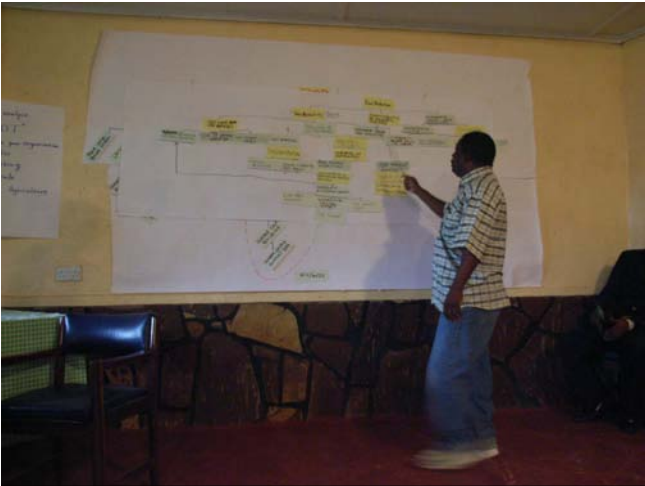
Luapula group is identifying the problems and causes that they are facing in their extension areas.



A group is now presenting their SWOTs identified to the floor, and clarification session follows.



A participant is now facilitating colleague participants to identify their problems and those causes.



A participant is presenting their work result which is a tree showing problems and those causes.



A participant is presenting their work result which is a tree showing problems and those causes.



In the closing session, a participant is reviewing what they have done and thanking the organizer of the WS.



In the closing session, the JICA Team Leader thanks all the participants for their collaborative works.



Mr. Luhamba Liembani, PACO of Northern province, is officially closing the WS,



All the participant listening to the closing remarks, and encouraged for the works to come.

ATTACHMENT 2 PARTICIPANT LIST**Venue: Kasama Farm Institute Date: 31/ March / 2009**

No.	NAME	TITLE	<u>STATION OFFICE</u> PROVINCES/DISTRICTS	Camp
1	Kelvin M. Simukoko	Ag/ S.T.O	Northern/Kasama	
2	Annie B. Kalima	J.T.O	Northern/Kasama	
3	Frank Mwansa Mporokoso	Compass man	Northern/Kasama	
4	Sinyangwe Harrison	S.A.O	Northern/Mungwi	
5	Sebastian Daka	Compass man	Northern/Kasama	
6	Beauty Chisanga	A.S	Northern/Mungwi	
7	Freddy Banda	C.T.O	Northern/Mungwi	
8	Azinous Simukoko	C.E.O	Northern/Isoka	
9	Clive Matengu	S.A.O.	Northern/Isoka	
10	Phiri Nelson L.	T.O.	Northern/Isoka	
11	Francis Mwambazi	S.T.O	Northern/Isoka	
12	Dickens M. Chikwekwe	T.O.	Luapula/Mwense	Kapisha
13	Chomba Litepo	J.T.O	Northern/Mporokoso	
14	Kasalina Sanama	A.A	Northern/Kasama	Chitambi
15	Mukoko M. Carol	A.A.	Northern/Mungwi	Misamfu
16	Chansa Grace	A.A.	Northern/Mbala	Lunzua
17	Musaba Eugenia Sikazwe	A.A.	Northern/Mbala	Luचेche
18	Joseph K Mulenga	A.A.	Northern/Mungwi	Ngulula
19	Mulenga M. Maipambe	S.A.O	Northern/Mpika	
20	Mulenga Francis	A.A.	Northern/Mpika	Chilonga
21	Nakoze .F. Chizyuka	T.O.	Northern/Mpika	
22	Kandala David	S.A.O	Northern/Mpika	
23	Witika K. Lucky	A.S.	Luapula/Mwense	Kashiba
24	Nyendwa Silvester	SE.M.DO	Northern/Kasama	
25	Kennedy Sikamba	S.A.O.	Northern/Mbala	
26	Patrick Katongo	T.O.	Northern/Mpulungu	
27	Henry Mgomba	D.A.CO.	Luapula/Kawambwa	
28	Philip S. Kalima	D.A.CO.	Luapula/Nchelenge	
29	Rodgers Phiri	T.O.	Northern/Mbala	
30	John Chiludika	A.A	Luapula/Mwense	kapishsa
31	Hendrix Ntalasha	P.T.O	Luapula/Kawambwa	
32	Vousburg Chibale	D.A.CO.	Northern/Mporokoso	
33	Fred Mukalwa	J.T.O.	Northern/Luwingu	
34	Kellies Sakajila	T.O.	Northern/Nakonde	
35	Joseph Kombe	S.A.O.	Northern/Nakonde	
36	Alex Kabwe	I.E.	Luapula/Mansa	
37	Francis K. Bwalya	P.T.O	Northern/kasama	
38	Chibwe Stanley	S.A.O.	Luapula/Chiengi	
39	Ackson Mbewe	J.T.O	Northern/Kasama	
40	Brian Siwale	J.T.O.	Luapula/Nchelenge	
41	Chibalamuna Hosia	P.T.O.	Luapula/Mansa	
42	Cletus N. Kasanda	B.E.O	Luapula/Mansa	

No.	NAME	TITLE	STATION OFFICE PROVINCES/DISTRICTS	Camp
43	Kangwa Albert	A.A.	Luapula/Kawambwa	
44	Bernard Mukuma	B.E.O.	Luapula/Milenge	
45	Stanford Nkhoma	D.A.CO	Luapula/Mwense	
46	Mwalunkanga Patrick	D.A.CO.	Luapula/Samfya	
47	Chola Matanda	A.J.T.O	Northern/Chinsali	
48	Kunda S. Kalaba	S.A.O.	Luapula/Nchelenge	
49	Humphery Mbao	J.T.O.	Luapula/Chiengi	
50	Samson Lungu	S.A.O	Northern/Chilubi	
51	Simbeye Peter	A.S.	Northern /Chilubi	Matipa
52	Luhamba Liembani	P.A.CO.	Northern/Kasama	
53	P.M. Daka	D.A.CO.	Luapula/Milenge	
54	Abraham Ngonya	Ag/PACO	Luapula/Mansa	
55	Rodrick L. Chewe	J.T.O	Northern/Kaputa	
56	Chilongwa P. Philip	J.T.O	Northern/Kaputa	
57	Sylvester Mwamba	I.O	Northern/Kasama	
58	Simukoko Mukudangi	J.T.O	Northern/kasama	
59	E.C. Shingalili	P.A.O	Luapula/Mansa	
60	C. Kapalasha	P.A.O	Northern/Kasama	
61	K. Zulu	I. E.	Northern/kasama	
62	Mwenge Yamanda	Ag/D.A.CO.	Northern/kasama	
63	Jonathan Mwamba	D.A.I.O.	Northern/Kasama	
64	B.C Mubanga	P.F.O	Northern/Kasama	
65	A. Sikanoa	D.A.CO	Northern/Luwingu	
66	Francis Mutale	S.A.O.	Northern/Luwingu	
67	Mulenga Moses	S.A.O.	Northern/Kaputa	
68	John Musalo	Ag/Principal	Northern/Kasama	K.F.I
69	Teddy Sikanyika	Horticulture	Northern/Kasama	K.F.I

ABBREVIATION**IN-FULL**

- | | | |
|-----|----------|--------------------------------------|
| 1. | J.T.O- | Junior Technical Officer |
| 2. | A.S - | Agriculture Supervisor |
| 3. | A.A - | Agriculture Assistant |
| 4. | T.O- | Training Officer |
| 5. | C.T.O- | Chief training Officer |
| 6. | C.E.O- | Camp Extension Officer |
| 7. | S.T.O- | Senior training Officer |
| 8. | SEMDO - | Senior marketing Development Officer |
| 9. | P.T.O.- | Principal Fisheries Officer |
| 10. | A.J.T.O- | Acting Junior Technical Officer |
| 11. | I.O- | Information Officer |
| 12. | I. E- | Irrigation Engineer |
| 13. | D.A.CO - | District Agriculture Coordinator |
| 14. | P.A.CO- | Provincial Agriculture Coordinator |
| 15. | P.A.O- | Principal Agriculture Officer |
| 16. | S.A.O - | Senior Agriculture Officer |
| 17. | B.E.O- | Block Extension Officer |

ATTACHMENT 3 POWER POINT SLIDES

THE CAPACITY BUILDING AND DEVELOPMENT FOR COMMUNITY-BASED SMALLHOLDER IRRIGATION SCHEME IN NORTHERN AND LUAPULA PROVINCES

Particular	Area	Pop. (2000)	District	
			Density, p/km ²	Nic. Area/district
Northern	147,826km ² 28,463,944km	1,407,000 (45.5)	12	12,319km ² 11,131,111km
Luapula	90,567km ² 22,522,251km	755,000 (15.5)	7	7,224km ² 8,529,836km
Total	198,393km ² 44,986,195km	2,192,000 (11.0)	19	19,543km ² 19,660,947km
Zambia	752,612km ²	10,285,000 (12.4)	-	-

AGENDA:

1. The Goal and Objectives
2. Work Schedule
3. Definition of Community-based Smallholder Irrigation
4. Pilot Project
5. Irrigated Agriculture, AOBs

Overall Goal:

To secure the food security in the Republic of Zambia through promoting irrigated agriculture in community based smallholder irrigation schemes.

Objectives:

1. To formulate Action Plan (AP) to promote smallholder irrigation scheme development for improving the agriculture productivity in Northern and Luapula Provinces, and
2. To transfer and build the capacity in smallholder irrigation development for counterpart personnel and concerned communities.

RELEVANCE TO THE NIP

Category	Particular	Relevance to the Study
1. Peri-urban Irrigation	To grow cash and export crops in peri-urban areas	
2. Out grower schemes	To grow cash and food crops, linked to an out-grower promoter in rural and peri-urban areas.	
3. Smallholder Irrigation	To utilize water from <i>dambos</i> , rivers, streams, lakes and other water bodies for food and cash crops in rural areas.	This Study Undertakes:
4. Large Scale Commercial and Estates	To produce cash, food and export crops; for commercial farmers under ZNFU Taskforce	
5. Other private farmers	To develop long-term large water transfer systems such as dams weirs, canals, etc.	
6. Manufacturing	To expand or test new irrigation technology for import substitution and cost saving	

Source: National Irrigation Plan, July 2005

OVERALL WORKSCHEDULE

Ph1: Situation Analysis, Draft Action Plan Formulation, Pilot Project (Demo., Temp. Weirs),

Ph2: Pilot Project (Ext'n, Upgrade/Rehab), Finalization of the Action Plan, Preparation of Technical Package

Year	2009												2010												2011											
Month	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M								
Phase 1	[Pink bars]												[Green bars]												[Green bars]											
Phase 2	[Green bars]												[Pink bars]												[Pink bars]											
Report Presentation	[Icons]												[Icons]												[Icons]											

OVERALL WORKSCHEDULE-2

Year	2009												2010												2011											
Month	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M								
Phase	Phase 1												Phase 2																							
Major Work	Draft Action Plan, Pilot Project (Temporary Weir)												Pilot Project (Extension, Permanent Weir), Action Plan Finalization																							
Report	[Icons]												[Icons]												[Icons]											
At Headquarters Level	[Icons]												[Icons]												[Icons]											
At Province and District Level	[Icons]												[Icons]												[Icons]											
At Community Level	[Icons]												[Icons]												[Icons]											
Month	2009												2010												2011											

WHAT IS COMMUNITY-BASED SMALLHOLDER IRRIGATION ALL ABOUT ?

COMMUNITY BASED SMALLHOLDER IRRIGATION:

THE SCALE:

must be small (less than 50ha?), or manageable by smallholder farmers.

MANAGEABLE IN:

Operation and Maintenance
CONSTRUCTION ??

COMMUNITY BASED SMALLHOLDER IRRIGATION:

CONSTRUCTION:

By Government & Donors
in Conventional Cases,

APART FROM ABOVE:

By **the smallholder farmers**
with the GVMT technical
assistances

In Other Words:

To the maximum extent:

the smallholders' initiative

To the minimum extent:

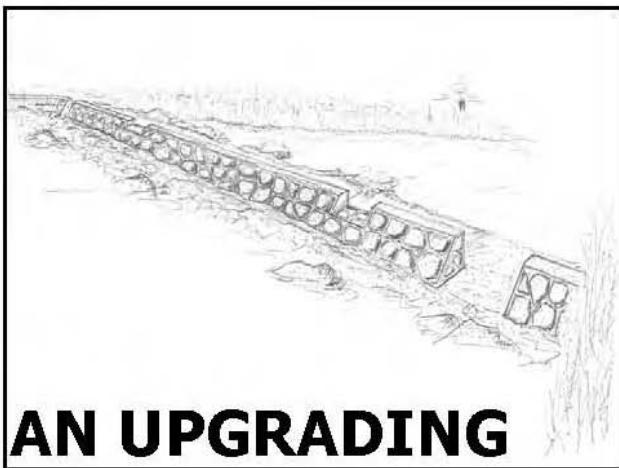
external physical assistances

Taking into Account:

- GVMT Budgetary Constraints,
- Capacity Building of S.H. Farmers, and
- Project Sustainability



EXAMPLES OF TEMPORARY DIVERSION WEIRS AND THOSE UPGRADING



On the Government Recurrent Extension Activities;

1. Farmers where potential exists should not wait until someone else comes to develop the potential with **CONCRETE**, and
2. Utilize the GVMT extension structure already in place;



In Summary:

1. Apart from Conventional Practices, the Study tries to start with whatever farmers can do, for example very simple irrigation structure, wherever possible, then upgrading,
2. This approach contrasts with a large scale project going through feasibility study, designing and construction, which may take 3 years before farmers get benefit.

SMALLHOLDER IRRIGATION DEVELOPMENT as a package

1. Temporary Diversion Weir
2. Upgrading to Permanent
3. Rehab. of Existing Schemes
4. Development of New Schemes
5. Reservoir (Storage) Irrigation
6. Pump Irrigation (Treadle, Engine)

REHABILITATION OF IRRIGATION SCHEMES

FRONT VIEW



BACK VIEW

RESERVOIR IRRIGATION MAINLY REHABILITATION



POND IRRIGATION constructed by a family



CONCEPTUAL FRAMEWORK OF S.I. ACTION PLAN

Fiscal Year	2009	2010	2011	2012	2013	2014	2015
National Agriculture Policy	2004-2015						
National Irrigation Plan	National Irrigation Plan			(next) National Irrigation Plan			
	4th	5th	1st	2nd	3rd	4th	5th
The JICA Study	The Study's Period			Follow Up (?)			
Irrigation Development Plan	1. Gravity Irrigation			Gravity Irrigation by Permanent Weir, by Rehabilitated Facilities			
	2. Reservoir Irrigation			Gravity Irrigation by Temporary Weir			
	3. Pump Irrigation (Manual)			To Upgrade High Potential Temporary Schemes to Permanent Structure			
	4. Pump Irrigation (Engine)						
Fiscal Year	2009	2010	2011	2012	2013	2014	2015

PILOT PROJECT MODUS OPERANDI

PILOT PROJECT MODUS OPERANDI

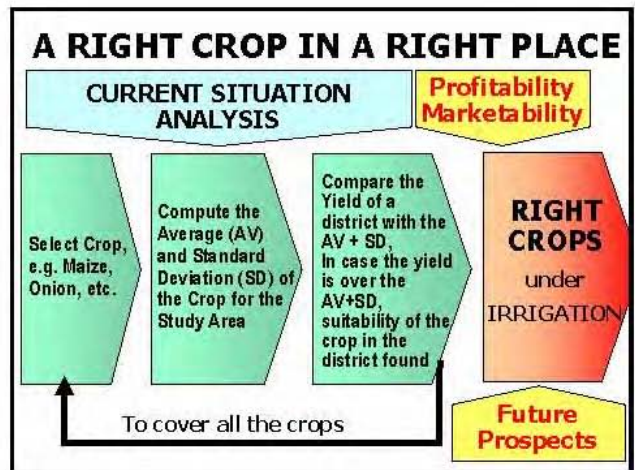
Year	2009												2010												2011				
Month	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5
Phase	Phase 1: Action Plan (Draft) Formulation												Phase 2: Pilot Project Implementation, Finalisation of Action Plan																
Work in Zambia	[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]				
Progressive Implementation of Pilot Project	Identification of Pilot Project (Temporary Weir Only) → Implementation of Temporary Weir Type Irrigation (Demonstrative) → Extension of Temporary Weir Type Irrigation												Identification of Existing Temporary Weir Irrigation → Upgrade → (Demonstrative) → Implementation of Permanent Smallholder Irrigation												Identification of To-be-Rehabilitated Irrigation Structure → Rehabilitation → Implementation of Permanent Smallholder Irrigation				
1. Temporary Weir (TW) 2. TW Extension 3. Upgrading of TW 4. Rehab. of Farm's Weir																													

PILOT PROJECT: THROUGH PEER TRAINING

Year	2009												2010												2011				
Month	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5
Phase	Phase 1: Action Plan (Draft) Formulation												Phase 2: Pilot Project Implementation, Finalisation of Action Plan																
Work in Zambia	[Gantt chart bars]												[Gantt chart bars]												[Gantt chart bars]				
Report Presentation	[Timeline markers: R1, R2, R3, R4, R5]												[Timeline markers: R6, R7, R8, R9, R10]												[Timeline markers: R11, R12, R13, R14, R15]				
Technical Transfer from JICA ST to Govt Officers (Demonstrative)	Identification of Pilot Project (Temporary Weir Only) → Implementation of Temporary Weir Type Irrigation in Northern Prov. (Demonstrative) → Upgrading → Implementation of Permanent Weir Irrigation (Upgrade from Temporary Weir / Rehabilitation) (Demonstrative only)																												
Technical Transfer from Officer to Officer (Extension)	Training → Smallholder Irrigation (Temporary Weir Type) is extended widely in Northern and Luapula → Extension of Temporary Weir Type Smallholder Irrigation → Follow up Training																												

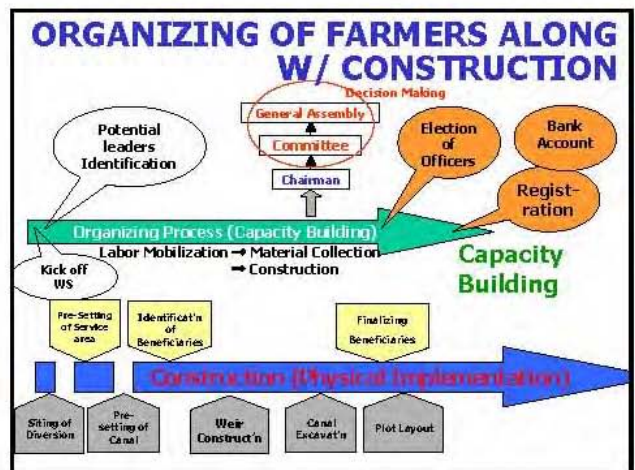
- ### PILOT PROJECT: IMPLEMENTATION ARRANGEMENT
1. Collaborative Work (Basic Principle)
 2. Designing by the Team and Core CPs
 3. Frontline Initiative by the Ext. Staff
Mobilization and Organizing of Farmers
 4. Day-Day Monitoring by the Ext. Staff
 5. Evaluation by Both Sides
 6. Finance supported by JICA, and contributed by the Government.

AGRICULTURE
SOIL CARE
RIGHT-CROP
POLY CULTURE



CONSIDER COMPANION CROP

Companion Crop:	Prevention of:
String Bean + Maize	Insects
Marry gold + Egg plant, Gourd plant, Rape, etc.	Nematode
Companion Crop:	Promotion of:
Sesame + Sweet Potato	Sesame Yield
Parsley + Maize, Tomato	Growth of Maize and Tomato



VI.2 Proceedings of Kick Off Training (April 2009)

**MINISTRY OF AGRICULTURE AND COOPERATIVES
THE REPUBLIC OF ZAMBIA**

**THE STUDY
ON
THE CAPACITY BUILDING AND
DEVELOPMENT
FOR
SMALLHOLDER IRRIGATION SCHEME
IN
NORTHERN AND LUAPULA PROVINCES
IN
THE REPUBLIC OF ZAMBIA**

**PROCEEDINGS
OF KICK-OFF TRAINING**

APRIL 2009

**JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
SANYU CONSULTANTS INC., TOKYO, JAPAN**

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PART I TOT FOR THE KICK OFF TRAINING

There are around 280 frontline extension staff, called Camp Extension Officers (CEOs), in Northern and Luapula provinces. To promote smallholder irrigation schemes, these CEOs must be engaged. To disseminate the technology through the CEOs, they have to be equipped with necessary knowledge, skills, attitude, hand-on experiences, etc. This arrangement can be done through administering a training course to the CEOs. Then, before the training, what is required is a TOT; Training Of Trainers.

The participants, trainees of the TOT, are expected to be the trainers of the CEO training course where CEOs were to gather from April 16 – 18, 2009. Therefore, the participants should at least have some experiences on smallholder irrigation or irrigated agriculture. Taking this pre-condition into account, the JICA Study Team in consultation with the Provincial Irrigation Engineer selected the following officers as the participants to the TOT:

1. Mr. Kelvin Simukoko TSB, Northern Province
2. Mr. Freddy Banda TSB, Northern Province
3. Mrs. Annie Bulaya TSB, Northern Province
4. Mr. Frank M. Mwansa TSB, Northern Province
5. Mr. Rodgers Phiri TSB, Mbala District
6. Mr. Kaira Machua TSB, Mbala District
7. Mr. Kenneth Zulu PIE, Northern Prov. (Overall Coordinator)

The TOT was carried out on 2 days of April 7 and 14 in the JICA Team's office. At first, topics to be undertaken during the CEO training were proposed by JICA Team, and discussed and agreed between the Team and TOT participants. Basically, technologies to be implanted in CEOs should be so simple and easy that farmers can apply, without engaging, say, general contractor. An example is temporary diversion weir made out of locally available materials. Should the training course be undertaking concrete-like structure, realizing of what was taught in the training can hardly be done unless there is a contractor. With this in mind, following 12 topics were selected;

1. Identification of Potential Gravity Diversion Sites
2. A Diversion Weir; Inclined Weir
3. A Diversion Weir; Single-line Weir
4. A Diversion Weir; Double-line Weir
5. A Diversion Weir; Trigonal Prop Weir
6. A Diversion Weir; Clay Soil Masonry Weir
7. Canal Alignment and Construction
8. Ancillary Facilities
9. Organizing of Farmers
10. Land Allocation (dividing the land into members)
11. On-farm Irrigation Method
12. Compost Making

Then, next session was to train the participants by the above topics. The Team Leader, with his co-team leader and his agriculture expert took the role of the trainer. They explained the tips of those above technologies with some handy extension materials.

Next part of the TOT was to allocate all the above topics in 3 days. In fact, the CEO training was scheduled on net 3 days, so that all the topics were grouped in two, and topics 1-8 were allocated in Day-1 and the rest in Day-3 with Day-2 for field practices. Field practices were scheduled for actual construction of a temporary diversion weir, probably single-line weir, and also canal alignment.

Having scheduled the net 3-day CEO training, the participants started discussing who should undertake which topics. Discussion among the participants did not take much time to arrive the session assignment. Then, a bit of dry-runs, rehearsals were conducted. With a consensus for which they are to prepare explanatory materials on their own to be used during their sessions of the CEO training, the TOT was completed.

PART II KICK-OFF TRAINING

CHAPTER 1 RATIONALE AND WORKSHOP OBJECTIVES

The Fifth National Development Plan (FNDP) established in December 2006 puts an emphasis on poverty alleviation for resource poor smallholder farmers by a means of irrigation development. In nowadays context, however, the Government is no longer allowed to stay as the main entity in developing the irrigation but is regarded as a facilitator of the development thereby promoting self-dependency on the farmers. Irrigation development increases agriculture production and enhances the food security, which will ensure the livelihood of resource poor smallholder farmers.

Smallholder Irrigation Development involves an extensive process and various activities such as identifying potential site, organizing farmers, constructing irrigation facilities, irrigating farms and harvesting. For the success of the development, there is a due need to cultivate a culture of irrigation by using appropriate technologies. The Technical Service Branch under the Department of Agriculture (DOA) of MACO together with JICA now believe that CEOs, the frontline extension officers, should be equipped with necessary skills, knowledge, hands on experience and right attitude to pursue the development; hence, this a 3-day training course is programmed.

By the end of the training program, the participants will be able to acquire the skills, knowledge and attitude necessary in discharging their duties and responsibilities of promoting smallholder irrigation development. Specifically, the participants are expected to be able to:

1. Internalize the concept of smallholder irrigation development being promoted under the Study,
2. Enumerate and discuss smallholder irrigation facilities and structures (mainly for temporary diversion weir system under the programmed training),
3. Acquire basic on-farm irrigation methods,
4. Organize farmers in developing smallholder irrigation schemes,
5. Acquire basic ideas of extending irrigation benefit to most of the villagers,
6. Acquire basic knowledge of compost manure making utilizing aerobic bacteria,
7. Prepare a camp basis entry program for 2009 dry season, and
8. Discuss way-forward for smallholder irrigation development in Zambia.

CHAPTER 2 PROGRAMME AND WORKSHOP MECHANICS

2.1 Workshop Programme

The training was a net tree-day line-in and out-activity held at Kasama Agriculture Institute. Methodologies employed were lecture-interactive discussion, brainstorming, practices on the field such as weir construction and line-leveling, and small group task preparing 2009 dry season entry program. Also, conducted during the course was provision of dissemination materials such as manual, leaflet, picture story-like illustrations, all of which can be used during a kick-off meeting of smallholder irrigation development with farmers. Following are the modules undertaken (for the detail, see Attachment 1):

- Module 1 Program Orientation
- Module 2 Smallholder Irrigation Facilities and Structures (in Lecture)
 - Identification of Potential Gravity Diversion Sites
 - Weir Type and Construction Method (Inclined Weir)
 - Weir Type and Construction Method (Single-line Weir)
 - Weir Type and Construction Method (Double-line Weir)
 - Weir Type and Construction Method (Trigonal Prop Weir)

	Weir Type and Construction Method (Clay Soil Masonry Weir) Canal Alignment and Construction Ancillary Facilities
Module 3	Smallholder Irrigation Facilities and Structures (Practice in Field) Practice of Construction of a Weir in the Field Practice of Canal Alignment
Module 4	On-farm Irrigation and Agriculture Aspects (in Lecture) Organizing of Farmers Land Allocation (dividing the land into members) On-farm Irrigation Methods Compost Making
Module 5	Entry Planning (in Workshop) Entry Planning Orientation Entry Planning and Output Presentation by CEO/ District (WS) Dissemination Materials (Technical Manual, Illustrations, Leaflet)

2.2 Workshop Participants

In advance of this training, there was a one-day kick off workshop held on March 31, 2009, inviting total 69 participants from the target 2 provinces under the Study. During the workshop, the participants were divided into 2 groups by province and prioritized their districts according to the smallholder irrigation potential. This training course invited relevant camp extension officers and district officers from those districts which were highly prioritized in terms of smallholder irrigation development potential. Following table shows the summary of participants (for detail, see Attachment 2):

Table 2.2.1 Summary of the Participants for the Kick-off Training Course

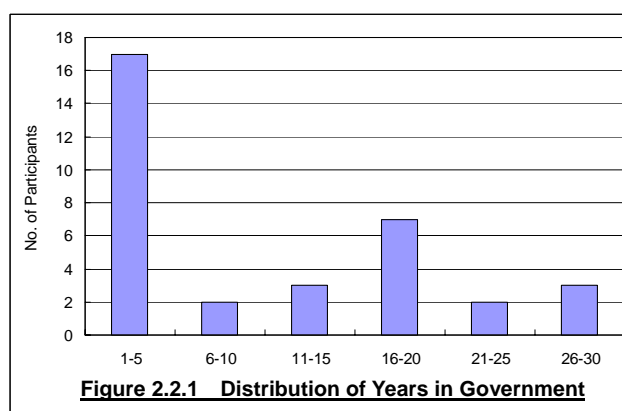
Particulars	Participants	Remarks
Northern Province		
Mbala district	4 (3F, 1M)	CEOs
Mpika district	2 (1F, 1M)	CEOs
Mungwi district	2 (2F, 0M)	CEOs
Kasama district	2 (1F, 1M)	CEOs
Mporokoso district	1 (0F, 1M)	CEOs
Luwingu district	2 (0F, 2M)	CEOs
Luapula Province		
Kawambwa district	4 (1F, 3M)	CEOs
Mansa district	3 (0F, 3M)	CEOs
CEOs total	20 (8F, 12M)	
District	8+1 (0F, 9M)	2 from Mbala District (one is trainer)
Northern Province	5 (1F, 4M)	Overall Management (cum trainer)
Luapula Province	1 (0F, 1M)	
Total	35 (9F, 26M)	Excluding JICA Members
Trainers	Office	
1. Mr. Kelvin Simukoko	Northern P.	
2. Mr. Freddy Banda	Mungwi	
3. Mrs. Annie Bulaya	Northern P.	
4. Mr. Rodgers Phiri	Mbala	
5. Mr. Frank Mporokoso Mwansa	Northern P.	
6. Mr. Kaira Machua	Mbala	
7. Mr. Kenneth Zulu	Northern P.	Overall coordinator
Back support: JICA Study Team		

Note: At first 4 districts were planned for Northern province, but through the discussion with the overall coordinator, it was increased to total 6 districts.

At the beginning of the training, a questionnaire was distributed to all the trainees so as to study their knowledge, experience and the view to irrigation development, etc. This section of the proceeding describes the outputs from the questionnaire so-called “Pre-Training Knowledge/ Experiences Inventory for the Training.”

2.2.1 Participants’ Service in Government

Figure 2.2.1 shows years in the government service for the participants. The mode falls in the category of 1-5 years, and then followed by a group of 16-20 years in the government service. This shows about half of the participants fall in the newly recruited groups like within 5 years. The average year in the government service is 10.7 years.



2.2.2 Definition of Smallholder Irrigation

Participants have different views to what the smallholder irrigation is. For example, one considers it as “easy and simple for operation and maintenance,” while the other thinks as “irrigated by small scale farmers in a small piece of land.” Other examples include, “using *dambo* or stream,” “agriculture in dry season,” and “using locally available materials.”

Yet, there are also some things in common among the different opinions as summarized in Table 2.2.2. In general, participants define it based on the scale of beneficiary farmers, type of irrigation facilities, and seasonality. The most popular is the ones defined by the scale of farmers; beneficiaries are small scale (59%). The second popular was the ones defined by the type/level of facility (18%); they consider smallholder irrigation as what is made with locally available materials. This result shows that their view to stallholder irrigation is basically in line with what the Study Team thinks of.

Table 2.2.2 Summarized Definition of Smallholder Irrigation

Definition	Number	%
Small scale farmers	20	59%
Locally available materials	6	18%
Dry season	2	6%
Others	6	18%
Total	34	100%

Source: Pre-training knowledge inventory, JICA Study Team

2.2.3 Experience in the Past Irrigation Projects Operated by Farmers

In terms of the experience of the participants in irrigation developments which are facilitated by the government of Zambia, NGOs, or donors and mostly operated and maintained by farmers, nearly half of the participants do not have any experience. As shown in Table 2.2.3, a total of 15 participants in the two provinces have some experience in such irrigation project, while the other 18 participants do not.

Looking at the station of the participants, same tendency is found among all stations: provincial, district, and camp offices. One exception is the camp officers in Northern province, out of 13 participants, nine officers do not have any experience in such irrigation projects, again, facilitated by outsiders but operated by the farmers. As far as the defined type of projects is concerned, these results indicate that the pilot project of the Study would be the first experience for a half of the participants.

Table 2.2.3 Experience in the Past Irrigation Project Operated by Farmers

Items	Northern			Luapula			Total
	Province	District	Camp	Province	District	Camp	
YES	2	4	3	1	1	4	15
NO	2	3	9	1	0	3	18
N/A	0	0	1	0	0	0	1
Total	4	7	13	2	1	7	34

Source: Pre-training knowledge inventory, JICA Study Team

2.2.4 Experience in Smallholder Irrigation Projects

A similar but another definition was applied to survey the participants' experience in a type of irrigation project. In this question, the question was: "which smallholder irrigation project(s), if any, have you been involved in and for how many years?" In this question, participants are the ones who decide what the smallholder irrigation is.

The result shows a total of 18 officers do not have any experience in smallholder irrigation scheme. The others, a total of 16 officers, listed 26 specific names of the projects they have ever been engaged in. Most of officers have only one project, while four officers have experience in three or more projects. Again, the pilot project in the Study would be the first experience of smallholder irrigation for around half of the participants. Among the participants who have experience in smallholder irrigation, their years of experience vary a lot from less than one year to the maximum 25 years, averaging 4.8 years. Although number of projects for each person is limited, mostly one project, they have a considerable length of experience in a project.

Table 2.2.4 Experience in Smallholder Irrigation Projects

Items	Northern			Luapula			Total
	Province	District	Camp	Province	District	Camp	
Number of officers who have no experience	2	3	9	1	0	3	18
Number of Project reported	4	6	6	3	3	4	26

Source: Pre-training knowledge inventory, JICA Study Team

2.2.5 Types of Irrigation System under Smallholder Irrigation

The participants have ever seen or known some types of irrigation systems under smallholder irrigation projects. Among the ones listed in Table 2.2.5, the most popular was gravity river diversion at the ratio of 70%, that is, 70% of the participants have ever seen, or know the fact, that gravity river diversion is practiced under smallholder irrigation projects. Almost same popularity, 67%, is canal and the third is treadle pump (45%).

Looking at each of the two provinces, similar result can be found. In Northern province, 78% of the participants have ever seen or know that gravity river diversion is used under smallholder irrigation, and 70% for canal. On the other hand, in Luapula province, treadle pump is the highest, 70%, and canal is the next. Interestingly, there are two officers who have never seen any of those under smallholder irrigation scheme. They may have different type of irrigation system in their mind, i.e., bucket irrigation, or they just simply do not know much about smallholder irrigation.

Table 2.2.5 Types of Irrigation System Observed/Known under Smallholder Irrigated Projects

Province	None	Canal	Gravity River Diversion	Treadle Pump	Motorized Pump	Dam (pond/Reservoir)
Northern	1 4%	16 70%	18 78%	8 35%	5 22%	5 22%
Luapula	1 10%	6 60%	5 50%	7 70%	3 30%	2 20%
Total	2 6%	22 67%	23 70%	15 45%	8 24%	7 21%

Source: Pre-training knowledge inventory, JICA Study Team

2.2.6 Problems to the Government Officers as Extension Agents

As government technical officers or extension officers, the participants face a range of problems. For example some complain that they do not have enough technical know how to teach farmers, while others point out that they do not have enough funding for the activities. These problems can be summarized as shown in Table 2.2.6.

The absolute number one problem is the ones associated with transportation, saying, limited means of transportation (vehicle, motorcycle, and bicycle), lack of spare parts, and less availability of fuel. It shares 38% of all the problems they listed. With respect to the issue of transportation, as one extension worker, or Camp Extension Officer (CEO), supposedly covers about 590 km² (24 km by 24 km) or more area (in a case of Northern province), it can be a bottleneck to any government-led extension activities including the promotion of smallholder irrigation development.

Understandably, the second is funding; it may be a root cause of the lacks of materials and equipments. In addition to those tangible problems, they also face some constraints related to technological arrangement. Some consider a lack of their technical capability is a primary problem, while the others claim for a lack of technical advices from the upper level offices.

Table 2.2.6 Problems to the Participants

Definition	Total	Portion
Transportation	24	38%
Funding	9	14%
Training	5	8%
Equipment	4	6%
Technical Know How	2	3%
Technical Advice	2	3%
Road	2	3%
Others	15	24%
Total	63	100%

Source: Pre-training knowledge inventory, JICA Study Team

2.2.7 Countermeasures Taken by the Participants to Deal with the Problems

It is not the case that government officers are reconciled just to look at the problems. To cope with those problems listed in Table 2.2.6, they are making a lot of efforts in different ways. Some of the officers take an alternative means of transportation, for example bicycle or even walking as substitute to motorbike, while others self-educates them by reading textbook. Furthermore, some extension officers consult with upper class staff like provincial officer for district officers, or district officers for CEOs.

Table 2.2.7 Countermeasures Taken by the Officers

Countermeasures Being Taken	Northern	Luapula	Total	Portion
Alternative for Transportation	6	2	8	17%
Ask farmers a favor	6	1	7	15%
Consult with upper staff	5	2	7	15%
Self-education	2	1	3	7%
Get equipment from other dep.	0	0	0	0%
Collaborate with other party	3	2	5	11%
Self-reliant on transportation	3	0	3	7%
Educate/train/organize farmers	6	3	9	20%
Others	2	2	4	9%
Total	33	13	46	100%

Source: Pre-training knowledge inventory, JICA Study Team

To cope with a lack of funding, for another example, some officers ask farmers to pay for a part of cost for fuel or trainings. It is noteworthy that three officers use/used their own money to buy fuel to handle the fuel problem. In addition, officers sometimes collaborate with other departments of MACO or NGOs so that they can mobilize themselves or borrow necessary equipments from the partners. These countermeasures that the participants have ever taken are summarized in Table 2.2.7.

2.2.8 Best Practices

Aside from the difficulties and the struggle against those problems, participants, as government officers, have successful or memorial experience as the best practices. One CEO specifically

remembers his best practice that his client farmers had a very good harvest from a *dambo* irrigation he supported. Some others are also proud of successful performance of their client farmers. Other best practices are more related to their own experiences in a project or alike. For example, one mentioned an engagement in FINNIDA project in 1997 as one's best experience and other mentioned an attendance in a training course offered by PaVidIA project. These best practices are summarized in Table 2.2.8.

Table 2.2.8 Best Practices of the Participants

Items	Numbers
Exposure to a new activities	13
Observing Farmers' good performance	7
Co-working with farmers	5
Completion of the task	2
Total	27

Source: Pre-training knowledge inventory, JICA Study Team

2.2.9 Contribution of Smallholder Irrigation to Improving Livelihood of Smallholder Farmers

It was asked to the participants how they think smallholder irrigation can improve the livelihood of smallholder farmers. To this question, two different types of answers were given back to the study team. One is about a means and the other is about an impact or contribution of smallholder irrigation to improving livelihood of smallholder farmers. For example, training and/or assistance of inputs were pointed out as necessary arrangements to promote smallholder irrigation for improving livelihood of beneficial farmers.

On the other hand, as of an outcome or an impact of smallholder irrigation, it was claimed that smallholder irrigation can improve food security and income level; in fact, 22 out of a total of 28 answers fell into this category. Also, increase in production area and type of crops in the dry season was second popular opinions. It suggests that participants believe that smallholder irrigation scheme can improve water availability in the dry season, increase production, and eventually enhance the food security of the smallholder farmers.

Table 2.2.9 Contribution of SH Irrigation to Livelihood Improvement

Items	Numbers
Food security and income will be increased	22
Dry season crops become available	6
Increasing area of production	4
Financial stability (i.e., school and health fees)	2
Intensify water flow in rural community	1
Having training on irrigation and assist with inputs	3
Total	38

Source: Pre-training knowledge inventory, JICA Study Team

2.2.10 Roles of Government Officers

Participants consider their own roles in various ways as shown in Table 2.2.10. Basically, as for the smallholder irrigation development, many of them, 14 out of 34, think themselves as facilitator who organize and mobilize smallholder farmers in irrigation and agricultural development. In addition, provision of technical advises is the other important role that they consider. Precisely, giving training, providing some financial resources or even implementing smallholder irrigation is considered as their primary roles. As majority of the participants consider that their roles are to facilitate farmers and providing advises, there should be some needs of trainings for them to equip themselves with technical capacity and facilitation skills; this workshop training must be a good opportunity for them.

Table 2.2.10 Roles of Government Officers

Items	Numbers
Facilitation and mobilization, guidance	14
Technical advise	13
Monitoring	5
Training	6
Implementation of smallholder irrigation	5
Finance (construction, resources)	3
Improve living condition/food security	3
Deployment of staff where vacant	1
Data collection	1
Educate the importance of growing irrigated crops	1
Total	52

Source: Pre-training knowledge inventory, JICA Study Team

2.2.11 Expectation from the Training

As expected, participants actually anticipate a lot about new knowledge and skills from the kick-off training. What the participants is expecting the most is to acquire knowledge on irrigation systems in general; 18 officers expect it. 16 officers specifically consider this training as an opportunity to learn

construction and management skills of irrigation facilities. Including the ones who generally would like to learn new technologies, 44 participants expect their technological advancement from the training.

Some others also expect sharing ideas and knowledge with other participants from different districts or province. As it is also addressed above, some participants, four participants, are willing to acquire some skills on facilitating and organizing farmers. There are also some participants who are expecting some logistical support from the Study Team. It implies that they may prospect for some financial support from the Study so that one of their serious constraints, a lack of fund, could be somehow tackled.

Table 2.2.10 Expectation from the Training

Items	Total
Acquire knowledge on irrigation systems	18
Construction and management of irrigation facilities	16
New technologies	10
Sharing ideas and knowledge/ challenges and experiences	6
Cultural technologies	2
Facilitation skills	4
Logistics support	6
Get certificate	1
Know selected camps for the pilot project	1
Make action plan	1
Total	65

Source: Pre-training knowledge inventory, JICA Study Team

CHAPTER 3 ACHIEVEMENT OF THE TRAINING OBJECTIVES AND THEIR SATISFACTION

3.1 Achievement of Training Objectives

Objectives are by the end of the training the participants are able to:

1. Internalize the concept of smallholder irrigation development being promoted under the Study,
2. Enumerate and discuss smallholder irrigation facilities and structures (mainly for temporary diversion weir system under the programmed training),
3. Acquire basic on-farm irrigation methods including discharge measurement,
4. Organize farmers in developing smallholder irrigation schemes,
5. Acquire basic ideas of extending irrigation benefit to most of the villagers,
6. Acquire basic knowledge of compost manure making utilizing aerobic bacteria,
7. Prepare a camp basis entry program for 2009 dry season, and
8. Discuss way-forward for smallholder irrigation development in Zambia.

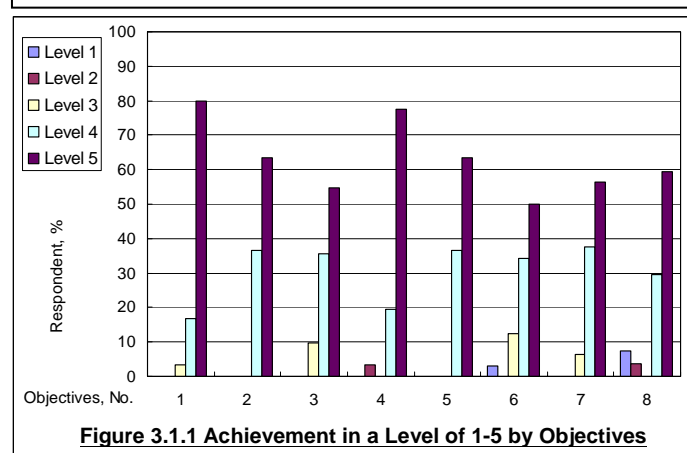


Figure 3.1.1 Achievement in a Level of 1-5 by Objectives

At the end of the training course, the participants were asked how much they have achieved the objectives of the training in a level of 1 to 5; level-1 is least achieved while level-5 is most-achieved. There are a few participants who gave less than level-3 achievement, but otherwise most of the participants gave more than that, and in any of the objectives, level-5 achievement marked the most many number of participants as shown in Figure 3.1.1. The percentage of the participants who gave level-5 achievement ranges from say 50% to as high as 80%. Objectives which marked higher percentages of level-5 achievement were Objective No.1 and No.4. Objective No.1 dealt with ‘internalization of the smallholder irrigation’ while Objective No.4 undertook ‘Organizing of farmers in developing smallholder irrigation schemes’.

Relatively lower percentage in level-5 achievement is shown in Objectives No.3 and No.6, though not lower than 50%. Objective No.3 was to “Acquire basic on-farm irrigation methods including discharge measurement”. On-farm irrigation methods were not difficult for most of the participants but the concept of discharge, its measurement and also relevant to how much acreage can be irrigated with it was difficult, which required repeated explanations. Also, trainer’s explanation could have been clearer. Objective No. 6 dealt with compost making with a help of aerobic bacteria. The process of making the compost is a bit cumbersome to understand, not as simple as conventional compost. Without practice, most of the participants felt a difficulty to fully understand, resulting in a relatively lower percentage of level-5 achievement.

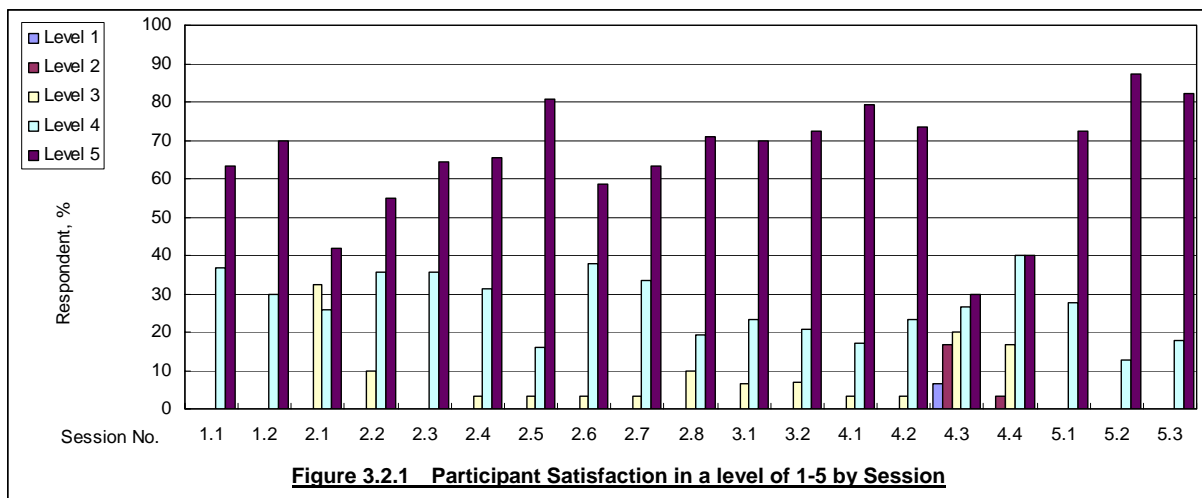
3.2 Participants’ Satisfaction by Session

At the end of each session, the participants were asked of what extend he/she was satisfied: level 1 is the least satisfied while level 5 is the most satisfied. Table 3.2.1 shows the sessions undertaken during the net 3-day training, and Figure 3.2.1 summarizes the level of satisfaction of the participants (for detail, see Attachment 3). The highest satisfaction can be seen in such sessions as ‘2.5 Trigonal prop type weir’, ‘5.2 Entry planning and

Table 3.2.1 Sessions Undertaken by Training

Session	
1.1	Program orientation
1.2	JICA presentation (Introduction & Overview)
2.1	Identification of potential gravity diversion sites
2.2	Weir type & construction method (Inclined weir)
2.3	Weir type & construction method (single line weir)
2.4	Weir type & construction method (double line weir)
2.5	Weir type & construction method (trigonal prop)
2.6	Weir type & construction method (soil masonry)
2.7	Canal alignment and construction
2.8	Ancillary facilities
3.1	Practice of construction of weir(s)
3.2	Practice of canal alignment
4.1	Organizing of farmers
4.2	Land Allocation
4.3	On-farm irrigation method & Discharge
4.4	Compost making
5.1	Entry planning and Orientation
5.2	Entry planning and output presentation (WS)
5.3	Dissemination materials

output presentation’, ‘5.3 Dissemination materials’, ‘4.1 Organizing of farmers’, etc. In fact, all the sessions marked highest percentage in level-5 satisfaction, though session No.2.1, session No.4.3 and session No.4.4 included such lower satisfactions as level-4, level-3, and level-2 for No.4.3 and No.4.4, and even level-1, the least satisfaction, for No.4.3.



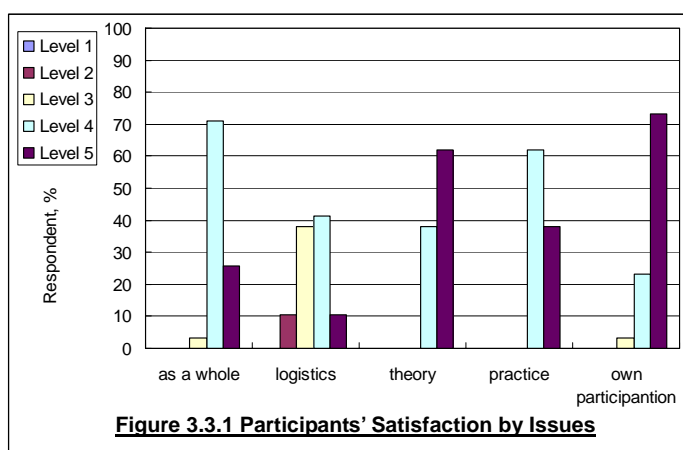
Session No.2.1 was for ‘identification of potential gravity diversion sites’, which included topography counter map reading. Potential gravity diversion sites can be easily found in villagers’ footpaths which cross a perennial stream and also at just upstream of natural drops (small fall). This is because that; 1) footpaths usually traverse streams at a shallow place, forming a topographic condition which is easier in diverting and getting water onto the farms, and 2) right upstream of natural drops (small fall) could easily lead the water into canal by gravity thanks to the elevation difference. These were not difficult at all for the participants, but the session came to how to read topographic counter maps, most of the participants were not cumbersome for it and required further clarification, resulting in lower level of satisfaction.

Session No.4.3 undertook ‘On-farm irrigation methods and Discharge’. As stated in the achievement of training objectives already, the participants had difficulties of concept of discharge/ flow of the stream, and also how to measure it. This has led some of the participants to the least satisfaction level such as level-2 and level-1. As per Session No.4.4, participants also had difficulties of understanding somewhat cumbersome process of compost making by utilizing aerobic microorganisms. Some participants could hardly understand the whole process of utilizing aerobic microorganisms, showing some lower satisfaction levels.

3.3 Participants’ Satisfaction by as a Whole, Logistics, Theory, Practice, and Own Participation

In addition to asking the participants of their satisfaction by session, satisfaction by as a whole, logistics, theory, practice and own participation in a level of 1-5 were also asked. Figure 3.2.1 shows the satisfactions for the participants by those issues.

Issues which marked highest level-5 satisfaction was ‘own participation’ and then followed by ‘theory. More than 70% participants in fact gave level-5 satisfaction in their ‘own participation’



and more than 60% participants in the 'theory' taught. Such issues as 'as a whole' and 'practice' also marked high level of satisfactions as the summated percentage of level-4 and level-5 satisfactions can arrive at almost 100%. As per 'logistics', however there were participants who gave satisfaction level-3 and also level-2, both of which together account for almost half, 48 percentage of the participants. They felt some difficulties in lodging where they accommodated in Kasama Agricultural Institute. The institute is located suburb of Kasama town, causing a little difficulty of commuting from the town without pre-arranged transportation. Also, most of the difficulties is associative with water problem, casing sanitation trouble. This situation led the participants to mark such lower satisfaction.

3.4 Participants' Comments to Improve

In addition to rating the satisfactions above, the participants were asked to make comments to improve if any with respect to: 1) as a whole, 2) logistics, 3) theory, 4) practice, 5) own participation, and 6) how to best improve the training course in future. Following are the excerpt of the comments and probable measures to take for future trainings (for detail, see Attachment 4):

- ✓ Some participants raised that there should be more practices, say for 2 days. They raised some concerns about compost making which requires through explanations and also practices. Also, given enough days for the training, some participants expected to use almost full day for action plan formulation.
- ✓ Four participants raised an issue of trainer, saying the presentation should be improved. These were mainly related to topographic map reading and discharge measurement. These issues require more time to thoroughly explain than that actually allocated.
- ✓ About one third of the participants raised an issue on lodging. Problem was reticulation system in the ablution. Some requested to improve the facilities of the institute and even suggested a change of the venue as well. Some participants from Luapula province commented that the training could be held in an area in Luapula province, e.g. in Mansa. In fact, some participants from Luapula province had to stay one more night in Mansa, and they came to Kasama on the following day.
- ✓ To further improve the training, 8 participants raised that the training should be done only in 5 weekdays. They complained the last day of the 3-day training was on Saturday, and had to travel back to their area on Sunday. Another ideas to improve were, for example, increase of practices (6 participants), change of the venue including shift to Luapula province (4 participants), more exposure visit (3 participants), increase of allowance (3 participants), including of experienced staff which can enrich the share of the experiences (2 participants), etc.

CHAPTER 4 TARGET SET FOR YEAR 2009 DRY SEASON FOR TEMPORARY SMALLHOLDER SCHEMES

The climax of the kickoff training was the action planning of each district. Based entirely on the experience and leaning in the past two and a half day, the participants were encouraged to plan their own action plan of their districts on smallholder irrigation scheme. The session of so-called entry planning started in a plenary session with an orientation by Mr. Zulu, the senior irrigation engineer of Northern Province. He explained the objective of the action planning and contents of the plan to be considered, which was followed by the explanation of reporting mechanics, pro-forma of site profile, and logistical arrangement.

Then, trainees were broken up into groups of each district so that they can discuss about their own plan. The plans consist of 1) TOT to be carried out at district level, 2) number of sites targeted, 3) number of farmers to be organized, 4) areas to be developed, and 5) canal length to be constructed. These targets, except for TOT, were set both for the purpose of improving existing irrigation scheme, "Improvement," and for the development of new irrigation scheme, "New Development."

Camp extension officers (CEOs) together with their district officers were asked to set his/her own target according to the potential of their extension areas. In addition, districts have also set the targets to be implemented by fellow camp extension officers who did not attend the training but are expected to learn the technology by the participants through TOT. These figures were then placed at the front wall of the conference room and presented to all the participants for their comparison and adjustment if so needed.

4.1 Target for TOT

Table 4.1.1 summarizes the targets of TOT by district, showing how many times they are to carry out TOT and how many fellow CEOs are to be trained. There was an issue raised by many participants, saying it is hardly possible to carry out TOT at the district level since CEOs are to meet only at an occasion of quarterly meeting. Otherwise, they come to their district offices only on ad-hoc basis. They discussed and made a consensus of when the trained participants are to develop smallholder irrigation schemes they should invite the neighboring CEOs. This is the reason why only handful number of fellow CEOs, that is a total of 78, are to be trained in spite of the frequency of the TOT which is to be carried out 26 times. One TOT is to call on 3 fellow CEOs as average.

Table 4.1.1 Planned TOT (Training of Trainers; fellow CEOs) by District

District	Mbala	Mpika	Mungwi	Kasama	Mporokoso	Luwingu	Kawambwa	Mansa	Total/Ave.
Times	3	6	4	2	2	3	2	4	26
Participants	15	26	5	6	3	6	5	12	78
Participants/TOT	5	4	1	3	2	2	3	3	3

Source: JICA Study Team, from the Kick-off Training held from April 16 – 18, 2009.

The maximum number of TOTs, six times, was set as a target in Mpika, while the minimum was twice in Kasama, Mporokoso, and Kawambwa. The number of expected participants was also the largest in Mpika at 26, while the smallest was found in Mporokoso at three. In the discussion session, the number of participants in Mpika was said too ambitious to facilitate in a limited period of time. In fact, with regard to the number of sites, a total of 137 sites and 115 sites were targeted for improvement and new development respectively, in which 39 sites and 56 sites in Mbala were the largest.

4.2 Target for Improvement of Existing Sites

There are already number of existing smallholder irrigation sites established by farmers. Most of the facilities do not, however, have diversion structure, and simply withdraw stream water to their canal

by gravity. Therefore, amount of water withdrawn to the canal can hardly meet crop requirement especially during late irrigation season when water level in the stream gets lower. Taking this situation into account, the participants decided to improve those existing facilities by introducing temporary diversion facilities made out of locally materials.

Table 4.2.1 summarizes the target for improvement of existing sites. Participated CEOs, altogether 21 CEOs, are to improve 53 existing sites. In addition, through TOT another 84 existing sites are to be improved, totaling 137 sites for the improvement in 2009 dry season. In terms of number of farmers to be benefited, participated CEOs are targeting about 1,400 members while through fellow CEOs another about 1,600 farmers are expected to benefit. Average number of farmers per site is expected to be around 22.

As per irrigated area, a total of 227 ha was targeted by the participated CEOs to improve, and another 281 ha is expected to improve through fellow CEOs. Total area to be improved by both participated CEOs and fellow CEOs is therefore estimated at 507 ha, giving an average area of 3.7 ha per site. Since the CEOs are to undertake smallholder irrigation schemes which can be realized in their locality without engaging any contractor, irrigable area per site is not big, rather very much conservative.

Canal length is very much dependent on the site condition. Therefore targeting of canal length can hardly be realistic, however the participants tried to estimate the work to come. The participated CEOs expect there could be a total of about 120 km length of canal while another 160 km can be expected through fellow CEOs. Expected total canal length is therefore 280 km, with an average canal length of 2 km per site.

Table 4.2.1 Target for Improvement of Existing Sites for Year 2009 Dry Season

Items	Mbala	Mpika	Mungwi	Kasama	Mporokoso	Luingu	Kawambwa	Mansa	Total/Ave.
Number of Sites to be improved									
CEO 1	3	3	3	4	4	2	2	1	22
CEO 2	6	3	2			3	1	1	16
CEO 3	4	2					2	2	10
CEO 4	4						1		5
Sites by Participants	17	8	5	4	4	5	6	4	53
Sites by Fellow CEOs	22	17	22	6	9	3	5		84
Total No. of Site	39	25	27	10	13	8	11	4	137
No. of Farmers by Participants	255	309	70	55	80	270	345	55	1,439
No. of Farmers by Fellow CEOs	330	695	100	65	180	110	150	0	1,630
Total No. of Farmers	585	1,004	170	120	260	380	495	55	3,069
Average No. of Farmers per Site	15	40	6	12	20	48	45	14	22
Total Area by Participants, ha	64	28	9	32	20	13	46	15	227
Total Area by Fellow CEOs, ha	82	75	7	60	45	3	9	0	281
Total Area, ha	146	103	15	92	65	16	55	15	507
Average Area per Site, ha	3.7	4.1	0.6	9.2	5.0	2.0	5.0	3.8	3.7
Total Canal L. by Participants, km	43	14	4	4	9	23	15	6	117
Total Canal L. by Fellow CEOs, km	55	37	8	20	25	9	10	0	163
Total Canal Length, km	97	51	12	24	34	32	25	6	280
Average Length per Site, km	2.5	2.0	0.4	2.4	2.6	4.0	2.3	1.4	2.0

Source: JICA Study Team, from the Kick-off Training held from April 16 – 18, 2009.

4.3 Target for New Development Sites

Table 4.3.1 summarizes the target of new development for temporary diversion schemes in 2009 dry season. Participated CEOs, altogether 21 CEOs, are to develop 41 new sites. In addition, through TOT another 74 new sites are to be developed, totaling 115 sites for 2009 dry season. In terms of number of farmers to be benefited, participated CEOs are targeting about 1,060 farmers while through fellow CEOs another about 1,600 farmers are expected to benefit. Average number of farmers per site is expected to be around 24.

As per irrigated area, a total of 140 ha was targeted by the participated CEOs to improve, and another 228 ha is expected to improve through fellow CEOs. Total area to be improved by both participated CEOs and fellow CEOs is therefore estimated at 368 ha, giving an average area of 3.2 ha per site. Though targeting of canal length can hardly be realistic, the participants estimated that there would be

a total of about 73 km length of canal while another 155 km can be expected through fellow CEOs. Expected total canal length is therefore 228 km, with an average canal length of 2 km per site.

Table 4.3.1 Target for New Development Sites for Year 2009 Dry Season

Items	Mbala	Mpika	Mungwi	Kasama	Mporokoso	Luwingu	Kawambwa	Mansa	Total/Ave.
Number of Sites to be developed									
CEO 1	2	2	1	3	2	2	1	2	15
CEO 2	4	1	1			1	1	2	10
CEO 3	3	3					1	2	9
CEO 4	5						2		7
Sites by Participants	14	6	2	3	2	3	5	6	41
Sites by Fellow CEOs	22	4	4	4	6	3	7	24	74
Total No. of Site	36	10	6	7	8	6	12	30	115
No. of Farmers by Participants	210	160	40	50	25	330	175	70	1,060
No. of Farmers by Fellow CEOs	330	373	40	40	150	145	210	360	1,648
Total No. of Farmers	540	533	80	90	175	475	385	430	2,708
Average No. of Farmers per Site	15	53	13	13	22	79	32	14	24
Total Area by Participants, ha	53	16	5	15	10	17	11	14	140
Total Area by Fellow CEOs, ha	83	36	0	42	30	6	8	24	228
Total Area, ha	135	52	5	57	40	23	19	38	368
Average Area per Site, ha	3.8	5.2	0.8	8.1	5.0	3.8	1.6	1.3	3.2
Total Canal L. by Participants, km	35	9	2	8	4	4	8	4	73
Total Canal L. by Fellow CEOs, km	55	24	6	28	15	5	10	12	155
Total Canal Length, km	90	33	8	36	19	9	18	16	228
Average Length per Site, km	2.5	3.3	1.3	5.1	2.4	1.5	1.5	0.5	2.0

Source: JICA Study Team, from the Kick-off Training held from April 16 – 18, 2009.

4.4 Logistical Arrangement to Be Considered

After the presentation and discussion of those targets set in the action plan of each district, it was also considered how to mobilize the development activities. Participants were required to estimate necessary fuel for the mobilization and facilitation of the projects.

For the activities of camp extension officers (CEOs), or agricultural assistances, an average of 637 liters per district, totaling 5,102 liters in the eight districts was estimated for the period of six months, May to October 2009. For the activities of district officers, in addition, a total of 3,210 liters were estimated for the eight districts, averaging 401 liters per district. As a result, a total of 8,312 liters, or 1,039 liters per district, were requested. To cover whole fuel cost, at the cost of 120 yen per liters, for example, approximately fifty million Zambian Kwacha (49,872,000 @50 Kwacha/yen) or one million yen (997,440 yen) should be required.

Looking at the required fuel per site, at most 103 liters are required in Mansa, Luapula province, and at least one liter in Mpika, Northern province. One liter seems to be an underestimate as of the cost of the activity for one site. It should be clarified if it is an overestimate for the number of sites or if the unit was misunderstood. After the discussion, it was explained by the team leader of the Study Team that this is just for a rough estimation and nothing is committed yet. He is to discuss with JICA HQs to settle this issue for the conduct of the pilot project, and thus according to the fund to be availed for the fuel, the target may have to be adjusted.

4.5 Dissemination of Materials

After the planning session, it was a time for the participants to be encouraged for the actual implementation of the pilot projects; necessary materials were distributed to each of eight districts. The materials distributed were as follows:

- ✓ Technical manual 30 sets per district
- ✓ Illustrations 20 sets per district
- ✓ Leaflet 20 sets per district
- ✓ Monitoring format 8 copies per district
- ✓ Line level 5 pieces per district
- ✓ String (five meter by six sets) 30 meter per district

✓ Crayon (six colors)	5 sets per district
✓ Color pencils (12 colors)	5 sets per district
✓ Glue	4 sets per district
✓ Colored mount paper	60 sheets per district
✓ Clear file	30 sets per district
✓ Tape measure	4 pieces per district
✓ Plastic bag	4 sets per district

These materials were distributed for the purpose of further extension and dissemination of the technologies. For example, participants were encouraged to paint a poster or a technical guideline with crayon and/or color pencils so that other colleagues or farmers can easily get a point of the technologies. Also, line level and string are to be used for the actual implementation of canal alignment.

CHAPTER 5 PRACTICE ON A SIMPLIFIED IRRIGATION SCHEME

A simplified irrigation scheme, which includes a construction of brush dam, or single-line weir, was implemented as a part of the training on the Day-2 (April 17, 2009). The training was carried out in a *dambo* area in Kalupa village, Mungwi district, which had been identified by the PACO counterpart personnel in Northern province and confirmed by the Study Team beforehand. In addition to a total of 35 trainees of the kick-off workshop, 31 villagers in the area also participated in the activity as the irrigation scheme is expected to benefit the villagers after the training. The one-day on-site training started around 9:00 hours and ended 17:00 hours. During this net seven-hour of practice except an hour lunch break, the training was organized in four steps as follows:

- 1) Identification of the construction site,
- 2) Driving of wooden poles across the water flow,
- 3) Weaving of grass fence across the poles, and
- 4) Aligning and digging a canal.

5.1 Identification of the Construction Site (9:00am-10:00am)

The specific location for the construction of a brush dam, or so-called a single line weir, was decided based on an observation of the site and discussion among all the participants. At first, there were actually two potential sites considered as potential sites: one located upstream, or alternative-1, and the other, downstream as alternative-2, illustrated in Figure 5.1.1.

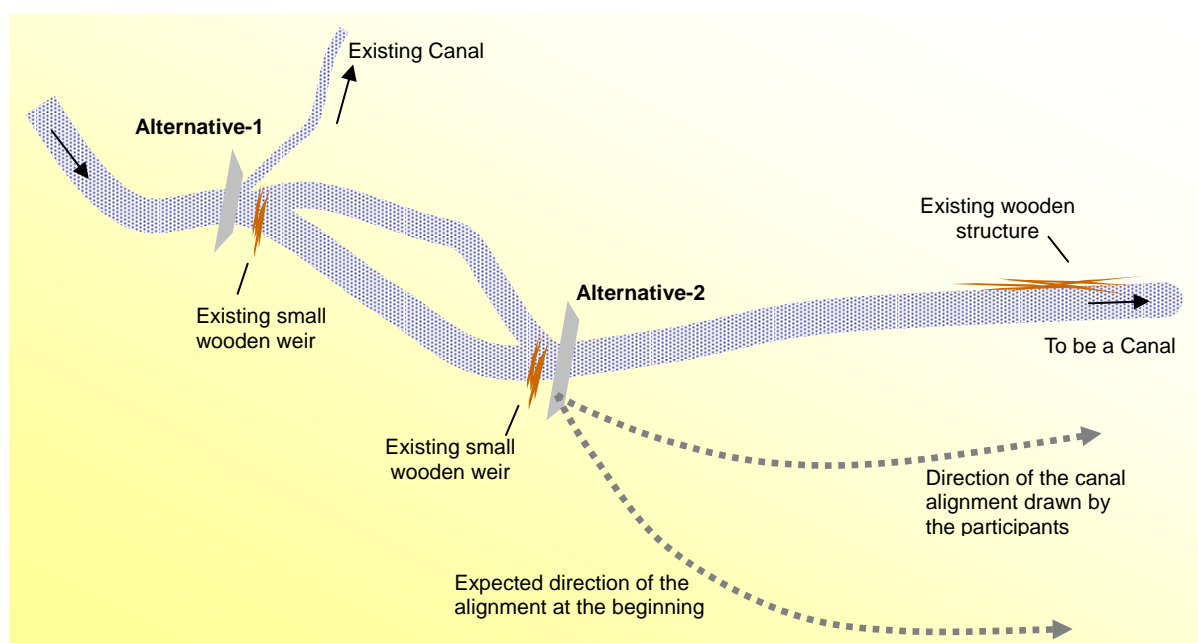


Figure 5.1.1 Geographical Profile of Construction Site

At the point of alternative-1, the water flow is divided into two different waterways; mainflow goes right-bank side and other goes left. Also, at the almost same point toward left-bank side, there is an earth canal (30-50cm in width) constructed by a group of farmers who were not joining on the day. The two waterways join at the point where alternative-2 was considered. In other words, the location of alternative-2 was proposed at the point after waterflows are merged so that more volume of water can be captured. In both sites, simple wooden structures were observed, which were not necessarily elevating the waterlevel so much at this time of the year.

For the site selection, some suggested alternative-1 due to its higher elevation than that of alternative-2 and for the narrow width of the waterflow. However, it was decided to take alternative-2 with regard to the existence of a canal, as some participants worried about a potential conflict with the owner/users of the canal. Although a trainee mentioned that the intake of the canal, for his best knowledge, would be closed during a dry season as the waterflow at that part is not enough.

However, it was agreed that, as the construction of a weir is just for a practice, unnecessary conflict should be strictly avoided, thus alternative-2 was taken. During this process, participants paid much attention to technical feasibility of the site as well as social consideration. On the other hand, it took about an hour and some complained about the loss of time for the construction practice.

Table 5.1.1 Feature of Candidate Sites for Weir Construction

Items	Alternative 1	Alternative 2	Remarks
Locatoin	Appx. five metetr upstream from the alternative-2	Appx. five metetr downstream from the alternative-1	
Elevation	XX m	1.1m lower than alternative-1	
Velocity of water flow	0.5m/s	0.7m/s	estimated
Width of the water flow	0.6-0.8m	0.9-1.2m	estimated
Depth of water flow	0.3-0.4m	0.3-0.4m	measured

5.2 Driving of Wooden Poles across the Water Flow (10:00am-10:35am)

Soon after the site selection, a number of wooden poles were driven straight across the water flow. The size of the poles was approximately 2 m in length and with an around 10 cm of diameter. The poles had been prepared by the villagers prior to the training using the trees and twigs in the area, and sharpened during the training. The poles were driven by hand. As the length of poles were too long, it was virtually impossible for the participants to use hammer or like. Therefore, some participants cut the top of some poles after driven, and others created an innovative wooden hammer so that even a long pole can be hit with it as shown in the picture on the right.

To align the poles straight in line, participants stretched a string across the water flow as to position definite locations where poles were supposed to be. The number of poles reached around 120 to across the water flow with around 25 m in width. From the Study Teams' point of view, however, the sizes of poles seemed to be relatively too long for the expected level of water level to be elevated by the weir. Also, the distance between the poles looked a bit too close. These items should be clarified before the commencement of the construction in the future.



An innovative hammer



Using a string to align the poles

5.3 Weaving of Grass Fence across the Poles (10:40am-12:30am/14:30pm-15:30)

The site was blessed with an exuberance of elephant grasses. Thus, fence of the weir was built by making use of the plant. By weaving the bundled grasses alternating the upright poles, participants gradually accumulated the materials. At this point, participants realized that the poles were located too

close to each other so that the weaving was so hard to facilitate. Although some poles were removed, most of the poles were left as they were. As a result, the participants had to make a lot of effort for weaving. For an easier weaving, the distance between the poles and the size of the grass bundles are the very important factors.



Alternating a bundle of grasses



Compacting the basement of the weir

After building a certain height and length of grass weir, participants, including the villagers, started compacting the basement of the weir by adding some silt soil as well as clay soil, and stamping upon them as shown in the picture right. The materials, as like elephant grass, were available right next to the site. To carry those materials, villagers were so cooperative that they carried the materials hand to hand as like a bucket-relay. Weaving and compacting took so much time as the foundation of the *dambo* was not uniform; some specific part of the stream along the weir was far deeper than the other part. After a while, it looked like the weir was completed. However, it was found that a lot of water was seeping underneath the weir or a far end of the weir. So an additional effort was made to make it more reliable. After a nearly six hours of effort, the weir elevated the water level about 70 cm higher than that of downstream of the weir. It seemed that the time for the construction of canal has come.

5.4 Aligning and Digging a Canal (14:30pm-16:00pm)

After the lunch, participants were divided into two groups; one for the continuation of weir construction and the other for drawing canal alignment. The canal alignment team started setting an alignment using a spirit level hang on a string with 5 m in length; each end of the string was tied to a wooden pole. They set a difference in the heights of each end of the string tied at 1 cm so that the expected slope between the two locations can be 1/500. Originally, it was expected that the alignment goes far right toward the right bank so that more land between the new canal and the existing canal can be irrigated.



Deciding an canal alignment with a line level

However, as the elevation of the water level was not high enough to the topography of the right bank, the direction of the alignment had to go toward the existing canal. Also, it was observed that participants had a hard time in deciding the alignment, because the land surface was soft and rough due to the accumulated organic matters. By the end of the training, canal alignment team drew the alignment approximately 200m. Along with the alignment, participants dug the canal with hoes for about 5-10m long just for a practice. By completing the construction of the weir and the delivery canal, the officer of the day called it a day.

5.5 Observation

During the practical training, some issues were observed both by the Study Team and the participants themselves. Noteworthy is the following:

1) Setting the Location

For the efficient irrigation, the location of weir is crucial. As it goes down, the elevation of the water flow goes also down, that is, farmers have to elevate the water level much higher at the downstream than that at the upstream, if a specific farmland is to be irrigated. In this practice, farmers chose the location of the weir downstream and faced some difficulty in two ways. First, as the elevation of the water level is not high enough, an estimated command area could not be as far toward the right-bank side as expected. Second, the width of the water flow at the location where the weir was constructed was wider than that of other candidate location, alternative-1. As a result, farmers had to construct much longer weir.

In addition, the location, in a wider term, was not necessarily suited for the construction of new weir, because the stream was running toward an existing earth canal until 2 – 3 km far from the location. Accordingly, it can be expected that farmers may not dig an additional canal in parallel with the existing canal; the weir may not cost-effective. This lesson provides the participants with an awareness of how important it is to select an appropriate location of the weir.

2) Sizing and Spacing of Wooden Poles

It was a surprise to the Study Team when they saw the wooden poles piled up at the site; they were far bigger than what they thought based on their experience. Poles were about two meter or longer in the length and about 10 centimeter in diameter; it looked like if participants were to elevate the water level more than one meter. Considering the size of completed weir, it should not have necessarily been that much. Also, as mentioned earlier, spacing of the poles was a bit too narrow, preventing the easier and faster weaving afterward. So, the size of the poles should be carefully decided based on the expected size of the weir so that unnecessary exploitation of woods can be avoided.

3) Gender

In the process of construction, there was not a clear division in the types of work between women and men. However, it seemed that women farmers tended to work on simpler works such as carrying soils, while men tended to participate in works such as putting soils and firming the basement of the weir. It was explained by a counterpart in this way; if a woman enjoy working with other men, her husband might be jealous to her. Therefore, in the future, role sharing between men and women should be paid an attention.

4) Participation of Future Irrigators

A lot of soil was required to firm the basement of the weir as the size of the weir was big and the foundation of it was not uniform. To carry the soil, many villagers joined in the relay of the material; children were not an exception. They might have joined just for fun but it would be a considerable experience to take part in the process of construction as they are the potential irrigators in the future.

5) Foundation of a *Dambo*

Wooden poles were easily sunk by manual in most cases up to more than 50 cm depth. Even the wooden hummer, which is in fact another wooden pole, could drive the poles very easily deep into the foundation. From this observation, we can estimate there must be a very thick organic matter accumulated in the foundation. Though we cannot precisely estimate the thickness of the soft part

of the foundation without foundation investigation, e.g. core boring with N-value test, such soft foundation could hardly support the weight of permanent diversion structure, e.g. concrete weir. Therefore, unless foundation is replaced with good materials to some depth, permanent structure may not be an option for *dambo* areas. This may imply temporary diversion structure might be a sole option to raise and divert water to canal in *dambo* areas where organic matters have been thickly accumulated.

ATTACHMENT 1 MODULES (SCHEDULE OF ACTIVITIES)

DATE / TIME	ACTIVITIES	RESPONSIBLE
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Day 0 (April 15, Wed): Gathering to the training institute**Day 1 (April 16, Thu): Officer of the Day; Mr. K. Simukoko****Module 1 - Program Orientation**

8:00-8:30	Registration, and Pre-Training Knowledge Inventory	Ms. Christine
8:30-9:00	Opening, Self Introduction, and Overview of the Training	Mr. Zulu
9:00-10:00	Introduction to JICA Smallholder Irrigation Study	Mr. Hashi
10:00-10:15	Tea Break	

Module 2 - Smallholder Irrigation Facilities and Structures (in Lecture)

10:15-10:45	Identification of Potential Gravity Diversion Sites	Mr. Banda/Mwansa
10:45-11:30	Weir Type and Construction Method (Inclined Weir)	Mr. Banda
11:30-12:30	Weir Type and Construction Method (Single-line Weir)	Mr. Banda
12:30-13:00	Weir Type and Construction Method (Double-line Weir)	Mr. Mwansa
13:00-14:00	Lunch Break	
14:00-15:00	Weir Type and Construction Method (Trigonal Prop Weir)	Mr. Simukoko
15:00-15:30	Weir Type and Construction Method (Clay Soil Masonry Weir)	Mr. Phiri
15:30-15:45	Tea Break	
15:45-16:30	Canal Alignment and Construction	Mr. Mwansa
16:30-17:30	Ancillary Facilities	Mr. Machua

DAY 2 (April 17, Fri): Officer of the Day; Mr. Freddy Banda

7:30-8:30	Recapitulation (Clarification of Day 1 Activities)	Ms. Bulaya
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Module 3 - Smallholder Irrigation Facilities and Structures (Practice in Field)

8:30-14:00	Practice of Construction of a Weir in the Field	Mr. Banda
14:00-15:00	Lunch Break	
15:00-17:00	Practice of Canal Alignment	Mr. Mwansa

DAY 3 (April 18, Sat): Officer of the Day; Mr. Rodgers Phiri

8:00-8:30	Recapitulation	Mr. Simukoko
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Module 4 – On-farm Irrigation and Agriculture Aspects (in Lecture)

8:30-9:00	Organizing of Farmers	Mr. Simukoko
9:00-9:30	Land Allocation (dividing the land into members)	Mr. Simukoko
9:30-10:30	On-farm Irrigation Method	Mr. Banda
10:30-11:30	Compost Making	Ms. Bulaya

Module 5 – Entry Planning and Training Program Evaluation

11:30-12:30	Entry Planning Orientation Materials to be provided Reporting Mechanics Pro-forma of Site Profile Logistical Support	Mr. Zulu/Hashi
12:30-13:30	Lunch Break	
13:30-15:30	Entry Planning and Output Presentation by CEO/ District (WS)	Mr. Simukoko
15:30-15:45	Tea Break	
15:45-16:30	Dissemination Materials (Tech. Manual, Illustrations, Leaflet)	Ms. Bulaya
16:30-17:00	Training Program Evaluation	Mr. Phiri
17:00-17:30	Closing Program	Mr. Zulu

Day 4 (April 19, Sun): Home Sweet Home

ATTACHMENT 2 PARTICIPANT LIST**Venue: Kasama Farm Institute Date: April 16 – 18, 2009**

NO	NAME	TITLE	STATION (Office)	
			Province/District	Camp
1	Rodgers Phiri	Junior Technical Officer	Northern/Mbala	-
2	Machua Kaira	Junior Technical Officer	Northern/Mbala	-
3	Chansa Grace	Agricultural Assistant	Northern/Mbala	Lunzua
4	Nicholas Kapaya	Agricultural Assistant	Northern/Mbala	Mambwe Mission
5	Mary Nambela Mwape	Agricultural Assistant	Northern/Mbala	Senga Hill
6	Musaba Eugenia Sikazwe	Agricultural Assistant	Northern/Mbala	Luचेche
7	Nakoze T. Chizyuka	Junior Technical officer	Northern/Mpika	-
8	Fidelis Bwalya	Agricultural Assistant	Northern/Mpika	-
9	Mercy B. Khwabe	Agricultural Assistant	Northern/Mpika	Chintu
10	Mulengs Francis	Agriculture Assistant	Northern/Mpika	Chilonga
11	Freddy Banda	Chief Technical Officer	Northern/Mungwi	-
12	Josephine K. Mulenga	Agricultural Assistant	Northern/Mungwi	Ngulula
13	Carol Mwanza	Agricultural Assistant	Northern/Mungwi	Misamfu
14	Kenneth Zulu	Provincial Irrigation Engineer	Northern/Kasama	-
15	Simukoko Kelvin Mbokosi	Senior Technical Officer	Northern/Kasama	-
16	Annie Kalima Bulaya	Junior Technical Officer	Northern/Kasama	-
17	Frank Mwansa Mporokoso	Compassman	Northern/Kasama	
18	Ackson Mbewe	Junior Technical Officer	Northern/Kasama	Lukulu North Project
19	Kasalina Sanama	Agricultural Assistant	Northern/Kasama	Chitambi
20	Teddy Sikanyika	Horticulturist	Northern/Kasama	Kasama Farm Institute
21	Chomba Litepo	Junior Technical Officer	Northern/Mporokoso	-
22	Michelo N. Mweemba	Agricultural Assistant	Northern/Mporokoso	Kalabwe
23	Fred Mukaiwa	Junior Technical Officer	Northern/Luwingu	-
24	Bwalya Giles	Agricultural Assistant	Northern/Luwingu	Mufili
25	John Chilundika	Agricultural Assistant	Northern/Luwingu	Kapisha
26	Lishimba Elizabeth	Agricultural Assistant	Luapula/Kawambwa	Muyembe
27	Cryton Simbaya	Agricultural Assistant	Luapula/Kawambwa	Mbereshi
28	Chiona Noah	Agricultural Assistant	Luapula/Kawambwa	Salanga
29	Albert Kangwa	Agricultural Assistant	Luapula/Kawambwa	Shikalaba
30	Hendrix Ntalasha	Principal Technical Officer	Luapula/Kawambwa	-
31	Alex L. Kabwe	Provincial Irrigation Engineer	Luapula/Mansa	-
32	Chibalamuna Hosia	Principal Technical Officer	Luapula/Mansa	-
33	Alfred Mwamba	Agricultural Assistant	Luapula/Mansa	Kasomalweza
34	Musonda Marvin	Agricultural Assistant	Luapula/Mansa	Mazumba
35	Chalwe Ceasor	Agricultural Assistant	Luapula/Mansa	Mutumbusa

ATTACHMENT 3 COMMENTS ON EACH SESSION

1.1 Program Orientation (Opening T. Program)	Respondents
Fully Satisfied	27
Very Active	1
1.2 JICA Presentation (Introduction & Overview)	
Fully Satisfied	28
All introduced themselves	1
Language Pronunciations	1
Very Good Presentation	1
Observed time	1
2.1 Identification of potential gravity diversion sites	
Topics has been very interesting/satisfied	15
The facilitator should not be too fast and shout	4
First presenter not prepared	1
The presenter should facilitate and not avoid point emphasis. Need a topographic maps at camp level	1
Need to go to one suitable area	1
Improve on methods of tools for remote sensing instead of one too only	1
Improve in communication skills	1
Improve on idea coordination	1
Some more clarification required	1
2.2 Weir type & construction methods (Inclined weir)	
Successfully conducted and facilitated	27
Facilitator should give chance to participants to ask questions	1
Improve on the explanations	1
More on power point presentation needed	1
2.3 Weir type & construction methods(single Line Weir)	
Successfully facilitated	28
Very easily to maintain but needs modification by polythene	1
Information on the long line diameter must be made clear	1
Presentation was brief	1
2.4 Weir type & construction methods(Double Weir)	
Good presentation	28
To be dismantled by annually perennial basis to reduce labor and deforestation	1
Presentation too short leaving the participants doubting	1
All was understood. However this method has got no regard for other stream users.	1
2.5 Weir type & construction Method (Trigonal prop)	
Very interesting topic	31
Additional of polysheet before grass cover to minimize seepage	1
2.6 Weir type & construction methods (Soil Masonry)	
Satisfied	28
Few materials required, soil, rocks, sandbags	1
The presentation was too brief	1
It didn't seem to be a reliable method.	1
2.7 Canal Alignment and Construction	
Satisfied	28
Need practical in the field	1
Not very much needs to be done practically.	1
The presentation was good, but we need improved methods –like GPS	1
2.8 Ancillary facilities	
Very good presentation	30
It was an eye opener on the challenges to be faced in the field	1
Presentation not very clearly exhausted, needs to research more	1
Day-2	
3.1 Practice of construction of Weir (s)	
Practical were conducted successfully	27
Experience was ok although work was not fully completed	1
Approach and discussion not involved the community, avoid commanding other officers	1
There is need to improve the double-line weir	1
The use of clay soil as a sealant may not always be very good	1
3.2 Practice of Canal alignment	
The exercise was ok and interesting	29
The distance from the canal alignment to be 10+ where obstacles arise	1

The practice was okay. Unfortunately it was involving a lot of obstacles encountered.	1
Day-3	
4.1 Organizing of farmers	
Well presented	29
Approach village headman/local leadership, and then conduct it in one to two days time.	1
4.2 Land Allocation	
Successful presentation	29
Involve local leadership facilitate classically done	1
Presentation very good.	1
4.3 On-farm irrigation method and Discharge	
The presentation was successful	16
Need for a practical demonstration	8
The facilitator should take his time	1
Need to improve on communication skills	1
Need more clarification	1
The presenter took it as if everyone knew what he was talking about, thus much points were left.	1
Not satisfied, the presenter too fast	1
4.4 Compost making	
Presentation was very ok	21
Need for a practical demonstration	5
Introduce to farmers on a small scale	1
Need to summarize the presentation	1
BOCASHI- a bit complicated	1
The use of rice as bocashi doesn't seem to very viable in our set up. Suggest the use of left over nshima.	1
5.1 Entry planning and Orientation	
Successfully facilitated	29
ASP fuel was given considering proximity and Bike consumption	1
Some activities were not well presented	1
5.2 Entry planning and output presentation	
Well presented	31
Some adjustments were made	1
5.3 Dissemination Materials	
Presented very well	26
Received required materials for field work	1
Carrier bags can't be carried on the back, easy to lose	1
Materials for use in the WS were adequate	1

ATTACHMENT 4 COMMENTS ON ISSUES, LOGISTICS, THEORY, PRACTICE, PARTICIPATION

1. Present your overall degree of satisfaction relative to the training content as a whole	Respondent
Very satisfied	16
Need more practical	5
Some facilitator need to improve in their presentation	4
Very satisfied but need more explanation on the farm irrigation methods (discharge measurement)	2
In future field work should be two days	1
There is need to increase in terms of duration so that action planning takes a full day	1
Some lesson needed practice e.g. compost making	1
Training went well but proper coordination from participants and facilitators be arranged	1
2. Present your overall degree of satisfaction relative to Logistics	
The place has poor water reticulation system in the ablution. Hospitality not good	12
Improvement on the lodging and allowances e.g. like GRZ	7
All materials were available	6
Change of venue	4
Carrier bags be improved on because they drop when using the motor bike.	1
The first are always omitted, please include in the allowance.	1
Need to improve on the transportation (bus) after the lessons	1
As the performance of our work in the field is satisfied, we hope conditions to improve for motivation	1
Venue was good but management should check on their schedule so as not to be inconvenience as it was	1
Payment at least K150,000.00 per night	1
3. How much do you think has the training program met in theory?	
Very successful and learnt new technology	24
Some topics were not well presented	4
Time needs to be increased/observe time	2
I did very well because theory was put into practice	1
Theory must be given to participant in time	1
4. How do you think has training program met in practice?	
Very successful	11
Practical should have been for two days/ more	7
Work not completed	1
People didn't practice the discharge measurement and compost making	1
To conduct some water technical training	1
Weir construction and canal alignment	1
Local materials must be put in place before the actual date of doing the practices.	1
Practice were a good experience	1
I thought I could not know new ideas at the beginning	1
The all expected materials for the practiced were in place.	1
Almost all topics should be accompanied by practical activity	1
Other group did not do the canal alignment, only carrying soil clots	1
Some areas were not done	1
Practical on on-farm irrigation not achieved and compost making either	1
Award certificate for attendance	1
5. How do you think has the training program met in your participation	
Participation was very good both in theory and practices	30
I was able to contribute without interference	1
I have known as I expected	1
Facilitators explained very well to my questions and doubts	1
6. How do you think this program be best improved in future?	
Extension of the training period (say 5 weekdays) rather than holding it on	8
The program can be improved in future if only more practices can be done	6
To change the venue to Luapula	4
Allowance to be paid on arrival day	3
Allowances should be improved on regular basis to refresh the officers	3
More exposure visits	3
By involving other experienced officers within the group to share their experience	2
Can be improved of other stake holders' participants (like agronomist, market officers etc.)	2
Include more camp officers	1
Interactions with Luapula province in the sense that Northern travels to Luapula	1
Change the venue	1
Groups to be split into small so that each participants should be actively involved	1
Motivation of any kind	1
Include other components like conservation agriculture and the use of treadle pumps and other pumps	1
Prepare training models in advance (for demos) in field irrigation layout	1

ATTACHMENT 4 PHOTOS



These are the participants from 2 provinces, a total 35 officers for the 3-day kick-off training on temporary structures.



A trainer is presenting how to identify ideal potential sites for gravity diversion.



Each session has a specific trainer, all of whom are government officers trained by the team in TOT beforehand.



A team member is now topping up some tips on what was presented by trainers.



Provincial Engineer of Northern province is elaborating how this trilateral prop can support the body of a brush dam.



A team member is recapitulating what was taught during the previous day, as the priming up of the day's activities.



A trainer is elaborating what the ancillary facilities are and those construction methods with PP prepared by the Team.



A trainer is summing up the targets set by the participants for improvement and new development in 2009 dry season.



Participants are practicing construction of a temporary diversion weir, putting clay soils beneath the weir body.



Trainees are constructing the temporary brush dam, made out of locally available materials.



Trainees are reading spirit level hung on the line, getting suitable gradient for canal which can deliver water by gravity.



Canal was dug according to the counter set by line-leveling, and the water starts flowing by gravity.